Fl. China 11: 112–115. 2008.

1. TOONA (Endlicher) M. Roemer, Fam. Nat. Syn. Monogr. 1: 131. 1846.

香椿属 xiang chun shu

Peng Hua (彭华); Jennifer M. Edmonds

Cedrela sect. *Toona* Endlicher, Gen. Pl. 2: 1055. 1840; *Surenus* Rumphius ex Kuntze, nom. illeg. superfl. (included type of *Toona*).

Trees to 50 m tall, monoecious, deciduous or semideciduous. Bark grayish brown, fissured, sometimes flaking irregularly; inner bark pink to red; sapwood cream-colored. Leaves spirally arranged, even-pinnate or occasionally odd-pinnate; leaflets usually more than 8 on each side of rachis; leaflet blades glabrous or pubescent with simple trichomes but with club-shaped glands often associated with veins, margin entire, serrate, or dentate; domatia (small deltate axillary pockets) usually present on proximal lateral veins of abaxial surface, often bordered with simple trichomes. Inflorescences much-branched pendent thyrses, often exceeding 1 m. Flowers 5-merous, unisexual with well-developed vestiges of opposite sex present, rarely hermaphrodite, small. Calyx 5(or 6)-lobed or 5(or 6) distinct sepals; sepals imbricate or cup-shaped in bud, margins always ciliate. Petals 5(or 6), white, cream-colored, or pink, distinct, longer than calyx in bud, imbricate (quincuncial), basally adnate to a short pulvinate androgynophore (disk). Stamens 5(or 6), distinct, arising from androgynophore, sometimes alternating with 1–5 filamentous staminodes; anthers in male flowers yellow, dehiscing laterally; antherodes in female flowers often sagittate, brown with abortive pollen. Ovary 5-locular, with 6–10 ovules per locule, vestigial in male flowers; style short in female flowers, pistillodes long and slender in male flowers; stylehead discoid with stigmatic papillae, usually 5-rayed. Fruit a capsule, ellipsoid or obovoid, pendulous, thinly woody, septifragal; valves 5, brown, smooth to verrucose, opening from apex; columella softly woody, concavely or convexly 5-angled, extending to capsule apex. Seeds numerous per locule, winged either at both ends when attached toward distal end of columella or at one end when attached by seed-end to proximal part of columella; wings membranous; endosperm residual; cotyledons collateral, flattened, leaflike; radicle laterally exserted.

About five species: E, S, and SE Asia, E Australia; four species (one endemic) in China.

This treatment of *Toona* largely follows J. M. Edmonds treatment (Fl. Males., Ser. 1, Spermat. 12(1): 358–371. 1995), in which a more complete synonymy can be found.

The timbers of *Toona* species are highly prized but now generally scarce through excessive logging activities throughout their distributional ranges. The genus is composed of only a few species, but phenotypic plasticity and genetic variation are responsible for much of the taxonomic complexity reflected in the literature. The species exhibit a phenomenal range of morphological variation, both within and between trees of the same population, and many of the features used by earlier authors to define their taxa have proved to be only slight morphological variants. Such vegetative characters include leaf and leaflet size; leaf and leaflet margin shape; indumentum type and trichome density. In particular, the velutinous pubescence, on which a number of *Toona* taxa have been based, occurs throughout the genus with the exception of *T. sinensis*, both inter- and infraspecifically, and even between seedlings of the same population. Both flowers and fruits are necessary for accurate identification of *Toona* species. This is especially relevant to *T. sureni* and *T. ciliata*, which are particularly difficult to differentiate in the herbarium.

1a. Flower buds conical; petals deep pink to purple and drying black, obpyriform; anthers exserted beyond petals in bud and appearing versatile; ovary and disk dark grayish brown with dense long brown trichomes clumping into strands ..... 1. *T. fargesii*

1b. Flower buds broadly ovate; petals white, cream-colored, or pale pink and drying white to brownish, broadly ovate; anthers not exserted beyond petals in bud when adherent to style and not appearing versatile; ovary glabrous or pilose with any trichomes translucent and not clumping into strands.

2a. Bark obnoxiously pungent; leaflet blade margins serrate or dentate; petal margins, ovary, and disk glabrous; capsule columella convex without apical scarring; seeds winged at one end ..... 2. *T. sinensis*

2b. Bark sweetly aromatic; leaf blade margins entire; petal margins ciliate, ovary and disk pilose; capsule columella concave with apical scarring; seeds winged at both ends.

3a. Twigs conspicuously lenticellate with warty lenticels; leaflet blades usually conspicuously pilose on adaxial midvein; petals in bud usually with dense ciliate bands on margin; style always pilose; capsule valves dark brown to blackish brown, verrucose with conspicuous rusty lenticels ..... 3. *T. sureni*

3b. Twigs inconspicuously lenticellate with minute lenticels; leaflet blades usually glabrescent on adaxial midvein but occasionally both surfaces pilose or velutinous; petals in bud glabrescent to sparsely ciliate with short trichomes on margin; style always glabrous; capsule valves red to reddish brown, smooth to minutely lenticellate with small inconspicuous lenticels ..... 4. *T. ciliata*

1. Toona fargesii A. Chevalier, Rev. Bot. Appl. Agric. Trop. 24: 158. 1944.

红花香椿 hong hua xiang chun

?*Cedrela febrifuga* Blume var. *assamensis* C. Candolle; ?*C. febrifuga* var. *verrucosa* C. Candolle, p.p. (as to all syntypes except those of Forbes from Sumatra); *C. rehderiana* H. L. Li; ?*Toona microcarpa* (C. Candolle) Harms var. *sahnii*

Bahadur.

Trees to 30 m tall; trunk to 90 cm d.b.h. Bark grayish brown, longitudinally scaly. Leaves 26–66 cm or more; petiole 6–11 cm, pilose; rachis pilose; leaflets usually 5–11 pairs; petiolules 3–9 mm, pilose; leaflet blades ovate-lanceolate to lanceolate, 10–22 × 2.9–9 cm, glabrous to glabrescent but midveins and main veins moderately to densely pilose, base asymmetric, margin entire or sinuate, apex acute to acuminate. Inflorescences to 60 cm or sometimes more, pendent; rachis dark grayish brown, often densely villous-pilose with spreading simple trichomes. Flower buds distinctly conical, drying black. Flowers ca. 4.4 mm. Pedicel dark grayish brown, 0.5–0.8 mm. Calyx cup-shaped, 0.8–1.1 mm, outside pilose; sepals spatulate, 0.3–0.9 × ca. 1 mm, margins ciliate. Petals pink, red, or purple, obpyriform, ca. 5 × 2.5 mm, outside glabrous, margin not ciliate. Androgynophore ca. 4.8 mm; filaments ca. 2 mm (male flowers) or ca. 2.1 mm (female flowers), glabrous; anthers of male flowers 0.7–0.9 × ca. 0.5 mm, exserted beyond petals and somewhat versatile, apex apiculate; antherodes of female flowers somewhat sagittate, ca. 0.5 × 0.2–0.3 mm, apex apiculate. Disk dark grayish brown, 2.2–2.3 mm in diam., densely villous with long brown uniseriate trichomes (often more than 1 mm) clumping and adhering to style in long strands. Ovary dark grayish brown, ca. 3.2 mm in diam., densely villous as disk, with to 5 ovules per locule; style 1.5–2 × ca. 0.5 mm (male) but shorter in female flowers, glabrous; stylehead clavate to discoid, 0.7–0.8 mm in diam. (male). Capsule elliptic, (2.2–)3–4 cm; columella (1.8–)2.2–4 × 1–1.2 cm, concave; valves dark yellow, brown, or reddish brown, 1.4–2.6 × 0.7–0.9 cm, verrucose with large prominent rusty lenticels, 0.6–0.9(–2.3) mm in diam., distributed evenly or becoming denser and smaller toward valve ends. Seeds 1.5–2.6 cm × 3–5.5 mm, winged at both ends; seed body 0.8–1.4 cm × 2–3 mm. Fl. Jun–Jul, fr. Sep–Dec.

● Dense forests, mixed woods, valleys, streamsides, often in moist habitats; 300–1900 m. Fujian, Guangdong, Guangxi, W Hubei, Sichuan, Yunnan [?Bhutan, ?NE India, ?Myanmar].

Toona fargesii has been overlooked in most treatments of Chinese *Toona* species. The recognition of it here is largely based on the work of J. M. Edmonds. Chevalier based this species on "Dode Ms. in Herb. Mus. Paris" in which it was placed in *Cedrela*. Chevalier correctly placed it in *Toona* and, describing it as *T. fargesii* Bahadur (Monogr. Genus *Toona* (Meliac.) 107. 1988), adopted this species; but, while recognizing that it was a distinct species, he muddled it with *T. sureni*. He cited only three collections. Two were from the N Hemisphere and included the type collection of *T. fargesii* cited by Chevalier from China as well as a second specimen from Assam thought to be conspecific. The third cited specimen, from New Guinea in the S Hemisphere, is conspecific with *T. sureni*. Flowering herbarium material of this species, which is needed for definitive determination, is rare. Although this species could be endemic to China, where it is now known to occur in at least six provinces, there are a number of fruiting specimens collected from Bhutan, NE India, and Myanmar that seem to be conspecific, extending the range of this species westward from S China. They include types of *Cedrela febrifuga* var. *assamensis*, *C. febrifuga* var. *verrucosa*, and *T. microcarpa* var. *sahnii*.

"Toona rubriflora" (C. J. Tseng, Acta Sci. Nat. Univ. Amoiensis 9: 303. 1962) belongs here but was not validly published because two gatherings were indicated as types (*Vienna Code*, Art. 37.2).

2. Toona sinensis (A. Jussieu) M. Roemer, Fam. Nat. Syn. Monogr. 1: 139. 1846.

香椿 xiang chun

Cedrela sinensis A. Jussieu, Bull. Sci. Nat. Géol. 23: 241. 1830; *Ailanthus flavescens* Carrière [*"Ailantus"*]; *C. glabra* C. Candolle; *C. longiflora* Wallich ex C. Candolle, nom. illeg. superfl. (included type of *C. glabra*); *C. longiflora* var. *kumaona* C. Candolle; *C. serrata* Royle; *C. serrata* var. *puberula* C. Candolle; *C. serrulata* Miquel; *C. sinensis* var. *hupehana* C. Candolle; *C. sinensis* var. *lanceolata* H. L. Li; *C. sinensis* var. *schensiana* C. Candolle; *Mioptrila odorata* Rafinesque; *Surenus glabra* (C. Candolle) Kuntze; *S. serrata* (Royle) Kuntze; *S. serrulata* (Miquel) Kuntze; *S. sinensis* (A. Jussieu) Kuntze; *Toona glabra* (C. Candolle) Harms; *T. microcarpa* (C. Candolle) Harms var. *denticulata* A. Chevalier; *T. microcarpa* var. *grandifolia* A. Chevalier; *T. serrata* (Royle) M. Roemer; *T. serrulata* (Miquel) Harms; *T. sinensis* var. *grandis* Pampanini; *T. sinensis* var. *hupehana* (C. Candolle) A. Chevalier; *T. sinensis* var. *incarvillei* A. Chevalier; *T. sinensis* var. *schensiana* (C. Candolle) H. Li ex X. M. Chen.

Trees to 40 m tall; trunk to 20 m tall, to 1.5 m d.b.h., buttressed. Bark gray to dark brown, fissured; inner bark pink to red, fibrous; sap-wood cream-colored to red, fibrous, smelling strongly of garlic and pepper when cut. Leaves 32–120 cm; petiole 5.5–20 cm, glabrous or pilose; rachis often reddish, glabrous or pilose; leaflets usually 8–20 pairs; petiolules 3–9 mm, glabrescent; leaflet blades narrowly lanceolate to linear-lanceolate, 11–22 × 3–5.6 cm, glabrous or pilose especially on midvein and secondary veins, with club-shaped glandular trichomes conspicuous on adaxial midvein areas and junction between leaf rachis and petiolules, base asymmetric, margin serrate, serrulate, or rarely entire, apex acuminate. Inflorescences to 1 m, pendent; rachis pilose, villous, or glabrescent, with short appressed or spreading simple trichomes. Flowers 3.5–4.5 mm. Pedicel ca. 0.5 mm, pilose to glabrescent. Calyx cup-shaped, 1–1.5 mm, outside glabrous; sepals 0.5–1.1 × 0.6–1.8 mm, margins ciliate. Petals white or flushed pink, 2.8–4.2 × 1.1–2.9 mm, outside glabrous, margin not ciliate. Androgynophore 2.5–4 mm, glabrous; staminodes always present, (1–)5, 0.7–1.8 mm, glabrous; filaments 1.3–1.8 mm (male flowers), 1–1.5 mm (female flowers), glabrous; anthers of male flowers 0.8–1.2 × 0.5–0.8 mm; antherodes of female flowers 0.3–0.8 × 0.3–0.5 mm, apex apiculate and sometimes extended. Disk orange, 1–1.5 mm in diam., glabrous. Ovary 1.6–2.3 mm in diam., glabrous, with to 6 ovules per locule; style 1.1–1.5 × ca. 0.5 mm (male), 0.5–0.8 × 0.3–0.4 mm (female), glabrous; stylehead 0.5–1 mm in diam. Capsule 1.5–3 cm; columella 1.2–2.9 × 0.6–1.1 cm, convex; valves reddish to dark brown, 1.5–3 × 0.4–0.7 cm, smooth or occasionally punctate but not conspicuously lenticellate, with only 0.3–0.5 mm in diam. scattered lenticels. Seeds 0.8–1.6 cm × 3.5–6.2 mm, winged at one end; seed body 0.8–1 cm × 1.7–4 mm. Fl. May–Oct, fr. Aug–Jan.

Primary montane forests, especially on steep hillsides or open slopes, sometimes near streams; also occurring in ravines, mixed or

secondary forests, disturbed areas; below 100–2900 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, SE Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand].

This is generally an upland species but also occurs at lower altitudes in China. It is planted in India and Sri Lanka for shade, and in various European cities (e.g., Paris) as an ornamental.

The timber is used for furniture and sieve hoop-making, and in bridge construction. The leaves are used as a vegetable in China and Malaysia, and as animal fodder in India. The trees are widely used medicinally, with the bark being used as an astringent and depurative, powdered root as a refreshment and a diuretic, and tender leaves as a carminative.

The leaf morphology and indumentum types and density are particularly variable in this species, with capsule valve form also showing some variability. On the basis of such features, up to eight infraspecific variants have been recognized by other authors.

3. Toona sureni (Blume) Merrill, Interpr. Herb. Amboin. 305. 1917.

紫椿 zi chun

Swietenia sureni Blume, Catalogus, 72. 1823; *Cedrela febrifuga* Blume; *C. febrifuga* var. *pealii* C. Candolle; *C. febrifuga* var. *verrucosa* C. Candolle, p.p. (as to *Forbes 118* and *Forbes s.n.* from Sumatra); *C. microcarpa* C. Candolle var. *grandifoliola* C. Candolle; *C. sureni* (Blume) Burkill; *C. toona* Roxburgh ex Rottler var. *henryi* C. Candolle; *C. toona* var. *pilistila* C. Candolle; *C. toona* var. *warburgii* C. Candolle; *Surenus febrifuga* (Blume) Kuntze; *Toona ciliata* M. Roemer var. *candollei* Bahadur; *T. ciliata* var. *grandifoliola* (C. Candolle) Bahadur; *T. ciliata* var. *henryi* (C. Candolle) Harms; *T. febrifuga* (Blume) M. Roemer.

Trees, medium sized to 40 m tall; trunk to 25 m tall, to 3 m d.b.h., with or without buttresses (to 2 m); crown fairly wide, spreading, occasionally dense. Bark whitish, grayish brown, gray, or light brown, usually vertically fissured and flaking; inner bark pinkish white, pinkish brown, reddish brown, or orange, fibrous; sap-wood white, pink, or pale red, sweetly aromatic when cut. Twigs pilose and often densely and prominently lenticellate with conspicuous verrucose lenticels. Leaves 29–84 cm; petiole 7–12 cm, pilose to glabrescent, often lenticellate; rachis moderately pilose to glabrescent, occasionally velutinous; leaflets usually 6–9(–12) pairs; petiolules (2–)4–12 mm, pilose/villous to glabrescent; leaflet blades lanceolate to ovate-lanceolate, 7–14(–19.5) × 3.1–6(–7) cm, often dark grayish
brown, moderately pilose to glabrescent, usually with short trichomes and club-glands apically on midveins, veins basally pilose to villous/velutinous, base symmetrical to asymmetrical, margin entire, apex acuminate to occasionally acute. Inflorescences to 40 cm, pendent; rachis pilose to villous with medium to long spreading trichomes, occasionally glabrescent. Flowers 4–5 mm, sweetly aromatic. Pedicel (0.3–)0.7–1.3 mm, pilose to villous. Calyx 1–1.5 mm, outside pilose to glabrescent, lobes imbricate; sepals usually shallowly triangular especially in bud, 0.6–1 × 0.8–1.5 mm, outside villous to glabrescent, margins ciliate, apex usually acute. Petals white, creamy white, or pale pink, 3.5–5 × 1.6–3.2 mm, outside villous to glabrescent but in bud usually with conspicuous ciliate bands of long appressed trichomes on margins. Androgynophore 2.5–4.7 mm; filaments 1.2–2.5 mm (male flowers), 1–1.3 mm (female flowers), pilose to villous with scattered to dense long trichomes; anthers of male flowers 0.7–1.3 × 0.3–0.8 mm, apex usually apiculate; antherodes of female flowers sagittate, 0.5–0.9 × 0.2–0.6 mm. Disk orange to red, 1.2–2.5 mm in diam., densely pilose. Ovary 1.6–2.8 mm in diam., moderately to densely pilose, with to 6 ovules per locule; style 1.2–3 × 0.2–0.5 mm (male), 0.5–1 × ca. 0.3 mm (female), pilose with scattered usually appressed trichomes especially on basal half; stylehead 0.7–1.3 mm in diam. Capsule 1.4–2(–2.4) cm; columella 1.4–2(–2.4) × 0.5–0.8(–1) cm, concave with apical scarring; valves dark brown to blackish brown, rough, verrucose, with conspicuous and often ovoid 0.3–2 × 0.4–1.3 mm rusty lenticels. Seeds 1.1–2(–2.2) cm × (3–)4–4.8 mm, winged at both ends, wings unequal with broadly obtuse apices; seed body 5–8 × 1.5–2 mm. Fl. Apr, fr. Apr–May.

Open hillsides, occasional in ravines, forests, and woods; 700–1600 m. Guizhou, Hainan, Sichuan, Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Thailand].

This species also yields excellent timber. Its bark is used as a powerful astringent and a purgative throughout its range. In Indo-China it is considered to be a tonic, an antiperiodic, and an antirheumatic, while in Indonesia it is used as an astringent and a tonic for treating diarrhea, dysentery, and other intestinal infections. The leaf extracts apparently have an antibiotic activity against *Staphylococcus*, with leaf tip concoctions being applied to swellings. Because of the difficulty of separating this species from *Toona ciliata* in the herbarium, it is probable that *T. sureni* is more widespread in China than the above localities indicate.

4. Toona ciliata M. Roemer, Fam. Nat. Syn. Monogr. 1: 139. 1846.

红椿 hong chun

Cedrela toona Roxburgh ex Rottler, Ges. Naturf. Freunde Berlin Neue Schriften 4: 198. 1803; *C. australis* R. Mudie, nom. superfl. (included type of *C. toona*); *C. australis* F. Mueller (1858), not R. Mudie (1829); *C. kingii* C. Candolle; *C. kingii* var. *birmanica* C. Candolle; *C. microcarpa* C. Candolle; *C. mollis* Handel-Mazzetti; *C. toona* var. *gamblei* C. Candolle; *C. toona* var. *haslettii* Haines; *C. toona* var. *latifolia* Miquel ex C. Candolle; *C. toona* var. *multijuga* Haines; *C. toona* var. *nepalensis* C. Candolle; *C. toona* var. *parviflora* Bentham; *C. toona* var. *puberula* C. Candolle; *C. toona* var. *pubescens* Franchet; *C. toona* var. *pubinervis* C. Candolle; *C. toona* var. *stracheyi* C. Candolle; *C. toona* var. *sublaxiflora* C. Candolle; *C. toona* var. *talbotii* C. Candolle; *C. toona* var. *vestita* C. T. White; *C. toona* var. *yunnanensis* C. Candolle; *Surenus australis* Kuntze; *S. microcarpa* (C. Candolle) Kuntze; *S. toona* (Roxburgh ex Rottler) Kuntze; *Toona australis* (Kuntze) Harms; *T. ciliata* var. *pubescens* (Franchet) Handel-Mazzetti; *T. ciliata* var. *sublaxiflora* (C. Candolle) C. Y. Wu; *T. ciliata* var. *vestita* (C. T. White) Harms; *T. ciliata* var. *yunnanensis* (C. Candolle) Harms; *T. febrifuga* (Blume) M. Roemer var. *cochinchinensis* Pierre; *T. febrifuga* var. *griffithiana* Pierre; *T. febrifuga* var. *ternatensis* Pierre; *T. kingii* (C. Candolle) Harms; *T. microcarpa* (C. Candolle) Harms; *T.*

mollis (Handel-Mazzetti) A. Chevalier; *T. sureni* (Blume) Merrill var. *cochinchinensis* (Pierre) Bahadur; *T. sureni* var. *pubescens* (Franchet) Chun.

Trees, medium sized to 30 m tall; trunk to 22 m tall, to 1.5 m d.b.h., with or without buttresses (to 3.5 m); crown usually rounded and spreading, occasionally dense. Bark grayish white to brown, usually fissured and flaking; inner bark brown to reddish, fibrous; sap-wood white, pink, or red, smelling strongly of cedar when cut. Twigs pilose to glabrescent, inconspicuously lenticellate with small lenticels. Leaves (15–)26–69 cm; petiole 6–11 cm, glabrous or pilose; rachis often reddish, glabrous or sparsely pilose, occasionally velutinous; leaflets usually (5–)9–15 pairs; petiolules 2–10(–14) mm, glabrescent, rarely pilose to velutinous; leaflet blades lanceolate to ovate-lanceolate, (7–)9–12.8(–16) × (2.2–)3.2–5(–6) cm, glabrescent with trichomes on apical midvein or absent or sparse, occasionally moderately pilose, base usually asymmetric, margin entire, apex acute to acuminate. Inflorescences to 55 cm, pendent; rachis pilose to pilose-villous with short to long spreading or appressed trichomes. Flowers 3.5–5(–6) mm, sweetly scented. Pedicel 0.5–1 mm, usually pilose to occasionally villous. Calyx 0.7–1.3 mm, outside usually glabrescent, lobes imbricate; sepals spatulate, (0.4–)0.7–1 × (0.5–)0.7–1.3 mm, margins shortly ciliate. Petals white to creamy white, 3.5–5.8 × 1.3–3.1 mm, usually glabrescent, occasionally outside pilose, margin shortly ciliate. Androgynophore (1.7–)3–4.9(–5.5) mm; filaments 1.2–2.5 mm (male flowers), 0.7–1.8 mm (female flowers), glabrous to pilose/villous; anthers of male flowers 0.6–1.1 × 0.4–0.9 mm, apex usually apiculate, often with long appendage; antherodes of female flowers usually sagittate, 0.5–0.9 × 0.3–0.6 mm, often with a long apiculate appendage. Disk reddish orange, 1.2–2.5 mm in diam., densely pilose. Ovary 1.2–1.8 mm in diam., moderately pilose, with to 8 ovules per locule; style 1.2–3 × 0.2–0.4 mm (male), 0.3–1.5 × 0.3–0.5 mm (female), glabrous; stylehead 0.7–1.3 mm in diam. Capsule 1.5–2(–2.5) cm; columella 1.5–2(–2.4) × 0.5–0.7(–1) cm, concave with apical scarring; valves red to reddish brown, smooth to lenticellate with 0.1–0.5 mm in diam. scattered lenticels. Seeds 1.1–1.9 cm × 2.5–4(–5.8) mm, winged at both ends; wings unequal, apex narrowly obtuse; seed body 5–7 × 1.2–3 mm. Fl. Jan–Jun, fr. Feb–Nov.

Common to abundant in shade or open habitats: valleys, ravines, woods, thickets, forests, hillsides, mountaintops, slopes, near rivers and streams especially throughout Yunnan; 400–2800 m. Guangdong, Hainan, Sichuan, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; E Australia, W Pacific islands].

This species is the most widely distributed *Toona*. It is commonly cultivated as an avenue tree in India. The timber is highly valued, especially in India and Australia, and is frequently used by carpenters in Yunnan. Worldwide, the wood of this species is used in house and boat construction, for high-grade furniture and carvings, and to make tea-chests, oil casks, pencils, and musical instruments. The flowers are used as a source of red and yellow dyes for silk and as an emmenagogue. The leaves and young shoots are lopped for cattle fodder in India. Various parts are used medicinally throughout its geographical range; for example, the bark is a powerful astringent, a tonic, and an antiperiodic, and it is used to treat dysentery and wounds.

Toona ciliata exhibits considerable variation in both vegetative and filament pubescence. It was first described from India, where it is the dominant *Toona* and is characterized by glabrous filaments. This variant extends eastward to Hainan. Showing a more restricted distribution within this range are plants with glabrescent or sparsely pilose/villous filaments, while extending as far as E Australia are plants with conspicuously villous filaments. Whether the eastern variants should be recognized infraspecifically has yet to be determined. Typical *T. ciliata* is characterized throughout its range by glabrescent leaflets, but many plants, while exhibiting the distinguishing floral characters given in the key, often display leaf pubescence varying from glabrescent to velutinous, sometimes on the same plant. Flowering and fruiting material are vital for the correct identification of species in this genus.

Fl. China 11: 112–115. 2008.