

## PROTEACEAE

山龙眼科 shan long yan ke

Qiu Huaxing (邱华兴 Chiu Hua-hsing, Kiu Hua-xing)<sup>1</sup>; Peter H. Weston<sup>2</sup>

Trees or shrubs. Stipules absent. Leaves alternate, rarely opposite or whorled, simple or variously divided. Inflorescences axillary, ramiflorous, cauliflorous, or terminal, simple or rarely compound, with flowers borne laterally either in pairs or sometimes singly, racemose, sometimes spicate, paniculate, or condensed into a head; bracts subtending flower pairs usually small, sometimes accrescent and woody; floral bracts usually minute or absent. Flowers bisexual or rarely unisexual and dioecious, actinomorphic or zygomorphic. Perianth segments (3 or)4(or 5), valvate, usually tubular in bud; limb short, variously split at anthesis. Stamens 4, opposite perianth segments; filaments usually adnate to perianth and not distinct; anthers basifixed, usually 2-loculed, longitudinally dehiscent, connective often prolonged. Hypogynous glands 4 (or 1–3 or absent), free or variously connate. Ovary superior, 1-loculed, sessile or stipitate; ovules 1 or 2(or more), pendulous, laterally or basally, rarely subapically attached. Style terminal, simple, often apically clavate; stigma terminal or lateral, mostly small. Fruit a follicle, achene, or drupe or drupaceous. Seeds 1 or 2(or few to many), sometimes winged; endosperm absent (or vestigial); embryo usually straight; cotyledons thin or thick and fleshy; radicle short, inferior.

About 80 genera and ca. 1700 species: mostly in tropics and subtropics, especially in S Africa and Australia: three genera (one introduced) and 25 species (12 endemic, two introduced) in China.

The family is subdivided into Bellendoideae, Caranarvonioideae, Eidotheoideae, Grevilleoideae, Persoonioideae, Proteoideae, and Sphalmioideae; all Chinese genera belong to Grevilleoideae. *Grevillea robusta* is grown extensively as a street tree in S China, especially in Yunnan.

Kiu hua-shing. 1988. Proteaceae. In: Kiu Hua-shing & Ling Yeou-ruenn, eds., Fl. Reipubl. Popularis Sin. 24: 6–29.

- 1a. Leaves whorled ..... 3. *Macadamia*
- 1b. Leaves alternate.
  - 2a. Flowers bisexual; fruit dry, with leathery to woody pericarp; leaves simple, margin entire or toothed ..... 1. *Helicia*
  - 2b. Flowers unisexual and plants dioecious; fruit drupaceous; leaves simple or tripartite to pinnatifid, margin entire ..... 2. *Heliciopsis*

### 1. HELICIA Loureiro, Fl. Cochinch. 1: 83. 1790.

山龙眼属 shan long yan shu

Trees, rarely shrubs. Leaves alternate, rarely ± opposite or ± whorled, petiolate or subsessile, simple, margin entire or serrate. Inflorescence axillary, ramiflorous, rarely subterminal, a raceme of flower pairs, many-flowered. Flowers bisexual; bracts of flowers and flower pairs small, ovate-acuminate to subulate, rarely foliaceous, caducous, rarely persistent. Flower pairs sessile (“pedicels free”) or with a basal common peduncle (“pedicels connate”). Perianth tube straight, slender, limb clavate to ± globose, segments free and revolute at anthesis. Stamens subsessile, attached slightly below limb; anthers oblong; connective apiculate. Pollen grains triporate, exine scabrate-granulate. Hypogynous glands 4, free or connate into a ring or cup. Ovary sessile; ovules 2, anatropous, inserted at base of locule or laterally on wall. Style slender; stigma terminal, punctiform. Fruit usually indehiscent, although sometimes splitting along ventral suture; pericarp mostly thick and leathery. Seeds 1 or 2, ± globose to hemispheric; testa thin; cotyledons fleshy, apically rugulose.

About 97 species: from S India and Japan to SE Australia, mainly in SE Asia and New Guinea; 20 species (ten endemic) in China.

- 1a. Ovary densely hairy.
  - 2a. Young leaves and flowers flexuose rust-colored tomentose; fruit brown, ± globose ..... 1. *H. vestita*
  - 2b. Young leaves and flowers rust-colored tomentulose; fruit purplish black, obovoid to ellipsoid ..... 2. *H. obovatifolia*
- 1b. Ovary glabrous.
  - 3a. Branchlets (apices excepted in some species) and leaves glabrous when young.
    - 4a. Branchlets apically glabrous.
      - 5a. Fruit apex not beaked; pericarp leathery, ca. 0.5 mm thick ..... 17. *H. cochinchinensis*
      - 5b. Fruit apex markedly beaked; pericarp woody, 1–1.5 mm thick.
        - 6a. Leaf blade leathery, margin entire or remotely denticulate; petiole 10–20 mm; rachis and pedicel pilosulose; pedicel 2.5–3 mm; perianth ca. 2.5 cm, pilosulose ..... 11. *H. dongxingensis*
        - 6b. Leaf blade papery, margin serrate on apical half; petiole 1–6 mm; rachis and pedicel glabrous; pedicel 3–5 mm; perianth 1.5–2.2 cm, glabrous ..... 12. *H. hainanensis*
    - 4b. Branchlets apically hairy.

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- 7a. Bracts of flower pairs 4–10 mm ..... 18. *H. shweliensis*  
 7b. Bracts of flower pairs 1–3 mm.  
     8a. Leaf blade with reticulate veins conspicuous on both surfaces.  
         9a. Perianth 1.3–1.6 cm; hypogynous glands basally connate ..... 14. *H. reticulata*  
         9b. Perianth 1–1.4 cm; hypogynous glands free ..... 15. *H. rengetiensis*  
     8b. Leaf blade with reticulate veins conspicuous only on adaxial surface.  
         10a. Petiole 2–4.5 cm; perianth white, 1.6–2.5 cm; hypogynous glands connate ..... 19. *H. longipetiolata*  
         10b. Petiole 0.8–2 cm; perianth greenish white or reddish, 1.2–1.6 cm; hypogynous glands free ..... 20. *H. falcata*  
 3b. Branchlets and leaves densely hairy when young.  
     11a. Leaves and rachis of inflorescences hairy when young, mature leaf blade glabrescent.  
         12a. Reticulate veins inconspicuous ..... 16. *H. kwangtungensis*  
         12b. Reticulate veins conspicuous.  
             13a. Pericarp woody.  
                 14a. Bracts of flower pairs ovate, ca. 1 mm; pedicel glabrous, 3–4 mm; perianth 1.2–1.5 cm ..... 9. *H. tsaii*  
                 14b. Bracts of flower pairs lanceolate, ca. 2 mm; pedicel pilosulose, 6–7 mm; perianth 1.6–1.8 cm ..... 10. *H. tibetensis*  
             13b. Pericarp leathery.  
                 15a. Bracts of flower pairs ca. 1 mm, pilose; fruit dark green, ± globose, 2.5–3.5 cm in diam.; pericarp 1.5–3 mm thick ..... 13. *H. nilagirica*  
                 15b. Bracts of flower pairs 1.5–2 mm, glabrous; fruit black, broadly ellipsoid, ca. 1.5 cm in diam.; pericarp ca. 1 mm thick ..... 14. *H. reticulata*  
     11b. Leaves and rachis of inflorescence rust-colored tomentose when young, mature leaf blade adaxially hairy or with hairs along midvein.  
         16a. Perianth 2–3 cm; rachis 2–4 mm in diam. at anthesis.  
             17a. Petiole 0.2–1.5 cm; leaf blade ± leathery, abaxially tomentose ..... 3. *H. grandis*  
             17b. Petiole 2.5–3 cm; leaf blade papery, abaxially pilose along midvein ..... 4. *H. pyrrobotrya*  
         16b. Perianth 1–2 cm; rachis 1–2.5 mm in diam. at anthesis.  
             18a. Perianth 1–1.4 cm, glabrous; pericarp leathery.  
                 19a. Mature leaf blade oblanceolate, adaxially pilose along midvein, margin dentiform serrate; rachis 1.5 mm in diam. .... 5. *H. silvicola*  
                 19b. Mature leaf blade broadly obovate-oblong to obovate, both surfaces pilose along midvein, margin remotely serrate or rarely entire; rachis 2.5 mm in diam. .... 6. *H. clivicola*  
             18b. Perianth 1.4–2 cm, pilose; pericarp woody.  
                 20a. Perianth 1.5–2 cm; mature leaf blade abaxially pilose along all veins, margin toothed; inflorescences 10–24 cm ..... 7. *H. formosana*  
                 20b. Perianth 1.4–1.5 cm; mature leaf blade abaxially pilose along midvein, margin entire; inflorescences 7–8 cm ..... 8. *H. yangchunensis*

**1. *Helicia vestita*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 181. 1918.

浓毛山龙眼 nong mao shan long yan

Trees 5–25 m tall. Branchlets flexuose rust-colored tomentose. Petiole 1.5–5 cm, tomentose; leaf blade obovate, ovate-oblong, obovate-oblong, or oblanceolate, 17–24 × 4–8 cm, ± leathery, abaxially flexuose rust-colored tomentose, adaxially glabrescent, base cuneate, margin subentire, serrulate or serrate on apical half, apex acute to rarely shortly acuminate; secondary veins 7–11 on each side of midvein, conspicuous; reticulate veins distinct. Inflorescences axillary or ramiflorous, 8–15 cm, flexuose rust-colored tomentose; bracts of flower pairs narrowly ovate or deltoid, 1–2 mm; floral bracts ca. 0.5 mm. Pedicels free, 1.5–2.5 mm. Perianth light brown, 1.2–1.8 cm; limb shortly clavate, ca. 2 mm in diam. Anthers 3–4 mm. Hypogynous glands ovoid, free, crowded together. Ovary rust-colored villous. Style glabrous. Fruit brown, ± globose, 2.5–3 cm in diam., apex apiculate; pericarp ca. 1 mm thick, leathery or woody, roughish. Fl. Mar–Aug, fr. Sep–Feb.

Rain forests, forests, mountains, mountain slopes, valleys; 600–1800 m. SE Xizang, Yunnan [Thailand].

- 1a. Pedicel 2–2.5 mm; perianth 1.6–1.8 cm ..... 1a. var. *vestita*  
 1b. Pedicel ca. 1.5 mm; perianth ca. 1.2 cm ..... 1b. var. *longipes*

**1a. *Helicia vestita* var. *vestita***

浓毛山龙眼(原变种) nong mao shan long yan (yuan bian zhong)

Trees 5–10 m tall. Petiole 1.5–2.5 cm; leaf blade obovate-oblong to oblanceolate, 20–24 × 4–8 cm, margin serrate on apical half. Inflorescences 8–14 cm; bracts of flower pairs narrowly ovate, 1–2 mm. Pedicel 2–2.5 mm. Perianth 1.6–1.8 cm. Fruit ca. 2.5 cm in diam.; pericarp leathery. Fl. Mar–May, fr. Sep–Nov.

Rain forests, mountains, valleys; 600–1400 m. Yunnan [Thailand].

**1b. *Helicia vestita* var. *longipes*** W. T. Wang in C. Y. Wu, Fl. Xizang 1: 568. 1983.

锈毛山龙眼 xiu mao shan long yan

Trees to 25 m tall. Petiole 1.5–5 cm; leaf blade ovate-oblong to obovate, 17–21 × 7–8 cm, margin subentire or serrulate. Inflorescences 12–15 cm; bracts of flower pairs deltoid, ca. 1.5 mm. Pedicel ca. 1.5 mm. Perianth ca. 1.2 cm. Fruit ca. 3 cm in diam.; pericarp woody. Fl. May–Aug, fr. Jan–Feb of following year.

- Forests, mountain slopes; 900–1800 m. SE Xizang (Médog).

**2. *Helicia obovatifolia*** Merrill & Chun, *Sunyatsenia* 5: 45. 1940.

倒卵叶山龙眼 *dao luan ye shan long yan*

Trees 6–14 m tall; branchlets, leaves, inflorescences, and flowers rust-colored tomentulose. Petiole 1.5–6 cm; leaf blade obovate, ovate, obovate-oblong, or broadly oblanceolate, 7–28 × 4–15 cm, leathery, glabrescent, base cuneate, margin entire or serrulate to serrate on apical half, apex rounded, abruptly ± acute, acute, or shortly acuminate; secondary veins 6–12 on each side of midvein, raised on both surfaces; reticulate veins conspicuous. Inflorescences axillary, 5–16 cm; bracts of flower pairs ovate, ca. 1.5 mm; floral bracts deltoid, ca. 1 mm. Pedicels free, 1–3 mm. Perianth white to yellow-brown, 1–1.4 cm; limb ovoid, ca. 1.5 mm in diam. Anthers 2–2.5 mm. Hypogynous glands ovoid, free or basally connate, crowded together. Ovary densely pubescent. Style glabrous. Fruit purplish black, obovoid to ellipsoid, 3–5 × 2–3.5 cm, apex apiculate; pericarp 1.5–2 mm thick, leathery. Fl. Jun–Oct, fr. Oct–Dec.

Forests, rain forests, montane evergreen broad-leaved forests, mountain slopes, valleys; 100–1000 m. Guangdong, Guangxi, Hainan [Vietnam].

- 1a. Leaf blade obovate to ovate, apex rounded to abruptly ± acute; hypogynous glands free ..... 2a. var. *obovatifolia*  
 1b. Leaf blade obovate-oblong to broadly oblanceolate, apex acute to shortly acuminate; hypogynous glands basally connate ..... 2b. var. *mixta*

**2a. *Helicia obovatifolia* var. *obovatifolia***

倒卵叶山龙眼(原变种) *dao luan ye shan long yan (yuan bian zhong)*

Leaf blade obovate to ovate, 7–13 × 4–7 cm, margin entire or serrulate on apical half, apex rounded or abruptly ± acute; secondary veins 6–8 on each side of midvein. Inflorescences 5–10 cm. Pedicel ca. 1 mm. Perianth 1–1.2 cm. Hypogynous glands free. Fl. Jul–Aug, fr. Oct–Nov.

Rain forests, montane evergreen broad-leaved forests; 300–1000 m. Guangdong, Guangxi [Vietnam].

**2b. *Helicia obovatifolia* var. *mixta*** (H. L. Li) Sleumer, *Blumea* 8: 32. 1955.

枇杷叶山龙眼 *pi pa ye shan long yan*

*Helicia vestita* W. W. Smith var. *mixta* H. L. Li, *J. Arnold Arbor.* 24: 444. 1943.

Leaf blade obovate-oblong to broadly oblanceolate, 9–28 × 5–15 cm, margin coarsely serrate or serrulate in upper half, sometimes entire, apex acute to shortly acuminate; secondary

veins 9–12 on each side of midvein. Inflorescences 10–16 cm. Pedicel 2–3 mm. Perianth 1.2–1.4 cm. Hypogynous glands connate into a crenulate ring. Fl. Jun–Jul, fr. Oct–Dec.

Forests, mountain slopes, valleys; 100–1000 m. Guangdong, Guangxi, Hainan [N Vietnam].

This variety provides timber.

**3. *Helicia grandis*** Hemsley, *Hooker's Icon. Pl.* 27: t. 2631. 1900.

大山龙眼 *da shan long yan*

Trees 3–10 m tall; branchlets, young leaves, and inflorescences rust-colored tomentose. Leaves alternate or crowded apically on twigs; petiole stoutish, 2–15 mm, tomentose; leaf blade obovate-oblong to oblanceolate, 15–38 × 7–12 cm, ± leathery, abaxially tomentose, adaxially glabrescent, base cuneate to obtuse, margin serrulate; secondary veins 11–21 on each side of midvein; reticulate veins conspicuous. Inflorescences axillary or ramiflorous, 10–30 cm; rachis 2–4 mm in diam.; bracts of flower pairs lanceolate, 2–3 mm; floral bracts subulate, 1–2 mm. Pedicels 2–5 mm, connate to middle. Perianth red, 2–3 cm, tomentose; limb ellipsoid, ca. 3 mm in diam. Anther ca. 2 mm. Hypogynous glands connate into a crenate cup. Ovary glabrous. Fruit dull brown, ellipsoid to ± globose, ca. 4 × 3 cm, apex apiculate; pericarp ca. 0.5 mm thick, leathery. Fl. Mar–Aug, fr. Oct–Dec.

Mountainous regions, forests in moist mountain valleys; 1100–2400 m. S to SE Yunnan [N Vietnam].

**4. *Helicia pyrrhobotrya*** Kurz, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 42(2): 103. 1873.

焰序山龙眼 *yan xu shan long yan*

Trees 8–10 m tall. Young branchlets rust-colored tomentose, soon glabrescent. Leaves alternate or crowded apically on twigs; petiole 2.5–3 cm, pilose; leaf blade obovate-oblong, sometimes broadly oblanceolate, 32–50 × 9–16 cm, papery, base cuneate and decurrent into petiole, abaxially pilose along midvein, adaxially glabrescent, margin remotely serrulate, apex shortly acuminate, rarely obtuse; secondary veins 11–19 on each side of midvein, abaxially raised. Inflorescences ramiflorous, 20–30 cm; rachis 2.5–3 mm in diam.; bracts of flower pairs narrowly triangular, ca. 1.5 mm; floral bracts lanceolate, ca. 0.5 mm. Pedicels 4–5 mm, basally connate. Perianth yellowish, 2–2.8 cm, pilose; limb ellipsoid, ca. 3 mm in diam. Anthers ca. 2.5 mm. Hypogynous glands connate into a crenate cup. Ovary glabrous. Fruit brown, ± globose, 2.5–4 cm in diam.; pericarp ca. 0.5 mm thick, leathery, roughish. Fl. Apr–Aug, fr. Sep–Mar.

Montane forests; 700–1600 m. Guangxi (Napo), S Yunnan [Myanmar]

**5. *Helicia silvicola*** W. W. Smith, *Notes Roy. Bot. Gard. Edinburgh* 10: 181. 1918.

林地山龙眼 *lin di shan long yan*

Trees 6–15 m tall; branchlets and rachis of inflorescence rust-colored tomentose. Petiole 1.5–2.5 cm; leaf blade oblanceolate, 14–29 × 3–7 cm, ± leathery, base cuneate to attenuate

and somewhat decurrent into petiole, abaxially glabrescent, adaxially pilose along midvein, margin dentiform serrate, apex acuminate to ± caudate; secondary veins 9–12 on each side of midvein. Inflorescences axillary, 8–17 cm; rachis ca. 1.5 mm in diam.; bracts of flower pairs lanceolate, 2(–3) mm; floral bracts lanceolate, 0.5–1 mm. Pedicels 3–4 mm, basally connate, pilose. Perianth yellowish, 1.1–1.2 cm, glabrous. Anthers ca. 2 mm. Hypogynous glands ellipsoid, basally ± connate. Ovary glabrous. Fruit dark green, ± globose, ca. 3 cm in diam., basally contracted into a short stipe, splitting tardily along distinct rib, apically apiculate; pericarp 1.5–2 mm thick, hard, leathery. Fl. Jul–Aug, fr. Oct–Apr.

- Montane forests; 1500–2100 m. S Yunnan.

**6. *Helicia clivicola*** W. W. Smith, Notes Roy. Bot. Edinburgh 10: 179. 1918.

山地山龙眼 shan di shan long yan

Shrubs or trees, 5–12 m tall; branchlets, young leaves, and rachis of inflorescence rust-colored tomentose. Petiole 1.5–4 cm; leaf blade broadly obovate-oblong to obovate, 14–24 × 7–10 cm, leathery, base cuneate to broadly cuneate, abaxially pilose along midvein and veins, adaxially pilose along midvein, margin remotely serrate, rarely entire, apex acute to shortly acuminate; secondary veins 6–9 on each side of midvein, abaxially conspicuous; reticulate veins abaxially flat or impressed, adaxially raised. Inflorescences solitary or in pairs, axillary, 10–22 cm; rachis ca. 2.5 mm in diam.; bracts of flower pairs ovate-acuminate, 2–3 mm; floral bracts lanceolate, ca. 1.5 mm. Pedicels ca. 4 mm, basally connate. Perianth yellowish, 1–1.4 cm, glabrous. Anthers 2–2.5 mm. Hypogynous glands ellipsoid, free. Ovary glabrous. Fruit dark green, ± globose, 2–2.5 cm in diam., base contracted into a short stipe, apex apiculate; pericarp ca. 1.5 mm thick, leathery. Fl. May–Jul, fr. Oct–Dec.

- Montane forests; 1100–2100 m. W Yunnan.

**7. *Helicia formosana*** Hemsley, J. Linn. Soc., Bot. 26: 394. 1891.

山龙眼 shan long yan

*Helicia formosana* var. *oblanceolata* Sleumer.

Trees 3–10 m tall; young branchlets and inflorescence rust-colored tomentose. Petiole 3–10 mm; leaf blade elliptic to ovate-oblong, 10–25 × 2.5–7 cm, ± leathery to papery, abaxially pilose along veins, glabrescent, adaxially glabrous, base cuneate, margin toothed, apex acuminate to acute; midvein raised on both surfaces; secondary veins 8–12 on each side of midvein, abaxially prominent. Inflorescences ramiflorous, rarely axillary, 10–24 cm; bracts of flower pairs deltoid, 1–2 mm; floral bracts lanceolate, 0.5–1 mm. Pedicels 2–5 mm, basally connate. Perianth whitish to yellowish, 1.5–2 cm, pilose. Anthers 1.5–2 mm. Hypogynous glands ovoid, free, rarely basally connate. Ovary glabrous. Fruit brownish, ± globose, roughish, 1.5–3 cm in diam., apex apiculate; pericarp 1–1.5 mm thick, woody. Fl. Apr–Jun, fr. Nov–Feb.

Forests on mountain slopes or valleys; 100–1000 m. Guangxi, Hainan, Taiwan [Laos, Thailand, N Vietnam].

This species provides timber.

**8. *Helicia yangchunensis*** H. S. Kiu, Guihaia 15: 110. 1995.

阳春山龙眼 yang chun shan long yan

Trees 4–6 m tall. Branchlets rust-colored tomentose when young. Petiole 1.5–2 cm; leaf blade oblong to ovate-elliptic, 7–11 × 3–4.5 cm, ± leathery, abaxially pilose along midvein, glabrescent, adaxially shiny, base cuneate and decurrent into petiole, margin entire, apex blunt and shortly apiculate; secondary veins 6–8 on each side of midvein. Inflorescences axillary or ramiflorous, 7–8 cm, rust-colored tomentose; bracts of flower pairs deltoid, ca. 1 mm; floral bracts ca. 0.5 mm. Pedicels ca. 3 mm, basally connate. Perianth whitish, 1.4–1.5 cm, appressed pilosulose; limb clavate, ca. 2 mm in diam. Anthers ca. 3 mm. Hypogynous glands obovate, free, crowded together into a ring. Ovary glabrous. Fruit dark green, ellipsoid, ca. 1.7 × 1.5 cm, basally somewhat rounded, apex shortly apiculate; pericarp woody, ca. 1 mm thick; pedicel 3.5–4 mm thick. Fl. Jun–Jul, fr. Oct–Nov.

- Forests, hilly slopes, often along streams; 600–700 m. Guangdong (Yangchun).

**9. *Helicia tsaii*** W. T. Wang, Acta Phytotax. Sin. 5: 292. 1956.

潞西山龙眼 lu xi shan long yan

Trees 6–10 m tall. Branchlets apically rust-colored pubescent, glabrescent. Petiole 1–2 cm; leaf blade oblong-lanceolate to obovate-oblong, papery to ± leathery, glabrescent, base cuneate, margin entire or remotely denticulate, apex acute to shortly acuminate; midvein and secondary veins raised on both surfaces; secondary veins 8–11 on each side of midvein; reticulate veins conspicuous on both surfaces. Inflorescences solitary or in pairs, axillary, 12–15 cm; rachis slender, pubescent, gradually glabrescent; bracts of flower pairs ovate, ca. 1 mm, ciliate; floral bracts ca. 0.5 mm. Pedicels 3–4 mm, glabrous, basally connate. Perianth white, 1.2–1.5 cm, glabrous. Anthers 2–3 mm. Hypogynous glands connate into a crenulate cup. Ovary glabrous. Fruit ± globose, ca. 3 cm in diam.; pericarp ca. 1.5 mm thick, woody. Fl. Feb–Apr. fr. Jun–Jul.

- Montane forests; 1400–2100 m. SW Yunnan.

**10. *Helicia tibetensis*** H. S. Kiu, Acta Phytotax. Sin. 18: 524. 1980.

西藏山龙眼 xi zang shan long yan

Trees (8–)15–30 m tall. Branchlets apically dark brown pilosulose, glabrescent. Petiole 1–2 cm; leaf blade obovate to obovate-oblong, 22–25 × 6.5–10 cm, papery, glabrescent, base cuneate, margin serrulate on apical half, apex abruptly acuminate; secondary veins 7–9 on each side of midvein, abaxially raised; reticulate veins conspicuous on both surfaces. Inflorescences axillary or ramiflorous, (15–)24–30 cm; rachis and pedicel pilosulose; bracts of flower pairs lanceolate, ca. 2 mm, pilosulose; floral bracts linear, 0.5–1 mm. Pedicels connate to middle, 6–7 mm, pilosulose. Perianth yellowish, 1.6–1.8 cm, glabrous. Anthers ca. 3 cm in diam., basally contracted into a short free filament, apex apiculate. Ovary glabrous. Fruit minutely verruculose; pericarp 1–1.5 mm, thickly woody. Fl. and fr. May–Sep.

• Broad-leaved evergreen forests, mountain slopes; 1700–2000 m. Xizang (Médog), Yunnan (Tengchong).

**11. *Helicia dongxingensis*** H. S. Kiu, Guihaia 15: 111. 1995.

东兴山龙眼 dong xing shan long yan

Trees 5–8 m tall. Branchlets terete, glabrous. Petiole 1–2 cm; leaf blade lanceolate to oblong-lanceolate, 10–20 × 2–4 cm, leathery, base cuneate and slightly decurrent, glabrous, margin entire or remotely denticulate, apex acuminate to long acuminate; midvein adaxially slightly impressed; secondary veins 7–10 on each side of midvein, basally straight, curved upward and anastomosing before margin. Inflorescences ramiflorous, 11–12 cm; rachis and pedicel appressed brown pilosulose; bracts of flower pairs lanceolate, ca. 1 mm; floral bracts ca. 0.2 mm. Pedicels 2.5–3 mm, connate to middle. Perianth whitish, ca. 2.5 cm; limb ellipsoid, appressed pilosulose. Anthers ca. 4 mm. Hypogynous glands connate. Ovary glabrous. Fruit base contracted into a short stipe, apex markedly beaked; pericarp ca. 1 mm thick, woody.

• Mixed forests, hilly slopes, often by streams; 100–500 m. S Guangxi.

Records of the Vietnamese species *Helicia cauliflora* Merrill from China (in FRPS) are now determined as *H. dongxingensis*.

**12. *Helicia hainanensis*** Hayata, Icon. Pl. Formosan. 9: 87. 1920.

海南山龙眼 hai nan shan long yan

Shrubs or trees, 2–12(–18) m tall; glabrous. Leaves alternate or 3 or 4, ± verticillate; petiole subsessile, 1–3(–6) mm; leaf blade broadly oblanceolate to obovate-oblong, 11–25 × 3.5–8 cm, papery, base cuneate or obtuse, margin serrate on apical half; secondary veins 7 or 8(–12) on each side of midvein, abaxially raised; reticulate veins distinct on both surfaces. Inflorescences axillary, 10–23 cm, glabrous; bracts of flower pairs deltoid, ca. 1 mm; floral bracts less than 0.5 mm. Pedicels 3–5 mm, basally connate. Perianth whitish, 1.5–2.2 cm, glabrous. Anthers 2–3 mm. Hypogynous glands connate into a 4-toothed ring. Ovary glabrous. Fruit brownish, ellipsoid, apex markedly beaked, 3–5 × 2.2–4 cm; pericarp 1–1.5 mm thick, woody. Fl. Apr–Aug, fr. Nov–Mar.

Forests or secondary forests, mountain slopes, along streams; 100–1500 m. E Guangdong, E to SE Guangxi, Hainan, SE Yunnan [Laos, Thailand, N Vietnam].

**13. *Helicia nilagirica*** Beddome, Madras J. Lit. Sci., ser. 3, 1: 56. 1864.

深绿山龙眼 shen lü shan long yan

*Helicia cornifolia* W. T. Wang; *H. erratica* J. D. Hooker; *H. erratica* var. *sinica* W. T. Wang; *H. stricta* Diels.

Trees 5–15 m tall. Branchlets apically densely rust-colored pilosulose, glabrescent. Petiole 0.5–2(–3.5) cm; leaf blade papery to ± leathery, glabrescent in age, base cuneate and somewhat decurrent into petiole, margin entire, sometimes distinctly serrate or serrate on apical half, apex shortly acuminate, ±

acute, or obtuse; secondary veins 5–8(–10) on each side of midvein, abaxially raised; reticulate veins conspicuous on both surfaces. Inflorescences axillary or ramiflorous, 10–18(–24) cm, rust-colored tomentose when young, glabrescent; bracts of flower pairs lanceolate, ca. 1 mm, pilose; floral bracts ca. 0.5 mm. Pedicels 1.5–4.5 mm, basally connate. Perianth white or yellowish, 1.2–1.8 cm, glabrescent. Anthers ca. 2.5 mm. Hypogynous glands free or connate into a 4-lobed cup. Ovary glabrous. Fruit dark green, ovoid to globose, (2–)2.5–3.5 cm in diam., base contracted into a short stipe, apex shortly apiculate; pericarp 1.5–3 mm, hard, leathery. Fl. May–Aug, fr. Nov–Jul.

Broad-leaved evergreen forests, mountain slopes, valleys; 1000–2000 m. Yunnan [Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

**14. *Helicia reticulata*** W. T. Wang, Acta Phytotax. Sin. 5: 300. 1956.

网脉山龙眼 wang mai shan long yan

*Helicia cochinchinensis* Loureiro var. *pseuderratica* Sleumer; *H. reticulata* var. *parvifolia* W. T. Wang.

Shrubs or small trees, 3–10 m tall. Branchlets and mature leaves glabrescent. Petiole 0.5–1.5(–3) cm; leaf blade oblong, obovate, or oblanceolate, (5.5–)7–27 × (2–)3–10 cm, leathery to ± leathery, base cuneate, margin remotely serrate to serrulate, apex shortly acuminate, acute, or obtuse; midvein and secondary veins raised on both surfaces; secondary veins 6–12 on each side of midvein; reticulate veins conspicuous on both surfaces. Inflorescences axillary or ramiflorous, 7–15 cm, glabrous, sometimes rachis and pedicel pilose but soon glabrescent; bracts of flower pairs lanceolate, 1.5–2 mm, glabrous; floral bracts ca. 0.5 mm. Pedicels 2–5 mm, connate basally or to middle. Perianth white or yellowish, 1.3–1.6 cm. Anthers ca. 3 cm. Hypogynous glands basally connate, 4-parted. Ovary glabrous. Fruit black, ellipsoid, 1.5–1.8 × ca. 1.5 cm, apex apiculate; pericarp ca. 1 mm thick, leathery. Fl. May–Jul, fr. Oct–Dec.

• Forests or secondary thickets, hilly slopes, mountain ridges; 300–2100 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, SE Yunnan.

**15. *Helicia rengetiensis*** Masamune, Bull. Tokyo Univ. Forest 39: 143. 1951.

莲花池山龙眼 lian hua chi shan long yan

*Helicia cochinchinensis* Loureiro var. *rengetiensis* (Masamune) S. S. Ying; *H. obovata* Y. C. Liu (1958), not Bennett (1838).

Trees 4–8 m tall. Branchlets apically brownish pubescent; branchlets and mature leaves glabrescent. Petiole 0.5–2.5 cm; leaf blade oblong to obovate, 8–15 × 5–7 cm, leathery, base cuneate, margin remotely serrate, apex acute to acuminate; secondary veins 6–10 on each side of midvein; secondary and reticulate veins conspicuous on both surfaces. Inflorescences axillary, 9–20 cm, glabrous; bracts of flower pairs lanceolate, 1–2 mm. Pedicels 4–7 mm, basally connate. Perianth white or yellowish, 1–1.4 cm. Anthers ca. 3 mm. Hypogynous glands free, crowded together. Ovary glabrous. Fruit black, ellipsoid,

ca. 1.5 cm in diam.; pericarp leathery. Fl. May–Jul, fr. Aug–Oct.

- Thickets, hilly slopes; 100–200 m. Taiwan.

**16. *Helicia kwangtungensis*** W. T. Wang, Acta Phytotax. Sin. 5: 297. 1956.

广东山龙眼 *guang dong shan long yan*

*Helicia chunii* W. T. Wang; *H. cochinchinensis* Loureiro var. *lungtauensis* Sleumer.

Trees 4–10 m tall. Branchlets and leaves rust-colored pubescent when young, glabrescent. Petiole 1–2.5 cm; leaf blade oblong to obovate, 10–26 × 6–12 cm, papery or leathery, base cuneate, margin remotely serrulate on apical half, sometimes entire, apex shortly acuminate, acute, or rarely obtuse; secondary veins 5–8 on each side of midvein, abaxially conspicuous; reticulate veins inconspicuous on both surfaces. Inflorescences solitary or in pairs, axillary, 14–20 cm; rachis and pedicel densely brown pubescent; bracts of flower pairs narrowly triangular, ca. 2 mm, pubescent. Perianth yellowish, 1.2–1.4 cm, pubescent or glabrous. Anthers ca. 3 mm. Hypogynous glands ovoid, free, crowded together. Ovary glabrous. Fruit dark purple to black when fully ripe, ± globose, 1.5–2.5 cm in diam., apex very shortly apiculate; pericarp ca. 1 mm thick, leathery. Fl. Jun–Jul, fr. Oct–Dec.

- Broad-leaved evergreen forests, mountain slopes; 400–800(–1200) m. E Fujian, Guangdong, Guangxi, S Hunan, S Jiangxi.

This species provides timber.

**17. *Helicia cochinchinensis*** Loureiro, Fl. Cochinch. 1: 83. 1790.

小果山龙眼 *xiao guo shan long yan*

*Helicia annularis* W. W. Smith; *H. tonkinensis* Lecomte.

Shrubs or trees, 3–20 m tall. Branchlets and leaves glabrous. Petiole 0.5–1.5 cm; leaf blade elliptic, obovate-oblong, narrowly oblong, or lanceolate, 5–12(–15) × 2.5–5.5 cm, papery to ± leathery, base cuneate and somewhat decurrent into petiole, margin entire, remotely serrate on apical half only in seedlings or leaves of fast growing shoots, apex shortly acuminate, ± acute, or obtuse; secondary veins 5–8 pairs. Inflorescences axillary, 7–14(–20) cm; rachis glabrous or sometimes rachis and pedicel whitish pubescent when young, glabrescent; bracts of flower pairs triangular, 1–1.5 mm; floral bracts subulate, ca. 0.5 mm. Pedicel 2.5–4 mm, free. Perianth whitish or yellowish, 0.9–1.2 cm, glabrous. Anthers 2–3 mm. Hypogynous glands ovate, free or sometimes connate into a deeply 4-lobed ring. Ovary glabrous. Fruit bluish black to black, ellipsoid, 1–1.5 × 0.8–1 cm; pericarp ca. 0.5 mm thick, leathery. Fl. Jun–Oct, fr. Nov–Mar.

Broad-leaved evergreen forests, mixed forests, plains, mountain slopes; (near sea level to) 800(–1300) m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, Japan, Thailand, N Vietnam].

This species provides timber.

**18. *Helicia shweliensis*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 180. 1918.

瑞丽山龙眼 *rui li shan long yan*

Shrubs or small trees, 4–10 m tall. Branchlets apically rust-colored pilose, persistently pilose only near a leaf. Petiole 2–5(–10) mm; leaf blade obovate-oblong, oblong, or oblanceolate, 6–10 × 2.5–3.5 cm, ± leathery to leathery, glabrescent, base cuneate and sometimes decurrent into petiole, margin entire or serrulate on apical half, apex acute to shortly acuminate; secondary veins 5–8 on each side of midvein; secondary and reticulate veins conspicuous on both surfaces. Inflorescences ramiflorous, 8–12 cm, glabrous; bracts of flower pairs oblong to lanceolate, 4–10(–20) × 1.5–3 mm but a few persistent bracts accrescent in fruit, leaflike, 2.5–3 × ca. 1 cm; floral bracts lanceolate, 1–2 mm. Pedicels 3–4 mm, basally connate. Perianth yellowish, 1–1.4 cm. Anthers ca. 3 mm. Hypogynous glands ovoid, free. Ovary glabrous. Fruit dark green, ± globose, ca. 1.5 cm in diam., apex apiculate; pericarp ca. 1 mm thick, leathery. Fl. Aug–Sep, fr. Sep–Dec.

- Montane forests; 300–2800 m. C to SW Yunnan.

**19. *Helicia longipetiolata*** Merrill & Chun, Sunyatsenia 2: 217. 1935.

长柄山龙眼 *chang bing shan long yan*

Trees 5–15 m tall. Branchlets apically brown pilosulose, glabrescent. Petiole 2–4.5 cm; leaf blade narrowly elliptic, oblong-lanceolate, or broadly lanceolate, 7–18 × 2–6 cm, leathery, glabrescent, base cuneate and somewhat decurrent into petiole, margin entire, apex acute to acuminate; midvein raised on both surfaces; secondary veins 6–11 on each side of midvein, slightly raised on both surfaces; reticulate veins adaxially conspicuous. Inflorescences axillary or ramiflorous, 15–20 cm, glabrous; bracts of flower pairs subulate, 1–3 mm; floral bracts ca. 0.5 mm. Pedicels free or basally connate. Perianth white, 1.6–2.5 cm. Anthers 2.5–3.5 mm. Hypogynous glands connate into a crenulate cup. Ovary glabrous. Fruit greenish black, ± globose, 1.5–2.5 cm in diam., apex apiculate; pericarp ca. 1 mm thick, leathery. Fl. Jun–Jan.

Montane forests; 400–1000 m. W Guangdong, SW Guangxi, Hainan [Thailand, N Vietnam].

**20. *Helicia falcata*** C. Y. Wu in C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 32. 1977.

镰叶山龙眼 *lian ye shan long yan*

Trees 5–20 m tall. Branchlets apically brown pilosulose, glabrescent. Petiole 0.8–2 cm; leaf blade falcate-lanceolate, oblong-lanceolate, or broadly lanceolate, 13–20 × 2–5 cm, papery to leathery, glabrescent, base attenuate, margin entire or rarely remotely serrulate, apex acuminate; midvein raised on both surfaces; secondary veins 9–11 on each side of midvein, slightly raised on both surfaces; reticulate veins adaxially conspicuous. Inflorescences axillary, 12–25 cm, glabrous; bracts of flower pairs subulate, ca. 1.5 mm; floral bracts ca. 0.5 mm. Pedicels 2–3 mm, basally connate. Perianth greenish white to reddish, 1.2–1.6 cm. Anthers ca. 2 mm. Hypogynous glands free. Ovary glabrous. Fruit greenish black, ellipsoid, 1.3–1.5 × 1.2–1.4 cm, apex apiculate; pericarp ca. 1 mm thick, leathery. Fl. May–Jul, fr. Oct–Nov.

Montane forests; 1200–1900 m. S to SE Yunnan [N Vietnam].

2. **HELICIOPSIS** Sleumer, Blumea 8: 79. 1955.

假山龙眼属 jia shan long yan shu

Trees, dioecious. Leaves alternate, simple, entire, many lobed, or pinnatipartite. Inflorescences axillary or ramiflorous, rarely terminal on short branchlets, simple, a raceme of flower pairs; bracts of flower pairs linear, subulate, or lanceolate, ± persistent; floral bracts often caducous. Perianth tube straight, slender; limb clavate to ellipsoid, basally dilated, segments revolute at anthesis. Stamens subsessile, inserted at base of limb; anthers oblong; connective apiculate; staminodes present in female flowers. Pollen grains triporate, exine reticulate. Hypogynous glands 4, free, close together. Ovary sessile; ovules 2, orthotropous. Style apically mostly clavate; stigma terminal or lateral, punctiform; pistillode present in male flowers. Fruit drupaceous, exocarp leathery, thin; mesocarp carmose, spongy, or with numerous radial soft fibers, sometimes fibers nearly absent when dry; endocarp hard, woody, rarely thin, outer face reticulate-lacunose. Seed 1 and ± globose or seeds 2 and hemispheric, testa thin, cotyledons fleshy.

About 10 species: SE Asia and E Himalayas; three species (two endemic) in China.

- 1a. Simple leaves with apex obtusely acute to obtuse ..... 3. *H. henryi*  
 1b. Simple leaves with apex acuminate.  
 2a. Leaves ± leathery; female inflorescences 15–22 cm; pedicel 8–10 mm; fruit 3–4.5 cm, soft fibers nearly absent when dry ..... 1. *H. terminalis*  
 2b. Leaves leathery; female inflorescences 2–5 cm; pedicel ca. 3 mm; fruit 7–9 cm, soft fibers persistent when dry ..... 2. *H. lobata*

1. **Heliciopsis terminalis** (Kurz) Sleumer, Blumea 8: 80. 1955.

痒腮树 zha sai shu

*Helicia terminalis* Kurz, Forest Fl. Burma 2: 312. 1877; *Heliciopsis lobata* (Merrill) Sleumer var. *microcarpa* C. Y. Wu & T. Z. Hsu.

Trees 5–15 m tall. Young branchlets rust-colored tomentose, glabrescent. Leaves dimorphic, simple or tripartite to pinnatipartite; petiole 1–2.5 cm for simple leaves, 4–5 cm for divided leaves; leaf blade ± leathery, glabrescent in age, base cuneate to attenuate, margin entire, apex shortly acuminate, acuminate, or sometimes obtusely acute; secondary and reticulate veins conspicuous on both surfaces. Simple leaf blade oblanceolate to oblong, 12–35 × 4–10 cm. Divided leaf blade 25–60 × 15–50 cm, lobes 1–7 pairs, sinuses somewhat rounded. Inflorescences axillary or ramiflorous, rarely terminal on short branchlet, pilose; bracts of flower pairs linear to subulate 0.5–2 mm; floral bracts linear, ca. 0.5 mm. Perianth white or yellowish. Male inflorescences 10–20 cm. Female inflorescences stout, 15–22 cm. Male flowers: pedicel 5–7 mm; perianth 1.1–1.4 cm; anthers ca. 2.5 mm; pistillode glabrous; style apically clavate. Female flowers: pedicel 8–10 mm; perianth ca. 1.2 cm; staminodes ca. 1.5 mm; ovary ovoid, glabrous; style ca. 1 cm, apex ± compressed; stigma lateral. Fruit brownish, ellipsoid, 3–4.5 × 1.7–3 cm; exocarp ca. 0.5 mm thick; mesocarp ca. 1.5 mm thick, soft fibers nearly absent when dry; endocarp 0.5–1.5 mm thick. Fl. Mar–Jun, fr. Aug–Nov.

Rain forests; below 100 to 700(–1400) m. E Guangdong, SE Guangxi, Hainan, S to SE Yunnan [Bhutan, Cambodia, NE India, Myanmar, Thailand, Vietnam].

This species is used medicinally.

2. **Heliciopsis lobata** (Merrill) Sleumer, Blumea 8: 83. 1955.

调羹树 tiao geng shu

*Helicia lobata* Merrill, Lingnan Sci. J. 6: 276. 1928; *H. caulifloroides* W. T. Wang.

Trees 5–20 m tall. Young branchlets and leaves appressed

rust-colored tomentose. Leaves dimorphic, simple or pinnatipartite; petiole 4–8 cm; leaf blade leathery, base cuneate, abaxially tomentose along reticulate veins but glabrescent, adaxially glabrescent, margin entire, apex shortly acuminate; reticulate veins raised, conspicuous. Simple leaf blade oblong, 10–25 × 5–7 cm. Pinnatipartite leaf blade 20–60 × 20–40 cm, lobes 2–8 pairs, sinuses somewhat rounded. Inflorescences ramiflorous, pilose; bracts of flower pairs lanceolate, ca. 1 mm. Male inflorescences 7–12 cm. Female inflorescences 2–5 cm. Perianth yellowish, pilose. Male flowers: pedicel 1–2 mm to subsessile; perianth 0.8–1.2 cm; anthers ca. 2 mm; hypogynous glands free; pistillode glabrous. Female flowers: pedicel ca. 3 mm; perianth ca. 1 cm, pilose; staminodes ca. 1.5 mm; ovary ovoid, glabrous; style ca. 8 mm, apex ± clavate; stigma lateral. Fruit yellowish green, ellipsoid to ovoid-ellipsoid, somewhat compressed, 7–9 × 5–6 cm; exocarp ca. 1 mm thick; mesocarp 2–4 mm thick, soft fibers numerous and persistent when dry; endocarp 3–4 mm thick. Fl. May–Jul, fr. Nov–Dec.

- Rain forests; below 100 to 800 m. Hainan.

This species provides timber and edible seeds.

3. **Heliciopsis henryi** (Diels) W. T. Wang, Acta Phytotax. Sin. 5: 307. 1956.

假山龙眼 jia shan long yan

*Helicia henryi* Diels, Repert. Spec. Nov. Regni Veg. 13: 528. 1915; *H. pallidiflora* W. W. Smith.

Trees 5–15 m tall. Branchlets apically rust-colored tomentose, glabrescent. Petiole 1–1.5 cm; simple leaf blade oblanceolate to oblong, 15–24 × 4–8 cm, ± leathery, glabrescent in age, base cuneate, margin entire, apex obtusely acute, obtuse, or sometimes retuse; secondary and reticulate veins conspicuous on both surfaces. Pinnatipartite leaf blade not seen. Inflorescences ramiflorous, sometimes terminal on short branchlets, pilose; bracts of flower pairs lanceolate, 1.5–2 mm; floral bracts linear, ca. 1 mm. Male inflorescences 17–30 cm. Female inflorescences 15–20 cm. Perianth yellowish. Male flowers: pedicel 6–8 mm; perianth 0.8–1.2 cm; anthers 2.5–3 mm; pistillode

glabrous, without a stigma. Female flowers: pedicel 8–10 mm; perianth ca. 1 cm; staminode ca. 1.5 mm; ovary ovoid, glabrous; style ca. 8 mm, apex ± compressed; stigma lateral. Fruit brownish, ellipsoid, 3.5–4.5 × 2.5–3 cm; exocarp ca. 1 mm

thick; mesocarp ca. 2 mm thick, spongy when dry; endocarp 1–2 mm thick. Fl. May–Jun, fr. Oct–May.

- Rain forests; 900–1500 m. S Yunnan.

### 3. *MACADAMIA* F. Mueller, Trans. & Proc. Philos. Inst. Victoria 2: 72. 1857.

澳洲坚果属 *ao zhou jian guo shu*

Trees or tall shrubs. Leaves whorled, margin entire or spiny serrate. Inflorescences axillary or sometimes terminal, a raceme or rarely a panicle of flower pairs; bracts of flower pairs early caducous; floral bracts absent. Flower bisexual. Pedicels free. Perianth tube slightly curved; limb segments clavate, free, recurved at anthesis. Stamens inserted slightly below limb; anthers oblong; connective produced into an appendage. Hypogynous glands connate into a cup or ring. Ovary sessile; ovules 2, orthotropous. Style straight or bent, apex clavate; stigma terminal, small. Fruit tardily dehiscent; pericarp thick, hard, leathery. Seed 1 and globose or rarely 2 and hemispheric; cotyledons fleshy.

About nine species: Australia and Indonesia (Sulawesi); two species (introduced) in China.

- 1a. Leaves in whorls of 3, margin irregularly spiny toothed or entire; petiole 4–18 mm; inflorescence sparingly puberulous; testa smooth ..... 1. *M. integrifolia*  
 1b. Leaves in whorls of (3–)4(–5), margin regularly spiny toothed; leaf subsessile or with petiole to 4 mm; inflorescence pubescent; testa wrinkled or with shallow depressions ..... 2. *M. tetraphylla*

**1. *Macadamia integrifolia*** Maiden & Betche, Proc. Linn. Soc. New South Wales 21: 624. 1897.

**2. *Macadamia tetraphylla*** Johnson, Proc. Linn. Soc. New South Wales 79: 15. 1954.

澳洲坚果 *ao zhou jian guo*

四叶澳洲坚果 *si ye ao zhou jian guo*

Trees 5–18 m tall. Leaves mostly in whorls of 3; petiole 4–18 mm; leaf blade oblong to oblanceolate, 5–15 × 2–6.5 cm, leathery, base attenuate, margin irregularly spiny toothed or entire, apex acute to obtuse and sometimes retuse. Inflorescences axillary, simple, 8.5–25 cm, sparingly puberulous; bracts of flower pairs ovate, 0.5–5 mm. Pedicel 3–4 mm. Perianth white or yellowish, 5–11 mm, pilose. Anthers 0.7–2.2 mm. Ovary and base of style brownish villous. Fruit globose, 2–4.5 cm in diam.; pericarp 2–6 mm thick. Seed usually 1, testa bony, smooth. Fl. Apr–May, fr. Jul–Aug.

Trees or shrubs, 3–18 m tall. Leaves in whorls of (3–)4(–5); leaf subsessile or with petiole to 4 mm; leaf blade oblong-oblanceolate, leathery, base truncate to ± cordate, margin regularly spiny serrate; apex acute to shortly acuminate. Inflorescences axillary, simple, 5.5–38 cm, densely brownish yellow tomentose; bracts of flower pairs subulate to linear, 0.2–1.4 mm. Pedicel 2–3 mm. Perianth yellowish or pink, 5.5–15 mm, tomentose. Ovary and base of style brownish yellow pubescent. Fruit globose, 1.5–5 cm in diam., apex apiculate. Seed usually 1, testa bony, wrinkled or with shallow depressions. Fl. Mar–Apr, fr. Nov–Dec.

Cultivated. Guangdong, Hainan, Taiwan, Yunnan [native to Australia; cultivated elsewhere as an ornamental or fruit tree].

Cultivated. Guangdong (Guangzhou) [native to Australia; cultivated elsewhere as an ornamental or fruit tree].

The seeds are edible.

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PROTEACEAE