

**3. TURPINIA** Ventenat, Mém. Cl. Sci. Math. Inst. Natl. France 1807(1): 3. Jul 1807, nom. cons., not Bonpland (Apr 1807).

山香圓屬 shan xiang yuan shu

*Triceros* Loureiro.

Trees or shrubs, evergreen or deciduous. Leaves opposite, exstipulate, odd-pinnately compound or simple; petiole constricted at tip; leaflet blades leathery, sometimes with stipels. Inflorescence a panicle, terminal or axillary. Flowers small, white, actinomorphic, bisexual, rarely unisexual. Sepals 5, imbricate, persistent. Petals 5, rounded, sessile, imbricate. Stamens 5, arranged at margin of disk; filaments flat. Floral disk conspicuous, margin undulate. Ovary sessile, 3-locular; styles 3, separate or united; stigmas capitate; ovules anatropous, numerous, arranged in 2 rows. Berry subglobose, indehiscent. Seed coat hard membranous or osseous.

Between 30 and 40 species: Asia, Central, North, and South America; 13 species (five endemic) in China.

- 1a. Leaves simple (rarely trifoliolate in *T. subsessilifolia*).
  - 2a. Leaves/leaflets cordate at base ..... 1. *T. subsessilifolia*
  - 2b. Leaves not cordate at base.
    - 3a. Ovary and style pubescent.
      - 4a. Flowers large, 8–10(–12) mm in diam.; leaf blade thickly papery, elliptic to oblong ..... 2. *T. arguta*
      - 4b. Flowers small, ca. 5.5 mm in diam.; leaf blade coriaceous, oblong to lanceolate ..... 3. *T. formosana*
    - 3b. Ovary and style glabrous.
      - 5a. Inflorescence a racemose cyme; leaf blade with 12–14 lateral veins, prominent on both surfaces, blade yellowish green and shining adaxially when dry ..... 4. *T. simplicifolia*
      - 5b. Inflorescence a panicle; leaf blade with 8–10 lateral veins, prominent only abaxially, blade grayish green adaxially when dry, not shining ..... 5. *T. indochinensis*
- 1b. Leaves pinnately compound.
  - 6a. Lower part of style and ovary hirsute; fruit pubescent ..... 6. *T. affinis*
  - 6b. Style and ovary glabrous; fruit often glabrous.
    - 7a. Filaments pubescent ..... 7. *T. ternata*
    - 7b. Filaments glabrous.
      - 8a. Pericarp 2–5 mm thick or more.
        - 9a. Fruit 2–2.5 cm in diam.; leaflets 3–9, blades oblong-elliptic; flowers arranged loosely ..... 8. *T. pomifera*
        - 9b. Fruit ca. 1.7 cm in diam.; leaflets 1–3(–5), blades elliptic to ovate; flowers arranged into a compact inflorescence ..... 9. *T. ovalifolia*
      - 8b. Pericarp 0.5–1(–1.5) mm thick.
        - 10a. Seeds ca. 1 cm in diam. .... 10. *T. macrosperma*
        - 10b. Seeds ca. 5 mm in diam.
          - 11a. Leaflets 3(or 4); peduncle with 2 deciduous bracts at apex ..... 11. *T. robusta*
          - 11b. Leaflets more than 3(or 4); peduncle without bracts at apex.
            - 12a. Leaflet blades papery or subcoriaceous, elliptic, 5–6 × 2–3 cm; inflorescence with flowers loosely arranged ..... 12. *T. montana*
            - 12b. Leaflet blades coriaceous, oblong, 10–12 × 2–4 cm; flowers arranged densely ..... 13. *T. cochinchinensis*

**1. *Turpinia subsessilifolia*** C. Y. Wu, Fl. Yunnan. 2: 355. 1979.

心叶山香圓 xin ye shan xiang yuan

Small trees, 2–5 m tall. Twigs robust, black-gray or brown-gray, nodes swollen, lenticels conspicuous. Leaves simple, rarely trifoliolate, opposite, sessile or shortly petiolate, no more than 5 mm; blade ovate to oblong-ovate, 11–14(–16.5) × 5.5–7(–8) cm, coriaceous, glabrous, adaxially lustrous green, abaxially pale green, main vein impressed adaxially and prominent abaxially, lateral veins 5–9(–11) pairs, slightly discernible adaxially and conspicuous abaxially, base subcordate, rarely rounded, margin glandular crenate or serrate, apex apiculate, cusp 5–10(–15) mm. Inflorescence

terminal or axillary, paniculate, ca. 11 cm, rarely cymose; pedicels dark purple, slightly pubescent, with flowers loosely arranged. Flower small, ca. 3 mm in diam., creamy with purple. Sepals yellowish white, oblong, ca. 1.5 × 1.1 cm, margin ciliate, exterior pubescent. Petals oval, ca. 2 × 1.8 mm, ciliate, inserted on disk margin. Floral disk undulate. Ovary superior; styles 3, free, as long as anther. Fruit not seen. Fl. Apr–Jun.

• Dry forests, limestone forests, wooded limestone mountaintops; ca. 1700 m. SE Yunnan (Xichou).

This species usually possesses simple leaves, whereas trifoliolate leaves are also recorded. This species has been hypothesized to be a possible transitional taxon between trifoliolate species and ones with simple leaves in this genus. Phylogenetic

studies are needed to test this hypothesis.

**2. *Turpinia arguta*** (Lindley) Seemann, Bot. Voy. Herald, 371. 1857.

锐尖山香圆 rui jian shan xiang yuan

Shrubs, deciduous, 1–3 m tall; old branches gray-brown and young branches speckled. Leaves simple; stipules borne on interior side of petiole; petiole 1.2–1.8 cm; leaf blade elliptic to oblong-oval, 7–22 × 2–6 cm, thickly papery or coriaceous, glabrous or pubescent, lateral veins 10–13 pairs, prominent adaxially and conspicuous abaxially, base rounded or broadly cuneate, margin glandular serrulate, apex acuminate, cusp 1.5–2 mm. Panicle terminal, short, (4–)5–8(–17) cm. Flowers 8–10(–12) mm in diam., white; pedicel with 2 bracteoles on middle. Sepals deltoid, green, ciliate or not. Petals white, glabrous. Stamens alternate on petals; filaments ca. 6 mm, slightly pubescent. Floral disk present. Ovary and style pubescent. Fruits subglobose, green when young, black when dry, (7–)10(–12) mm in diam., coarse, apex cuspidate. Seeds 2 or 3. Fl. Mar–Apr, fr. Sep–Oct.

• Forests, shrubby areas, dry areas, roadsides; 400–700 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang.

- 1a. Leaf blade thickly papery, glabrous ..... 2a. var. *arguta*  
1b. Leaf blade coriaceous, adaxially pubescent ..... 2b. var. *pubescens*

**2a. *Turpinia arguta* var. *arguta***

锐尖山香圆(原变种) rui jian shan xiang yuan (yuan bian zhong)

*Ochranthe arguta* Lindley, Bot. Reg. 21: t. 1819. 1836; *Eyrea vernalis* Champion; *Maurocena arguta* Kuntze; *Staphylea simplicifolia* Gardner & Champion.

Leaf blade thickly papery, glabrous.

• Forests, shrubby areas, dry areas, roadsides; 400–700 m. Chongqing (Chengkou), Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Zhejiang.

**2b. *Turpinia arguta* var. *pubescens*** T. Z. Hsu, Fl. Reipubl. Popularis Sin. 46: 28, 291. 1981.

绒毛锐尖山香圆 rong mao rui jian shan xiang yuan

Leaf blade coriaceous, abaxially pubescent, especially along veins.

• Forests. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi.

**3. *Turpinia formosana*** Nakai, J. Arnold Arbor. 5: 80. 1924.

台湾山香圆 tai wan shan xiang yuan

Small trees; branches dry brown-black, nodes swollen. Leaves simple; petiole (2–)3–5 cm, base greatly swollen; leaf blade oblong or oval to lanceolate, 8–12(–25) × 4–7 cm, leathery, glabrous, midvein prominent abaxially, lateral veins 6–8 pairs, rarely obvious adaxially and conspicuous abaxially, base cuneate, margin sparsely serrate, apex acuminate or blunt. Panicle terminal or axillary, with flowers sparsely

arranged, ca. 15 cm, glabrous; bracteoles caducous. Flowers ca. 5.5 mm in diam., yellowish white. Sepals oblong-oval, ca. 3.5 mm, glabrous. Petals spatulate, ca. 4 mm, glabrous. Stamens inserted in floral disk; filaments ca. 4.5 mm, slightly pubescent. Ovary superior, 3-locular, pubescent, as well as style; stigma capitate. Fruit globose, green or yellowish purple, 8–15 mm in diam. Fl. Apr, fr. Jun.

• Forests; below 100–1500 m. Taiwan.

**4. *Turpinia simplicifolia*** Merrill, Philipp. J. Sci. 27: 34. 1925.

亮叶山香圆 liang ye shan xiang yuan

*Turpinia simplicifolia* var. *longipes* C. Y. Wu; *T. unifoliata* Merrill.

Small trees or shrubs, 3–7(–10) m tall; branches brown or gray-brown when dry. Leaves simple; petiole 1.5–5.5 cm, base greatly swollen; leaf blade oblong to oblong-elliptic, 9–18 × 3.5–7 cm, thinly leathery, adaxially yellowish green and lustrous when dry, lateral veins 12–14 pairs, conspicuous on both sides, base cuneate or broadly cuneate, margin crenulate with teeth relatively hard in texture, apex abruptly acuminate, cusp to 1–1.5 cm. Panicle cyme 7–12 cm. Flowers small, ca. 3 mm in diam. Sepals white, oval, 1–1.5 mm, ciliate. Petals white or yellow, elliptic, ca. 2 mm. Stamens slightly shorter than petals; filaments flat; anthers ovoid. Ovary 3-locular; ovules 2 per locule. Berry light green, subglobose, 5–10 mm in diam., surface of exocarp coarse, apex with 3 concave slits. Seeds nearly globose, 3–5 mm in diam., light yellow. Fl. Mar–Jun, fr. Jul–Sep.

Dense forests, valleys; 400–1000 m. Guangdong, N and SW Guangxi (Daxin, Ningming, Rongshui) [Indonesia, Malaysia, Philippines].

**5. *Turpinia indochinensis*** Merrill, J. Arnold Arbor. 19: 43. 1933.

疏脉山香圆 shu mai shan xiang yuan

Small trees or shrubs, 2–8 m tall; bark yellowish brown to light brown. Leaves simple; petiole 6–30 mm, base swollen; leaf blade oblong, oval to obovate-elliptic, 7–13(–15) × 3.5–7.5 cm, glabrous, adaxially lustrous green, abaxially greenish, lateral veins 8–10 pairs, conspicuous adaxially and prominent abaxially, base cuneate to broadly so, margin sparsely serrate, with teeth relatively hard or bony, apex cuspidate. Panicle terminal, 12(–23) cm. Flower small, ca. 5 mm in diam.; pedicel ca. 2 mm. Sepals leathery, elliptic to obovate-elliptic, 3–5 mm. Petals membranous, spatulate, 3.5(–4) mm, white when dry, glabrous. Stamens ca. 3.5 mm; filament ca. 1.2 mm, flat, base enlarged to ca. 1 mm wide, white tomentose. Floral disk conspicuous, undulate. Ovary oval, ca. 1.5 mm in diam., white tomentose, 3-locular with 4 ovules per locule; styles 3, free. Berry subglobose, (6–)10 mm in diam., exocarp ca. 1.5 mm thick. Seeds irregularly globose, ca. 5 mm in diam., brownish. Fl. Mar–Apr, fr. Aug–Nov.

Forests; below 100–1300 m. Hainan (Baoting), SE Yunnan (Hekou, Pingbian, Xichou) [Vietnam].

**6. *Turpinia affinis*** Merrill & L. M. Perry, J. Arnold Arbor. 22: 550. 1941.

硬毛山香圆 ying mao shan xiang yuan

Trees, whole plants glabrous except inflorescence; bark dark brown. Leaves odd-pinnate; stipule caducous; rachis 6–14 cm; leaflets 2–4, rarely 5; petiolule 1–1.5 cm; leaflet blades oblong-elliptic, 7–18 × 2.5–6 cm, leathery, lateral veins 7–10 pairs, slightly conspicuous, base cuneate to obtuse, margin crenate, apex acuminate, cusp 1–1.25 cm. Panicle ca. 30 cm, spreading, pubescent. Pedicel ca. 1.5 mm. Petals obovate-elliptic, ca. 4 mm, margin ciliate, interior tomentose. Filaments ca. 3 mm, base enlarged to 1 mm wide, pubescent; anthers oblong-oval, 1(–1.2) mm. Floral disk conspicuous, undulate, ca. 1/2 as long as ovary. Ovary ca. 1 mm; style ca. 2 mm, hirsute at base; ovules 6–8. Berry subglobose, 1–1.5 cm in diam., style persistent with stiff hairs, exocarp 0.5–1 mm thick. Fl. Mar–Apr, fr. Aug–Nov.

• Forests in ravines and valleys; (500–)1000–2000 m. Guangxi, Guizhou, Sichuan, Yunnan.

7. *Turpinia ternata* Nakai, J. Arnold Arbor. 5: 78. 1924.

三叶山香圆 san ye shan xiang yuan

Trees, evergreen, ca. 10 m tall; branches glabrous. Leaves trifoliolate, sometimes simple leaves on upper branches, glabrous; petiole 1–9 cm, base swollen; petiolule 0.5–3 cm; leaflet blades narrowly oblong to oblong-lanceolate, 5–17 × 2.8–6 cm, abaxially pale, with prominent lateral veins, base cuneate, margin crenately serrate, apex acuminate. Plants dioecious. Panicle terminal or subterminal, 20–30 cm, glabrous; bracts and bracteoles small, deltoid, caducous. Male flower with sepals 4 or 5, imbricate, glabrous, sometimes margin ciliate, 1–1.5 mm; petals 4 or 5, subspatulate, yellowish or white, 2–3 mm; stamens 4 or 5, anthers oval, white; gynoeceum vestigial. Female flower with sepals 4 or 5, oblong to oval-oblong, 2–3 mm; petals yellowish or white, 3–4 mm; stamens 4 or 5; ovary globose to ovoid, ca. 1 cm in diam. Seeds black or dark brown, lustrous.

Forests. Taiwan [S Japan].

8. *Turpinia pomifera* (Roxburgh) Candolle, Prodr. 2: 3. 1825.

大果山香圆 da guo shan xiang yuan

Trees, 8(–15) m tall, or shrubs; branches gray, glabrous, nodes swollen. Leaves odd-pinnate, 15–50 cm; stipules 2, borne between petioles of two opposite leaves, deltoid, caducous; leaflets 3–9; stipule lanceolate-rounded to suboval, caducous; terminal petiolule ca. 5 cm, lateral ones 5–15 mm; leaflet blades oblong-elliptic, rarely suboval, 8–14(–20) × (2.5–)5–7(–8) cm, thinly coriaceous, glabrous, lateral veins 7 or 8(or 9) pairs, conspicuous on both sides, base broadly cuneate, margin serrate, apex acuminate with cusp. Panicle terminal, to 21 cm. Flowers 3.5–4 mm in diam. Anthers lanceolate-oblong, usually acuminate. Berry up to 2.5 cm in diam., surface of exocarp coarse when young, 2–5 mm thick at maturity. Fl. Jan–Apr, fr. Jun–Aug.

Forests, forest margins, roadsides; 300–1400(–1500) m. S and W Guangxi, S Yunnan [Bhutan, India, Malaysia, Nepal, N Vietnam].

1a. Fruit large, 1.5–2.5 cm in diam. .... 8a. var. *pomifera*

1b. Fruit small, less than 1 cm in diam. .... 8b. var. *minor*

8a. *Turpinia pomifera* var. *pomifera*

大果山香圆(原变种) da guo shan xiang yuan (yuan bian zhong)

*Dalrympelea pomifera* Roxburgh, Pl. Coromandel 3: 76. 1820.

Fruit large, 1.5–2.5 cm in diam.

Forest margins, roadsides; 300–700 m. S Yunnan [Bhutan, India, Malaysia, Nepal, N Vietnam].

8b. *Turpinia pomifera* var. *minor* C. C. Huang, Fl. Yunnan. 2: 358. 1979.

山麻风树 shan ma feng shu

Fruit small, not over 1 cm in diam.

• Forests; 700–1400(–1500) m. S and W Guangxi (Debao, Fusui), S Yunnan.

9. *Turpinia ovalifolia* Elmer, Leaflet. Philipp. Bot. 2: 490. 1908.

卵叶山香圆 luan ye shan xiang yuan

*Turpinia lucida* Nakai; *T. pachyphylla* Merrill.

Trees; branches dark brown when dry. Leaves 1–3(or 5)-foliolate, ca. 25 cm; petiole 10–14 mm; leaflet blades oval, 10–15 × 5–7 cm, thinly coriaceous, adaxially olive green, abaxially greenish, lateral veins 6 pairs, conspicuous on both sides, base broadly cuneate to rounded, margin glandular serrate, apex acuminate. Panicle terminal, glabrous, ca. 25 cm, many flowered. Flowers ca. 4.5 mm in diam. Sepals leathery, ovate-elliptic, ca. 4 mm, margin ciliate. Petals thin, narrow, ciliate, apex obtuse. Filaments ca. 2.5 mm, glabrous. Ovary 3-locular; style 1; ovules 6 per locule and arranged in 2 rows. Berry globose, ca. 1.7 mm in diam.

Forests. Taiwan (Huoshao Dao, Lan Yu) [Philippines].

10. *Turpinia macrosperma* C. C. Huang, Fl. Yunnan. 2: 358. 1979.

大籽山香圆 da zi shan xiang yuan

Trees, ca. 8 m tall, some up to 20 m; branches black-brown when dry. Leaves odd-pinnate; petiole 1–1.5 cm, glabrous; rachis up to 30 cm; leaflets (5–)7; leaflet blades oval to oblong-oval, 12–16.5 × 5.5–7 cm, papery or thinly papery, glabrous, lateral veins 7–9 pairs, conspicuous abaxially, base obtuse-rounded, margin serrate, apex acuminate to obtuse with cusp. Panicle terminal. Flower not seen. Ovary 2- or 4-locular; ovule 1 per locule. Berry green, irregularly globose, 1–1.2 cm in diam., exocarp thin, ca. 0.2 mm. Seeds yellowish, 8–10 mm in diam., lustrous.

• Moist forests; 1100–1400 m. Yunnan (Gongshan).

11. *Turpinia robusta* Craib, Bull. Misc. Inform. Kew 1926: 361. 1926.

粗壮山香圆 cu zhuang shan xiang yuan

Trees, ca. 8 m tall; branches glabrous, bark red-brown,

lenticels impressed. Leaves trifoliolate, rarely 4-foliolate; rachis gray-white when dry, glabrous; petiolule 3–10 mm, adaxially sulcate, with 2 glands present at apex; leaflet blades oblong to oblong-ovate or oblong-obovate, ca. 14 × 6 cm, leathery or thinly leathery, lateral veins 8(–10) pairs, conspicuous abaxially, base obtuse, rarely cuneate, margin serrulate or crenate, apex acuminate. Panicle axillary, 8–15 cm; bracts 2 present at peduncle apex, ca. 6 × 2.5(–4) mm, caducous, glabrous. Pedicel 0.7–4 cm. Sepals nearly ovate or oblong-ovate, ca. 1.75 × 1.5 mm, ciliate, apex obtuse. Petals obovate, ca. 2 × 1.5 mm, ciliate, apex obtuse. Filaments ca. 1.5 mm, glabrous, base broad and acuminate to apex; anthers ca. 0.75 mm. Floral disk undulate. Styles 3, short, free at apex. Fruit not seen. Fl. starting in Jan.

Limestone forests; ca. 900 m. S Yunnan [N Thailand].

**12. *Turpinia montana*** (Blume) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46: 182. 1875.

山香圓 shan xiang yuan

*Zanthoxylum montanum* Blume, Bijdr. 248. 1825; *Turpinia glaberrima* Merrill; *T. glaberrima* var. *stenophylla* Merrill & L. M. Perry; *T. gracilis* Nakai; *T. montana* var. *glaberrima* (Merrill) T. Z. Hsu; *T. montana* var. *stenophylla* (Merrill & L. M. Perry) T. Z. Hsu; *T. parva* Koorders & Valetton.

Small trees; branches greenish white. Leaves odd-pinnate; rachis ca. 15 cm, slim; leaflets 5; terminal petiolule up to 15 mm, slender, green, lateral ones 2–3 mm; leaflet blades oblong to oblong-oval, (4–)4.5–6 × 1.5–4 cm, papery, glabrous, adaxially green, abaxially greenish, lateral veins many, conspicuous abaxially and faint adaxially, base broadly cuneate, margin sparsely crenate or serrate, apex cuspidate with cusp 5–7 mm. Inflorescence terminal, main axis up to 17 cm. Flowers small, ca. 3 mm in diam., densely arranged on panicle. Sepals broadly ovate, ca. 1.3 mm, glabrous. Petals ovate to rounded, ca. 2 mm, tomentose or glabrescent. Filaments glabrous. Ovary 2- or 3-locular; ovule 1 per locule. Berry dark purple, globose, 4–7 mm in diam., exocarp thin, ca. 0.2 mm.

Forests on slopes, dense forests, moist forests. Guangdong, Guangxi, Guizhou, Yunnan [India, Indonesia (Java, Sumatra), Myanmar, Thailand, Vietnam].

**13. *Turpinia cochinchinensis*** (Loureiro) Merrill, J. Arnold Arbor. 19: 43. 1938.

越南山香圓 yue nan shan xiang yuan

*Triceros cochinchinensis* Loureiro, Fl. Cochinch. 1: 184. 1790; *Maurocena cochinchinensis* (Loureiro) Kuntze; *Turpinia microcarpa* Wight & Arnott; *T. nepalensis* Wallich ex Wight & Arnott.

Trees, deciduous, 6–7(–12) m tall; old branches dark brown or black-brown, young branches gray, lenticels brown, impressed. Leaves odd-pinnate, 15–21 cm; leaflets 3–5; leaflet blades oblong to oblong-obovate, (6–)10–12(–13) × 2.5–4(–5)

cm, leathery, glabrous, lateral veins 7 or 8(–10) pairs, conspicuous, base acute, margin crenately serrate, apex acuminate. Panicle terminal or axillary, compact, with densely arranged small flowers, 8–14(–23) cm; bracts and bracteoles small, caducous. Sepals broadly ovate, 1–1.5 mm, margin white. Petals oblong, ca. 2 mm. Stamens as long as petals; anthers rounded with 2 thecae. Floral disk undulate. Styles 3, ca. 1 mm; stigma nearly saucer-shaped. Berry dark brown, ca. 7 mm in diam., with 3 short horns (remains of styles).

Moist and shady forests; 1200–2100 m. Guangdong, Guangxi, Guizhou, Sichuan, S Yunnan [Bhutan, India, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

Fl. China 11: 500–504. 2008.