
**Epicycas** de Laubenfels.

Morphological characters and geographical distribution are the same as those for the family. The angle of insertion of the leaflets to the rachis is that formed between the leaflet and the longitudinal axis of the rachis. Features of leaflets in 1-pinnate leaved species refer to those of the middle part of the leaf blade.

1a. Leaves 2- or 3-pinnate; leaflets dichotomously forked.

2a. Leaves 2-pinnate; leaflets dichotomously 1(–3)-forked into linear, often irregular segments (ultimate leaflets), each 10–38 cm with apex attenuate to long acuminate ................................................................. 3. C. micholitzii

2b. Leaves 3-pinnate; secondary leaflets dichotomously (2 or)3–5-forked into linear, regular segments.

3a. Leaves 1(or 2), to 7 m; segments obovate-linear, apex shortly acuminate to caudate; sterile blade of megasporophylls with 25–35 subulate lobes ............................................................... 1. C. multipinnata

3b. Leaves (3–)5–11(–15), to 2.7 m; segments linear, apex long attenuate or long acuminate; sterile blade of megasporophylls with 39–51 filiform lobes ......................................................... 2. C. debaoensis

1b. Leaves 1-pinnate; leaflets simple.

4a. Leaves strongly “V”-shaped in cross section, longitudinally recurved; margin of leaflets revolute (slightly recurved in *C. taitungensis*).

5a. Trunk not tomentose at apex; bark pale gray, smooth toward base of trunk; mature leaflets glaucous ............................................................................................................................................. 15. C. hongheensis

5b. Trunk densely tomentose at apex; bark black, scaly; mature leaflets not glaucous.

6a. Leaflets strongly recurved along margin; sterile blade of megasporophyll ovate to narrowly so, deeply lacinate; sclerotesta of seed not grooved on sides ....................................................... 6. C. revoluta

6b. Leaflets flat or slightly recurved along margin; sterile blade of megasporophyll suborbicular or rhombic-orbicular, pectinate; sclerotesta of seed with 2 or 3 irregular grooves on each side 7. C. taitungensis

4b. Leaves flat to inconspicuously “V”-shaped in cross section, longitudinally flat; margin of leaflets not revolute (except in *C. ferruginea*).

7a. Trunk subterranean, base not swollen; median leaflets (12–)18–25 mm wide, margin often undulate; median microsporophylls blunter.

8a. Petioles green in 1st year; megasporophylls 5–15(–20), loosely grouped, sterile blade divided into 15–25 lobes ............................................................................................................................................. 4. C. balansae

8b. Petioles blue in 1st year, later green; megasporophylls 25–50, densely grouped, divided into 33–45 lobes ............................................................................................................................................. 5. C. segmentifida

7b. Trunk not subterranean (or, if so, then base swollen); median leaflets 6–11(–14) mm wide, margin flat (revolute in *C. ferruginea*); median microsporophylls spinose.

9a. Leaves (0.7–)1–3 m × 30–60 cm; terminal lobe of sterile blade of megasporophyll usually flattened.

10a. Trunk inflated; bark white-gray, nearly smooth toward base of trunk; median leaflets often less than 10 mm wide; petiole densely spinose from base upward; seeds 3.5–4.5 cm 9. C. hainanensis

10b. Trunk cylindric; bark dark, scaly; median leaflets often more than 11 mm wide; petiole without spines or with sparse spines near base; seeds 2.5–3 cm.

11a. Leaflets longitudinally inserted at 55–75° to rachis; apex of cataphylls with hard point; sterile blade of megasporophyll rhombic-ovate; sclerotesta of seed finely verrucose ........................................................................................................................................ 10. C. taiwaniana
11b. Leaflets longitudinally inserted at ca. 50° to rachis; apex of cataphylls with soft point; sterile blade of megasporophyll broadly ovate, obovate, or suborbicular; sclerotesta of seed smooth .......................................................... 11. *C. szechuanensis*

9b. Leaves 0.5–1(–1.3) m × (12–)20–30(–40) cm; terminal lobe of sterile blade of megasporophyll subulate, not flattened.

12a. Trunk cylindric, 1–7 m; bark white-gray, gray, or brown, scaly or raised; pollen cones (25–)30–45 × 8–15 cm, microsporophylls 3.5–6 cm; megasporophylls 13–20 cm.

13a. Trunk often dichotomously branched toward apex, to 16 m, apex not tomentose; bark gray or white-gray, smooth toward base of trunk; leaflets with midvein sulcate adaxially and margin revolute to slightly recurved; seeds 4.5–6 × 4–4.7 cm .................. 16. *C. pectinata*

13b. Trunk simple, to 2(–3) m, apex densely tomentose; bark brown to dark gray, scaly; leaflets with midvein never sulcate adaxially and margin flat to slightly recurved; seeds 2.5–3.5 × 2.2–3 cm .......................... 8. *C. panzhihuaensis*

12b. Trunk subterranean, base swollen; bark gray, smooth; pollen cones 20–30 × 6–8 cm, microsporophylls 1.5–3 cm; megasporophylls 8–14 cm.

14a. Leaflets longitudinally inserted at 55–65° to rachis; petiole with 9–16 spines along each side throughout length (SW Hainan) ......................... 14. *C. changjiangensis*

14b. Leaflets longitudinally inserted at ca. 90° to rachis; petiole with 0–8(or more) spines along each side often only in apical part (W Guangxi).

15a. Young leaves densely rusty brown tomentose abaxially; leaflets not overlapping, light green at maturity, 20–30 cm × 5–12 mm, base attenuate, margin strongly revolute ........................................................ 12. *C. ferruginea*

15b. Young leaves sparsely red-brown tomentose abaxially; leaflets often overlapping, dark green at maturity, 10–18 cm × 14–18 mm, base usually truncate, margin flat or only slightly revolute ........................................... 13. *C. miquelii*


多歧苏铁 duo qi su tie

*Cycas longipetiolula* D. Y. Wang; *Epicycas multipinnata* (C. J. Chen & S. Y. Yang) de Laubenfels.

Trunk almost subterranean, to 40 × 20 cm above ground; bark brown-gray, scaly. Leaves 1(or 2), 3-pinnate, trullate in outline, flat, 3–7 m × 60–100 cm; petiole subterete, 1.5–2.5 m × 3–6 cm; spines 30–50 along each side, 3–6 cm apart, compressed conical, 3–5 mm; primary leaflets in 12–22 pairs, longitudinally inserted at 60–90° to primary rachis, lanceolate, slightly “V”-shaped in cross section at 100–130° to rachis; middle leaflets largest, 35–60 × 15–20 cm; basal and apical leaflets gradually shorter, 20–40 × 10–15 cm; secondary leaflets flavellate or obtriancular, dichotomously (2 or)3–5-forked, 20–22 × 5–15 cm, with petiolule 0.5–5 cm; segments (ultimate leaflets) obovate-linear, regular, 7–12 × 1–2 cm, papery, midvein slightly elevated on both surfaces, base decurrent, glabrous, margin entire or somewhat wavy, apex shortly acuminate to caudate. Pollen cones fusiform-cylindric, 15–23 × 4–6 cm; microsporophylls 1.2–2 cm × 8–10 mm, tomentose, apex acute. Megasporophylls 8–12 cm, brown tomentose, glabrescent; stalk ca. 4 cm; sterile blade triangular-ovate, 4–7 × 3–6.5 cm, deeply divided into 25–35 subulate lobes 1–3.5 cm; ovules 3–5 on each side of stalk. Seeds 6–10, greenish to yellowish, obovoid, slightly compressed, 2.5–3.2 × 2.3–2.8 cm; sclerotesta finely verrucose, apex mucronate. Pollination Apr–May, seed maturity Oct–Nov.

- Red soil over granite or limestone in somewhat shaded monsoon forests along valleys; 200–1000 m. SE Yunnan (Gejiu Shi, Hekou Yaozu Zizhixian, Mengzi Xian, Pingbian Miaozu Zizhixian).
- This and *Cycas debaeaeusis*, with their 3-pinnate leaves, are the most distinct of all extant cycads. *Cycas multipinnata* is also one of the most endangered cycads in China, mainly as a result of over collection by commercial dealers and habitat damage as forests are opened up for farmland. If conservation measures are not taken immediately, the species will most likely become extinct in the wild within the next ten years.

德保苏铁  de bao su tie

Trunk almost subterranean, to 40(–70) × 25(–40) cm above ground, sometimes clumped; bark brown-gray, scaly toward apex of trunk, subsmooth toward base. Leaves (3–)5–11 (–15), 3-pinnate, ovate in outline, ± openly “V”-shaped in cross section at 110–150° between leaflets, 1.3–2.7 × 0.5–1.5 cm; petiole obovate-oblanceolate in cross section, 0.6–1.3 m × 1.5–3 cm, tomentose when young, later glabrous except at base, spiny except at base; spines 20–55 along adaxial part of each side, 1–4.5 cm apart, conical, 3–4 mm; primary leaflets in 6–14 pairs, 3–12 cm apart, middle leaflets subopposite, longest, 40–70 × 20–27 cm, “V”-shaped in cross section at 70°–90° between secondary leaflets, basal and apical leaflets alternate, gradually smaller toward base and apex of leaf blade, 17–50 × 10–23 cm; secondary leaflets in 3–5 pairs, ovate to oblong, each leaflet with subulate lobes 1–2 cm; ovules 1 or 2 on each side of deeply divided leaflet, 39–51 filiform lobes 3–6 cm, subcordate or subflabellate, 6–9 × 5–10 cm, glabrescent, 18–25 cm in diam.; stalk 9–12 cm; sterile blade green, yellow-brown tomentose, forming an oblate group mucro. Megasporophylls 30–50, laxly grouped, 15–20 cm, densely brown tomentose, apex acuminate. Pollination Apr–May, seed maturity Oct–Nov.

• Thickets and sparse forests of small trees on dry, sunny, open slopes of limestone hills; 700–1000 m. NW Guangxi (Debao Xian).


叉叶苏铁 cha ye su tie

*Cycas micholitzii* f. distichus Z. T. Guan; *C. micholitzii* f. stonensis (S. L. Liang) Z. T. Guan; *C. micholitzii* var. stonensis S. L. Liang; *C. multifrondis* D. Y. Wang; *C. rumphii* Miquel var. *bifida* Dyer; *Epicycas micholitzii* (Dyer) de Laubenfels.

Trunk almost subterranean, to 60 × 20 cm above ground, base swollen; bark dark gray, scaly, except at base of trunk where nearly smooth. Leaves 3–8, 2-pinnate, flat, 2–3(–4) m × 40–60 (–80) cm; petiole 0.5–1(–2) m, with sparse, short spines; leaf blade glaucous when young, flat; leaflets dichotomously forked, 1 (–3) forked into 1 or 2 (or 3) segments; segments linear, often irregular, 10–38 × 1.5–3 cm, papery, base constricted into a short petiolule 0.5–5 cm, decurrent, margin somewhat undulate, apex attenuate to long acuminate. Cataphylls broadly deltoid, 3–4 × 4–5 cm, densely brown velutinous. Pollen cones fusiform-cylindric, 15–23 × 4–6 cm; microsporophylls 1.2–2 cm × 8–10 mm, tomentose, apex acute. Megasporeophylls 8–12 cm, brown tomentose, glabrescent; stalk ca. 4 cm; sterile blade obovate, ca. 4 × 3 cm, deeply divided into 13–17 subulate lobes 1–2 cm; ovules 1 or 2 on each side of stalk. Seeds 2–4, greenish to yellowish, obvoid, slightly compressed, 2.3–2.8 × 1.8–2.4 cm; sclerotesta finely verrucose, apex mucronate. Pollination Apr–May, seed maturity Oct–Nov.

Semishaded thickets, broad-leaved monsoon forests; 130–600 m. W Guangxi, SE Yunnan [Laos, Vietnam].

Endangered in China as a result of over collection by commercial dealers and habitat destruction.


宽叶苏铁 kuan ye su tie


Trunk subterranean, to 40 × 35 cm above ground; bark dark brown, densely scaly. Leaves 5–20 (–30), 1-pinnate, 1.5–3 m × 40–60 cm; petiole green in 1st year, 20–70 cm, suberet, with 10–25 spines 3–8 mm along each side, 2–6 cm apart; leaf blade oblong, flat; leaflets in 20–75 pairs, longitudinally inserted 1–3 cm apart at 60–100° to rachis, straight, 20–38 × (1.2–)1.8–2.5 cm, papery, base constricted into a very short petiolule, margin flat or somewhat undulate, apex long acuminate. Cataphylls triangular, 4–6 × 1.2–1.5 cm, brown tomentose. Pollen cones subcylindric, 15–25 × 4–7 cm; microsporophylls broadly cuneate, 1.4–1.7 cm × 7–10 mm, pale brown tomentose abaxially, apex of median microsporophylls shortly acute, blunt. Megasporeophylls 5–15 (–20), loosely grouped, 9–13 cm,
pale brown tomentose, glabrescent; stalk 5–7 cm; sterile blade broadly ovate, subcordate, or rarely obovate, 3.5–5.5 × 2.5–5 cm, deeply divided into 15–25 subulate, pointed lobes 2–3.5 cm, terminal lobe somewhat flattened, 2.5–4 cm; ovules 2 or 3 on each side of distal part of stalk, glabrous. Seeds often 2, yellowish when fresh, brown when dry, broadly ovoid or ellipsoid, 1.8–2.7 × 1.5–2.5 cm; sclerotesta smooth. Pollination Mar–May, seed maturity Sep–Nov.

Lateritic soil in monsoon forests, deep sand on limestone-derived soil in forests; 100–800 m. S Guangxi (Fangcheng Gezu Zizhixian), S Yunnan [Laos, Myanmar, Thailand, Vietnam].

There are taxonomic problems with the species delimitation of Cycas balansae, particularly of fertile specimens. Chinese plants of C. balansae have been misidentified as C. simplexpinna (e.g., in FRPS). The latter species occurs only in Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam.


叉孢苏铁


Trunk subterranean, to 70 × 70 cm above ground; bark dark brown, densely scaly. Leaves 15–25, 1-pinnate, 2–3.3 m × 45–60 cm; petiole blue in 1st year, later green, 0.6–1.5 m, subterete, with 25–55 spines (1–)2–3.5 mm along each side, 1–2.5 cm apart; leaf blade oblong, flat, pale brown tomentose when young; leaflets in 55–110 pairs, horizontally inserted at ca. 45° to rachis, straight, 21–40 × 1.2–1.8 cm, leathery, glabrous abaxially, midvein raised on both surfaces only when fresh, flat abaxially when dry, base decurrent, margin flat or somewhat undulate, apex attenuate, pubescent. Cataphylls triangular, 7–9 × 1.5–2.5 cm, densely pale brown tomentose, apex long, somewhat soft. Pollen cones yellow, narrowly ellipsoid-cylindric, 30–60 × 5–12 cm; microsporophylls narrowly cuneate, 2–2.5 × 1–1.2 cm, apex with short, upcurved mucro or nearly blunt. Megasporophylls 25–50, densely grouped, 10–16(–20) cm, pale brown tomentose; stalk 6–9(–13) cm, yellowish brown tomentose; sterile blade ovate, broadly ovate, or cordate-ovate, 5–9 × 4–8(–11) cm, margin glabrescent and pectinate, with 33–45 sometimes forked lobes 1.5–7 cm, terminal lobe subulate to rhombic-lanceolate, 2–7 cm × 2–8 mm, margin usually irregularly serrulate; ovules (1 or)2 or 3 on each side of distal part of stalk, glabrous. Seeds (2 or)3–5, pale yellowish, globose or broadly obovoid, slightly compressed, 2.8–3.5 × 2.6–3 cm, base contracted into point; sclerotesta finely verrucose. Pollination Mar–Jun, seed maturity Nov–Dec.

Lateritic soil derived from sandstone in semishade of broad-leaved or mixed forests; 600–900 m. S Guizhou, W Guangxi, SE Yunnan (Funing Xian).

Differs from Cycas szechuanensis in its subterranean trunk, blue young petioles, and wider leaflets. As defined here, C. segmentifida is close to C. balansae, but is a wide-ranging, more northern species, differing in its blue young petioles, with much shorter spines, and its more numerous megasporophylls (30–50 together), with more lobes on the sterile blade.


苏铁

Trunk to 3(–)8 m × 45(–)95 cm, base and sometimes distal part with numerous adventitious lateral branches or bulbils, apex tomentose; bark gray-black, scaly. Leaves 40–100 or more, 1-pinnate, 0.7–1.4(–1.8) m × 20–25(–28) cm; petiole subtetragonal in cross section, 10–20 cm, with 6–18 spines along each side; leaf blade oblong-elliptic-lanceolate, strongly “V”-shaped in cross section, recurved, brown tomentose when young; leaflets in 60–150 pairs, horizontally inserted at ca. 45° above rachis, not glaucous when mature, straight to subfalcate, 10–20 × 4–7 mm, leathery, sparsely pubescent abaxially, basal decurrent, margin strongly recurved, apex acuminate, pungent. Cataphylls triangular, 4–5 × 1.5–2.3 cm, densely brown tomentose, apex acuminate. Pollen cones pale yellow, ovoid-cylindric, 30–60 × 8–15 cm; microsporophylls narrowly cuneate, 3.5–6 × 1.7–2.5 cm, apex rounded-truncate, cuspidate. Megasporophylls yellow to pale brown, 14–22 cm, densely tomentose; stalk 7–12 cm; sterile blade ovate to narrowly so, 6–11 × 4–7 cm, deeply laciniate, with 21–35 lobes 1–3 cm; ovules 2 or 3 on each side of stalk, densely pale brown tomentose. Seeds 2(–5), orange to red, obovoid or ellipsoid, somewhat compressed, (3–)4.5 × 2.5–3.5 cm, sparsely hairy; sclerotesta not grooved on sides. Pollination May–Jul, seed maturity Sep–Oct.

Thickets on hillsides on islands, sparse forests on mainland; 100–500 m. Fujian (Lianjiang Xian, Ningde Xian, and some islands) [S Japan (Kyushu, Ryukyu Islands)].

A vulnerable, if not endangered, species in China. Its formerly wide distribution in E Fujian has now been severely reduced as a result of over collection by commercial dealers and habitat destruction. It was sporadically distributed in Fujian in the 1960s, but it is now uncertain that any wild populations still exist. Cycas revoluta is the most commonly cultivated cycad because of its ornamental appearance, hardiness, and adaptability.


台东苏铁

Trunk sometimes branched, to 5 m × 45 cm, apex very tomentose; bark black, scaly. Leaves to 50 or more, 1-pinnate, (1.1–)1.3–1.6(–2) m × 20–30(–40) cm; petiole (10–)15–25 (–30) cm, subtetragonal in cross section,
with 7–14 spines along each side; leaf blade oblong, strongly "V"-shaped in cross section, recurved, densely orange-brown tomentose when young; leaflets in 130–200 pairs, horizontally inserted at 55–65° above rachis, straight to subfalcate, not glaucous when mature, 14–20 cm × 5–8 mm, leathery, sparsely pubescent abaxially, base decurrent, margin flat or slightly recurved, apex attenuate, pungent. Cataphylls triangular, 4–7 × 1.7–2.5 cm, densely pale brown tomentose, apex pungent. Pollen cones ovoid-cylindric, 45–55 × 8–13 cm; microsporophylls narrowly obtriangular, 3.5–4.5 × 1.1–1.5 cm, apex cuspidate. Megasporophylls bright orange-red, spadelike, 15–28 cm, pale brown tomentose, glabrescent; stalk 8–17 cm; sterile blade suborbicular or rhombic-orbicular, 7–14 × 6–11 cm, pectinate, with 29–39 lobes 2–4.5 cm; ovules 2(or 3) on each side of stalk, densely pale brown tomentose. Seeds 2–6, orange-red, narrowly obvovoid or subellipsoid, 4–5 × 2.5–3.3 cm, often with remnant hairs; sclerotesta with 2 or 3 irregular grooves on each side. Pollination Apr–Jun, seed maturity Sep–Oct.

Plants now treated as Cycas taiwaniaensis were formerly misidentified as C. taiwaniaensis, a species occurring in Guangdong, E Guangxi, SW Hunan, SE Yunnan, and possibly Vietnam.


Cycas baguanheensis

Plants now treated as Cy. taiwaniaensis were formerly misidentified as C. taiwaniaensis, a species occurring in Guangdong, E Guangxi, SW Hunan, SE Yunnan, and possibly Vietnam.

Trunk cylindric, simple, to 2(–)3 m × 25(–30) cm, apex densely tomentose; bark brown to dark gray, scaly. Leaves 30–60(–80), 1-pinnate, 0.7–1.3 m × 18–25 cm; petiole suborbicular in cross section, 7–20 cm, with 5–13 spines along each side of apical part, base densely brown tomentose; leaf blade oblong, flat to irregularly and slightly "V"-shaped in cross section, brown tomentose when young; leaflets in 70–120 pairs, longitudinally inserted at 50–60° to rachis, straight to slightly falcate, 12–20 cm × 6–7 mm, leathery, glabrous, midvein never sulcate adaxially, base decurrent, margin flat or slightly recurved, apex acuminate, pungent. Cataphylls triangular-lanceolate, 6–9 × 2.2–2.5 cm, densely brown tomentose. Pollen cones fusiform- or ovoid-cylindric, 25–45 × 8–12 cm; microsporophylls narrowly cuneate, 4–6 × 1.8–2 cm, apex broadly rounded, shortly cuspidate. Megasporophylls more than 30, tightly grouped, 15–20 cm, densely brown tomentose; stalk 8–12 cm; sterile blade rhombic or rhombic-ovate, 8–10 × 4–6 cm, margin glabrescent and pectinate, with 23–41 subulate lobes 1–3 cm, terminal lobe subulate, longer than lateral lobes; ovules 2 or 3 on each side of distal part of stalk, glabrous. Seeds 2–4, bright orange-red when mature, globose or obovoid-globose, slightly compressed, 2.5–3.5 × 2.2–3 cm, apex shortly mucronate; sclerotesta smooth, shortly mucronate. Pollination Apr–May, seed maturity Sep–Oct.

Grassy places and thickets with sparse trees on limestone and sand shale along the arid Jinsha Jiang valley; 1100–2000 m. SW Sichuan, N Yunnan.

An endangered species.

9. Cycas hainanensis

C. hainanensis

C. pan zhi hua su tie

Trunk cylindric, simple, to 1.5(–2) m × ca. 40 cm, inflated toward base; bark dark gray and scaly toward apex of trunk, white-gray and nearly smooth toward base. Leaves 50–80, 1-pinnate, 1.2–2 m × 30–50 cm; petiole rhomic in cross section, 20–70 cm, with 50–80 spines along each side from base upward; leaf blade elliptic-oblong, flat; leaflets in 50–80 pairs, longitudinally inserted 0.8–1.5 cm apart at 40–50° to rachis, straight, 15–30 cm × 6–9(–11) mm, leathery, glabrous axially, base decurrent, margin flat or slightly recurved, apex acuminate, pungent. Cataphylls triangular, 5–5.5 × 2–2.3 cm, densely brown tomentose, apex abruptly tapered into a long point, soft and recurved when fresh, becoming hard and straight when dry. Pollen cones unknown. Megasporophylls more than 30, tightly grouped, 14–20 cm, brown tomentose; stalk 7–12 cm; sterile blade greenish, ovate or broadly so, 6.5–9 × 6–9(–12) cm, glabrescent, margin pectinate, with 13–27 lobes 1–3 cm, terminal lobe flattened, oblong or triangular, 2.3–(4) × 0.7–2(–3) cm, remotely serrulate; ovules 1 or 2 on each side of distal part of stalk, glabrous. Seeds greenish to yellowish, broadly ovoid or subglobose, slightly compressed, 3.5–4.5 × 2.8–3.6 cm; sclerotesta finely verrucose. Pollination Mar–May, seed maturity Sep–Oct.

Tropical jungles and thickets with sparse trees; 100–1000 m. Hainan.

10. Cycas taiwaniaensis

C. taiwaniaensis

Grass jungles and thickets with sparse trees; 100–1000 m. Hainan.

Cycas taitungensis

C. revoluta

Griffith subsp. taiwaniana (Carruthers) Schuster.

Cycas diannanensis

C. pectinata

C. revoluta

Thunberg var. taiwaniaensis (Carruthers) Schuster.

Cycas hainanensis

C. pan zhi hua su tie

Trunk cylindric, to 3.5 m × 35 cm; bark dark brown or gray-brown, scaly. Leaves 60–90, 1-pinnate, 1.5–3 m × 40–60 cm; petiole obovate in cross section, 40–120 cm, with 30–60 spines along each side of basal part, glabrous; leaf blade oblong, flat, orange-brown tomentose when young; leaflets in 70–150 pairs, horizontally inserted at 55–75° above rachis, 20–70 cm × 6–9(–11) mm, leathery, glabrous axially, base decurrent, margin flat or slightly recurved, apex acuminate, pungent. Cataphylls triangular, 5.5–7 × 2–2.3 cm, densely brown tomentose, apex abruptly tapered into a long point, soft and recurved when fresh, becoming hard and straight when dry. Pollen cones unknown. Megasporophylls more than 30, tightly grouped, 14–20 cm, brown tomentose; stalk 7–12 cm; sterile blade greenish, ovate or broadly so, 6.5–9 × 6–9(–12) cm, glabrescent, margin pectinate, with 13–27 lobes 1–3 cm, terminal lobe flattened, oblong or triangular, 2.3–(4) × 0.7–2(–3) cm, remotely serrulate; ovules 1 or 2 on each side of distal part of stalk, glabrous. Seeds greenish to yellowish, broadly ovoid or subglobose, slightly compressed, 3.5–4.5 × 2.8–3.6 cm; sclerotesta finely verrucose. Pollination Mar–May, seed maturity Sep–Oct.

Trunk cylindric, simple, to 2(–)3 m × 25(–30) cm, apex densely tomentose; bark brown to dark gray, scaly. Leaves 30–60(–80), 1-pinnate, 0.7–1.3 m × 18–25 cm; petiole suborbicular in cross section, 7–20 cm, with 5–13 spines along each side of apical part, base densely brown tomentose; leaf blade oblong, flat to irregularly and slightly "V"-shaped in cross section, brown tomentose when young; leaflets in 70–120 pairs, longitudinally inserted at 50–60° to rachis, straight to slightly falcate, 12–20 cm × 6–7 mm, leathery, glabrous, midvein never sulcate adaxially, base decurrent, margin flat or slightly recurved, apex acuminate, pungent. Cataphylls triangular-lanceolate, 6–9 × 2.2–2.5 cm, densely brown tomentose. Pollen cones fusiform- or ovoid-cylindric, 25–45 × 8–12 cm; microsporophylls narrowly cuneate, 4–6 × 1.8–2 cm, apex broadly rounded, shortly cuspidate. Megasporophylls more than 30, tightly grouped, 15–20 cm, densely brown tomentose; stalk 8–12 cm; sterile blade rhombic or rhombic-ovate, 8–10 × 4–6 cm, margin glabrescent and pectinate, with 23–41 subulate lobes 1–3 cm, terminal lobe subulate, longer than lateral lobes; ovules 2 or 3 on each side of distal part of stalk, glabrous. Seeds 2–4, bright orange-red when mature, globose or obovoid-globose, slightly compressed, 2.5–3.5 × 2.2–3 cm, apex shortly mucronate; sclerotesta smooth, shortly mucronate. Pollination Apr–May, seed maturity Sep–Oct.

Grassy places and thickets with sparse trees on limestone and sand shale along the arid Jinsha Jiang valley; 1100–2000 m. SW Sichuan, N Yunnan.

An endangered species.
Pollen cones ovoid or ellipsoid-cylindric, 30–45 × 8–10 cm; microsporophylls narrowly cuneate, 2–3 cm × 5–8 mm; apex obtuse-rounded, with very short, upcurved micro. Megasporophylls more than 30, tightly grouped, 15–22 cm, pale brown tomentose; stalk 8–12 cm; sterile blade rhombic-ovate, 7–12 × 6–7 cm, margin glabrescent and pectinate, with (11–)23–47 lobes 2–3.5 cm, terminal lobe ± flattened, 2–3.5 cm × 5–10 mm, margin usually irregularly serrulate, apex acute; ovules 2 or 3 on each side of distal part of stalk, glabrous. Seeds 2–4, pale yellowish, globose, or broadly obovoid, slightly compressed, 2.8–3.3 × 2.5–3 cm; sclerotesta finely verrucose. Pollination Apr–May, seed maturity Sep–Nov.

Sunny, grassy places or sparse, mixed forests, often disturbed places, long cultivated in S China but now only sporadically distributed in the wild; 400–1100 m. Guangdong, E Guangxi, SE Yunnan [?Vietnam].


南盘江苏铁

Trunk to 2.9–(5) m × 40–(50) cm; bark dark gray, scaly. Leaves 60–90, 1-pinnate, 1–2.5(–3) m × 35–50 cm; petiole subtubercle in cross section, 40–70 cm, with 25–50 spines along each side; leaf blade oblong, flat, pale brown villous when young; leaflets in 60–120 pairs, longitudinally inserted at ca. 50° to rachis, straight or slightly falcate, 15–35 × 0–1.3 cm, thick, leathery, glabrous, midvein strongly raised on both surfaces, base decurrent, margin flat or slightly recurved, apex acuminate. Cataphylls triangular, 3–4 × 1–1.3 cm, brown tomentose, apex soft. Pollen cones ovoid-fusiform, 20–30 × 6–8 cm; microsporophylls broadly cuneate, 1.5–3 × 1.2–1.5 cm, apical (sterile) part subrhombic, thickened, densely pale brown tomentose, margin inconspicuously toothed, apex with upcurved micro. Megasporophylls more than 30, tightly grouped, 8–14 cm, tawny tomentose; stalk 4.5–7.5 cm; sterile blade rhombic-ovate, 3.5–5.5 × 3–5 cm, margin glabrescent and pectinate, with 17–31 subulate lobes 1–3 cm, terminal lobe subulate, 3–4 cm; ovules 2 or 3 on each side of stalk, glabrous. Seeds 2–4, yellowish when fresh, brown when dry, obovoid or subglobose, 2.2–2.8 × 1.8–2.5 cm, apex mucronate; sclerotesta smooth. Pollination Mar–Apr, seed maturity Aug–Oct.

Semishaded, rocky crevices in broad-leaved forests in limestone mountains; 200–500 m. W Guangxi [Vietnam].


锈毛苏铁 xiu mao su tie
Cycas ferruginea Hung T. Chang & al.; C. sexseminifera F. N. Wei; C. spiniformis J. Y. Liang; Cycas miqueli warburg (Warburg) de Laubenfels.

Trunk generally subterranean, sometimes to 60 × 25 cm above ground, base swollen; bark dark gray and scaly toward apex of trunk, white-gray and nearly smooth toward base. Leaves 25–40, 1-pinnate, 1–2 m × 25–55 cm; petiole suberete, 30–70 cm, with (0)–8–21 spines along each side, densely rusty brown tomentose when young; leaf blade oblong, flat; leaflets in 60–100 pairs, longitudinally inserted at ca. 90° to rachis, not overlapping, straight or downcurved, 13–18 cm × 5–12 mm, papery to subleathery, densely red-brown tomentose abaxially when maturing, later becoming light green and sparsely tomentose, midvein raised on both surfaces, base attenuate, symmetric, margin strongly revolute, apex acute to acuminate, somewhat soft at maturity. Cataphylls triangular, 3–4 × 1–1.3 cm, brown tomentose, apex soft. Pollen cones ovoid-fusiform, 20–30 × 6–8 cm; microsporophylls broadly cuneate, 1.3–3 × 1.2–1.5 cm, apical (sterile) part subrhombic, thickened, densely pale brown tomentose, margin inconspicuously toothed, apex with upcurved micro. Megasporophylls more than 30, tightly grouped, 8–14 cm, tawny tomentose; stalk 4.5–7.5 cm; sterile blade rhombic-ovate, 3.5–5.5 × 3–5 cm, margin glabrescent and pectinate, with 17–31 subulate lobes 1–2.5 cm, terminal lobe subulate, 3–4 cm; ovules 2 or 3 on each side of stalk, glabrous. Seeds 2–4, yellowish when fresh, brown when dry, obovoid or subglobose, 2.2–2.8 × 1.8–2.5 cm, apex mucronate; sclerotesta smooth. Pollination Mar–Apr, seed maturity Aug–Oct.

Semishaded, rocky crevices in broad-leaved forests in limestone mountains; 200–500 m. W Guangxi [Vietnam].


石山苏铁 shi shan su tie

Trunk generally subterranean, often ellipsoid or abruptly tapered apically, sometimes to 60 × 20 cm above ground; bark white-gray, nearly smooth toward base of trunk. Leaves 25–40, 1-pinnate, 50–100 × 15–22 cm; petiole suberete, 10–20 cm, with 0–8 spines along each side of apical part; leaf blade oblong, flat; leaflets in 60–100 pairs, longitudinally inserted at ca. 90° to rachis, often overlapping, straight, 13–18 × 1.4–1.8 cm, thick, leathery, sparsely red-brown tomentose abaxially when young, later becoming dark green and glabrous, midvein nearly flat adaxially, raised abaxially, base usually truncate, decurrent, sometimes contracted, margin flat or only slightly revolute, apex mucronate, pungent at maturity. Cataphylls triangular, 3–4 × 1–1.3
cm, brown tomentose, apex soft. Pollen cones ovoid-fusiform, 20–30 × 6–8 cm; microsporophylls broadly cuneate, 1.5–3 × 1.2–1.5 cm, apical, sterile part subrhombic, thickened, densely pale brown tomentose, margin inconspicuously toothed, apex with short, upcurved macro. Megasporophylls more than 30, tightly grouped, 8–14 cm, tawny tomentose when young, later glabrescent; stalk 4.5–7.5 cm; sterile blade rhombic-ovate, 3.5–5.5 × 3–5 cm, margin pellucid, with 17–31 subulate lobes 1–2.5 cm, terminal lobe subulate, 3–4 cm; ovules 2 or 3 on each side of stalk, glabrous. Seeds 2–4, yellowish when fresh, brown when dry, obovoid or subglobose, 2.8–2.8 × 1.8–2.5 cm, apex mucronate; sclerocysta smooth. Pollination Mar–Apr, seed maturity Aug–Oct.

Semishaded, rocky crevices in broad-leaved forests in limestone mountains, often on N-facing slopes; 200–500 m. W Guangxi [N Vietnam].

There are taxonomic problems with the species delimitation in the various populations of Cycas miqueli. The authors have chosen to recognize only two closely related species, C. ferruginea and C. miqueli, from among the many described because ample material was available and the characters separating them have no intermediate states. Cycas miqueli has dark green, leathery, glabrous leaves that are truncate basally and mucronate and pungent apically, whereas C. ferruginea has light green, papery, adaxially pubescent leaves that are attenuate basally and acute to acuminate and not pungent apically. Moreover, although their general distribution patterns are the same, there is no sympatry within individual populations. However, a more meaningful evaluation cannot be made until more material has been studied from more populations throughout the range. Chinese plants of C. miquelii have been misidentified as C. siamensis Miquel by some authors.


葫芦苏铁 hu lu su tie

Trunk often subterranean, cylindric or flask-shaped, sometimes moniliform, to 50 × 15 cm, base abruptly swollen to 25 cm in diam., apex almost glabrous; bark gray, nearly smooth toward base of trunk. Leaves 25–45, 1-pinnate, 50–130 × 20–40 cm; petiole suborbicular in cross section, 10–40 cm, with 9–16 spines along each side throughout length, base densely brown tomentose; leaf blade ovate-oblong in outline, flat; leaflets in 40–70 pairs, longitudinally inserted 0.8–1.8 cm apart at 55–65° to rachis, straight, 10–17(–23) cm × 4–7(–9) mm, leathery, glabrous, midvein prominent on both surfaces, especially adaxially, base decurrent, margin flat or slightly recurved, apex attenuate, pungent. Cataphylls triangular-lanceolate, 4–7 × 1–1.3 cm, densely yellow-brown tomentose, apex long attenuate, subsoft at tip. Pollen cones conical-cylindric, 15–25 × 4–6 cm; microsporophylls cuneate or broadly cuneate, 1.5–2 × 0.6–1 cm; apical sterile part subrhombic, thickened, densely yellow or brown tomentose, margin subentire, with short, upcurved macro. Megasporophylls 40–60, tightly grouped, 8–13 cm, densely yellow-brown silky tomentose; stalk 3–8 cm; sterile blade broadly ovate or flabellate, 5–6 × 4–8 cm, margin pellucid, with 17–35 lobes 2–3.8 cm, terminal lobe broadly lanceolate, 1.5–3.5 cm, margin irregularly serrulate or biserrulate; ovules 1 or 2 on each side of distal part of stalk, glabrous. Seeds 2–4, green to yellowish brown, broadly obovoid or subglobose, ca. 2 × 1.8 cm; sarcocysta not spongy or fibrous. Pollination Apr–May, seed maturity Oct–Nov.

- Hills and rocky slopes among grass and low shrubs, or in open broad-leaved forests, with tropical climate of hot, wet summers and hot, dry winters; 600–800 m. Hainan (Changjiang Xian).

Similar to Cycas siamensis Miquel in its gray and abruptly swollen trunk base, but quite different from that species in its strongly adaxially raised midvein and small seeds (ca. 1.8 cm in diam.) with sarcocysta not spongy or fibrous.


灰干苏铁 hui gan su tie


Trunk cylindric, sometimes branched, to 8 m × 60 cm, apex not tomentose; bark gray, smooth toward base of trunk, with fine, longitudinal fissures. Leaves 20–50(–60), 1-pinnate, 50–120 × 15–35 cm; petiole subterete, 10–25 cm, with 25–50 spines along each side; leaf blade oblong to elliptical-lanceolate, strongly “V”-shaped in cross section, recurved, pale brown tomentose when young; leaflets in 50–70 pairs, horizontally inserted at 45–50° above middle of rachis, glaucous when mature, 8–18 cm × 6–8 mm, leathery, densely pubescent when young, midvein flat adaxially when fresh (but sulcate when dry), prominent abaxially, base decurrent, margin ± revolute, apex acuminata, pungent. Cataphylls lanceolate, 3–5 × 1–1.5 cm, densely pale brown tomentose adaxially, apex acuminate, pungent. Pollen cones and megasporophylls unknown.

- Dry and hot, sunny forests with sparse trees on sharp limestone slopes; 400–600 m. SE Yunnan (Gejiu Shi).

Very rapidly disappearing in the wild as a result of over collection by commercial dealers and habitat destruction; it should be considered an endangered species in China. There is no doubt as to the distinctiveness of this species on the basis of vegetative characters, although its affinities are difficult to ascertain in the absence of fertile material.


篦齿苏铁 bi chi su tie

Cycas pectinata Linnaeus var. pectinata (Griffith) Schuster; C. dilatata Griffith; C. jenkinsiana Griffith; C. pectinata Griffith; C. walllchii Miquel.

Trunk cylindric, often dichotomously branched toward apex and gradually thickened toward base, up to 16 m × 60 (–90) cm, apex not tomentose; bark gray or white-gray, smooth toward base of trunk. Leaves 40–80(–100), 1-pinnate, 0.7–1.2 (–1.5) m × 20–30(–40) cm; petiole compressed orbicular in cross section, 10–35 cm,
with 6–15 spines along each side above middle part; leaf blade oblong-lanceolate, flat or occasionally slightly “V”-shaped in cross section, pale brown tomentose when young; leaflets in 50–100 pairs, longitudinally inserted at 50–60° to rachis, straight to falcate, 9–20 cm × 5–7 mm, thickly, leathery, midvein flat adaxially, sulcate when dry, raised abaxially, base decurrent, margin slightly recurved, apex acute, pungent. Cataphylls triangular, 3.5–4.5 × 1.5–2 cm, brown tomentose, apex soft. Pollen cones fusiform, 30–45 × 10–15 cm; microsporophylls cuneate, 3.5–5 × 1.2–2.5 cm, densely pale brown tomentose, apex thickened, with an upcurved point 3–4 cm. Megasporophylls more than 30, tightly grouped, 13–18 cm, densely yellowish brown silky hairy; stalk 4–7 cm; sterile blade deltoid-ovate or suborbicular, 7–9 × 6–10 cm, margin pectinate, with 29–37 lobes 2.5–3.5 cm, terminal lobe subulate, 3–4.5 cm; ovules 1(–3) on each side of distal part of stalk, glabrous. Seeds 2(–4), orange, becoming dark brown, often obovoid, compressed, 4.5–6 × 4–4.7 cm; sclerotesta smooth, sarcotesta with a mixed, thick, fleshy, fibrous layer. Pollination Jun–Jul, seed maturity Feb–Mar.

Dry, open thickets in limestone mountains, red soil in sparse monsoon forests; 1000–1800 m, S Yunnan [Bangladesh, Bhutan, Cambodia, NE India, Laos, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

A vulnerable species in China. Cultivated as an ornamental in S Yunnan and elsewhere in SE Asia. Chinese plants have been misidentified as *C. rumphii* Miquel (e.g., in FRPS), which occurs only in Indonesia and Papua New Guinea.