

### 23. ANNONA Linnaeus, Sp. Pl. 1: 536. 1753.

番荔枝属 fan li zhi shu

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*Guanabanus* Miller.

Trees or shrubs, with an indument of simple or stellate hairs. Inflorescences terminal, leaf-opposed, extra-axillary, or sometimes cauliflorous, never axillary, 1-flowered or in few-flowered clusters. Pedicel usually short. Sepals 3, small, valvate. Petals 6, in 2 whorls or inner whorl rudimentary or absent, free or connate at base; outer petals valvate, fleshy but leathery when dry, connivent or somewhat spreading, inside basally concave, margin thick; inner petals imbricate or valvate. Stamens many; filament short; connectives apically convex or apiculate. Carpels many, often connate; ovule 1 per carpel, basal; styles clavate; stigmas muriculate. Fruit syncarpous, surface covered with knobs, bulges, spines, or less often smooth. Seeds many per syncarp, embedded in edible pulp.

About 100 species: mostly in tropical America, a few in tropical Africa; seven species (all introduced) in China.

*Annona* includes several trees that have become widely grown for their fruit.

- 1a. Inner petals present.
  - 2a. Carpels glabrous; ripe syncarp smooth ..... 1. *A. glabra*
  - 2b. Carpels pubescent; ripe syncarp with soft prickles.
    - 3a. Leaf blade elliptic, 14–24 cm, secondary veins punctate at base; inner petals glabrous ..... 2. *A. montana*
    - 3b. Leaf blade obovate-oblong to ovate-elliptic, 5–18 cm, secondary veins not punctate at base; inner petals pubescent ..... 3. *A. muricata*
- 1b. Inner petals absent or reduced to minute scales.
  - 4a. Leaf blade abaxially tomentose.
    - 5a. Axillary vegetative buds glabrous; leaf blade adaxially pubescent; leaves associated with flowering branches not auriculate ..... 4. *A. cherimolia*
    - 5b. Axillary vegetative buds pubescent; leaf blade adaxially glabrous; leaves associated with flowering branches auriculate ..... 5. *A. diversifolia*
  - 4b. Leaf blade abaxially pubescent or puberulent when young, glabrescent.
    - 6a. Outer petals outside surface and carpels hairy; ripe syncarp not pruinose, areoles flattened and separated by ± raised ridges; fruit pulp yellowish ..... 6. *A. reticulata*
    - 6b. Outer petals and carpels glabrous; ripe syncarp slightly pruinose, areoles convex and separated by deep grooves; fruit pulp whitish ..... 7. *A. squamosa*

#### 1. *Annona glabra* Linnaeus, Sp. Pl. 1: 537. 1753.

圆滑番荔枝 yuan hua fan li zhi

Trees to 12 m tall, evergreen. Branches glabrous, lenticellate. Axillary leaf buds ovoid, fulvous pubescent, apex obtuse. Petiole 0.8–2.5 cm; leaf blade ovate, elliptic-ovate, elliptic, or oblong, 6–20 × 3–8 cm, papery to thinly leathery, glabrous at maturity, secondary veins 7–12 on each side of midvein and forming a ca. 60° angle with midvein, secondary and reticulate veins prominent on both surfaces when dry, base obtuse to rounded and slightly decurrent onto petiole, apex acute to obtuse. Inflorescences internodal or terminal on a short branchlet, 1-flowered. Flower buds ovoid to subglobose. Pedicel 1.5–2 cm, glabrous. Sepals broadly ovate, 3–4 × 3–4 mm, free, glabrous. Outer petals greenish yellow to pale yellow and inside basally with a red spot, broadly ovate, 1.5–3 × 1.3–2.5 cm, outside glabrous, inside minutely puberulent, apex obtuse; inner petals outside yellow, inside carmine, 1.2–2.5 × 0.7–1.5 cm, minutely puberulent. Stamens oblong, 3–4 mm; connectives apically slightly convex. Carpels connate at anthesis, glabrous. Syncarp yellow to orange, ovoid, 5–12 × 5–8 cm, smooth, apex rounded. Seeds pale reddish brown, 1.3–1.5 cm. Fl. May–Jun, fr. Jul–Aug.

Cultivated; 100–200 m. Fujian, Guangdong, Guangxi, Hainan,

Taiwan, Yunnan, Zhejiang [native to tropical America].

The insipid fruit, pond apple, are mostly used for jellies or eaten raw. This tree is tolerant of saline soils and is considered a very troublesome invasive species in coastal areas of Australia.

#### 2. *Annona montana* Macfadyen, Fl. Jamaica 1: 7. 1837.

山地番荔枝 shan di fan li zhi

Trees to 10 m tall, evergreen. Bark purplish brown. Branchlets green and smooth when young. Petiole 1.2–2 cm, adaxially grooved; leaf blade elliptic, papery, abaxially smooth and pale green, adaxially light to dark green, secondary veins 11–16 on each side of midvein, basally punctate, and adaxially slightly concave, base cuneate, apex shortly acuminate. Inflorescences terminal or axillary on apical branchlets, 1- or 2-flowered. Pedicel 2.5–4 cm, robust. Sepals ovate, ca. 6 mm. Outer petals yellowish brown, broadly ovate, apex acute; inner petals orange, shorter than outer petals, apex obtuse. Stamens many; filaments white, flat; anther locules brown; connectives apically dilated. Carpels oblong, 6–7 mm, free at anthesis; ovaries pubescent. Syncarp brownish yellow, ovoid, subglobose, or cordate-ovoid, slightly oblique, 9.5–14 × 9.5–12.5 cm, with dense soft prickles and dark brown hairs; pulp yellowish, aromatic. Fl. May–Jun, fr. Jul–Sep.

Cultivated; 100–200 m. Guangdong, Taiwan [native to W tropical America].

The fruit, mountain soursop, are of a good flavor.

**3. *Annona muricata*** Linnaeus, Sp. Pl. 1: 536. 1753.

刺果番荔枝 ci guo fan li zhi

Trees to 10 m tall, evergreen. Bark rugose. Petiole short; leaf blade obovate-oblong to ovate-elliptic, 5–18 × 2–7 cm, papery, abaxially greenish and glabrous, adaxially green and shiny, secondary veins 6–13 on each side of midvein and slightly prominent on both surfaces, base broadly cuneate to rounded, apex acute to obtuse. Inflorescences axillary, 1- or 2-flowered. Flowers ca. 3.8 cm in diam. Pedicel 0.5–2.5 cm, pubescent. Sepals ovate-elliptic to ovate-triangular, 3–5 mm. Petals green, later yellowish, inside basally without a red spot; outer petals thick, broadly triangular, 2.5–5 × 2–4 cm, inside finely pubescent, apex acute to obtuse; inner petals ovate-elliptic, 2–4 × 1.5–3.5 cm, slightly thin, imbricate, pubescent, base clawed, apex obtuse. Stamens 4–5 mm; filaments fleshy; connectives apically dilated. Carpels ca. 5 mm, pubescent. Syncarp green, ovoid and often oblique or curved, 10–35 × 7–15 cm, covered with soft prickles, base impressed, apex rounded; pulp white. Seeds brownish yellow, reniform, ca. 2 × 1 cm. Fl. Apr–Jul, fr. Jul–Dec.  $2n = 14, 16$ .

Widely cultivated; 100–400 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [native to tropical America].

The fruit, soursop, is the largest among *Annona* species. It is eaten raw, used in sherbets, and used in drinks. The pulp is also consumed with wine or cognac.

**4. *Annona cherimolia*** Miller, Gard. Dict., ed. 8, *Annona* no. 5. 1768.

毛叶番荔枝 mao ye fan li zhi

Trees 3–7 m tall, deciduous. Branchlets tomentose, glabrescent. Axillary leaf buds ovoid, apex obtuse. Petiole 6–12 mm; leaf blade ovate, ovate-lanceolate, elliptic, obovate, or rarely orbicular, 5–25 × 2.5–10 cm, thinly papery, abaxially tomentose, adaxially pubescent, secondary veins 11–14 on each side of midvein and forming an angle from 60° to almost 90° with midvein, base rounded to obtuse and slightly decurrent onto petiole, apex obtuse to shortly acuminate. Inflorescences 1–3-flowered. Sepals ovate, 2–4 mm, outside tomentose, inside glabrous. Petals outside greenish yellow to reddish, inside yellowish to whitish and basally purple-spotted, linear-oblong, 1.5–3 cm, tomentose, apex obtuse; inner petals absent or reduced to minute scales. Stamens oblong, 1.2–1.7 mm. Syncarp mostly green, ovoid, cordate, conic, or rarely globose, to 20 × 15 cm, smooth or tuberculate but not furrowed between areoles; pulp white. Seeds blackish brown, turning paler when dry, obovoid, ca. 1 cm, slightly flattened, apex obliquely truncate. Fl. Mar–Jul, fr. Jun–Nov.

Widely cultivated; 100–300 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [native to tropical America].

The fruit, cherimoya, has good dessert qualities and is subacid and delicate. It is eaten raw, used in cooling drinks, and used in sherbets. It contains up to 18.4% sugar, 1.8% protein, and 0.4% fat.

**5. *Annona diversifolia*** Safford, Science, n.s., 33: 471. 1911.

异叶番荔枝 yi ye fan li zhi

Trees to 8 m tall, deciduous. Branchlets tomentose, glabrescent. Axillary leaf buds ovoid, brown tomentose, apex obtuse. Petiole ca. 1 cm; leaf blade broadly obovate to ovate-lanceolate, 7.5–20 × 3–10 cm, papery, abaxially gray pruinose and brown tomentose, adaxially smooth and glabrous, secondary veins 11–14 on each side of midvein and adaxially flat, base rounded to obtuse, apex rounded. Flowering branches associated with large auriculate leaves. Inflorescences 1–3-flowered. Flowers ca. 3 cm. Sepals ovate, 2–4 mm, outside tomentose, inside glabrous. Petals reddish; outer petals linear-oblong, 1.5–3 cm, tomentose; inner petals absent. Stamens oblong, ca. 1.5 mm. Syncarp green to reddish, conic, ovoid, or spherical, ca. 20 × 15 cm, tuberculate; pulp white or brownish when ripe. Seeds blackish brown, ovoid to obovoid, ca. 1 cm. Fl. Apr–Aug, fr. Jun–Nov.  $2n = 14$ .

Cultivated; 100–200 m. Guangdong [native to Central America and S Mexico].

This species is cultivated for the fine fruit, ilama, which are eaten raw.

**6. *Annona reticulata*** Linnaeus, Sp. Pl. 1: 537. 1753.

牛心番荔枝 niu xin fan li zhi

Trees to 6 m tall, evergreen. Branchlets grayish sericeous, glabrescent. Axillary leaf buds ovoid, apex obtuse. Petiole 1–1.5 cm; leaf blade oblong-lanceolate, 9–30 × 2–7 cm, papery, pubescent when young but glabrescent, secondary veins 9–18 on each side of midvein, forming an angle of 30°–60° with midvein, and flat, base cuneate to obtuse and slightly decurrent onto petiole, apex acuminate. Inflorescences leaf-opposed or internodal, cymose, several flowered. Flower buds lanceolate, apex obtuse. Sepals ovate, 2–3 mm, outside pubescent, inside glabrous. Petals yellowish green; outer petals oblong-lanceolate, fleshy, outside puberulent, inside glabrous; inner petals absent. Stamens oblong, 1–1.3 mm; connectives apically subtruncate. Carpels oblong, villous; stigmas muriculate. Syncarp turning yellow to reddish, spherical to ovoid, 5–12.5 cm in diam.; areoles ± flat, separated by a reticulation of often raised ridges; pulp yellowish. Seeds blackish brown. Fl. Nov–Feb, fr. Mar–Jun.  $2n = 14$ .

Widely cultivated; 100–200 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [native to tropical America].

The fruit, bullock's-heart or custard-apple, are edible, containing nearly 17% sugar, 1.6% protein, and 0.26% fat.

**7. *Annona squamosa*** Linnaeus, Sp. Pl. 1: 537. 1753.

番荔枝 fan li zhi

Trees, deciduous, to 8 m tall. Bark thin. Branchlets pubescent, glabrescent. Petiole 4–15 mm; leaf blade elliptic-lanceolate, narrowly elliptic, or oblong, 5–17.5 × 2–7.5 cm, thinly papery to membranous, abaxially pale green and puberulent when young but glabrate in age, base obtuse to rounded and slightly decurrent, apex acute to obtuse, lateral veins 8–15 on each side of midvein, adaxially flat. Inflorescences 1-flowered or 2–4-fasciculate. Flowers 2–3 cm, puberulent. Sepals triangular. Outer petals basally green to purple, oblong-lanceolate,

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1.5–3 × 0.5–0.8 cm, fleshy, thick, inside concave, keeled on apical half; inner petals absent or reduced to scales, as long as stamens. Stamens oblong, ca. 1 mm; connective broad, apex subtruncate. Carpels oblong, distinct at anthesis; stigmas ovate-lanceolate. Syncarp greenish yellow, slightly pruinose, spherical to ovoid, 5–10 cm in diam., areoles rounded, convex, separated by deep grooves; pulp white. Seeds black-brown, ca. 14 mm. Fl. May–Jul, fr. Jun–Nov.

Widely cultivated; near sea level to 200 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan, Zhejiang [native to tropical America].

The fruit, sugar-apple or sweetsop, is edible. It contains more than 20% sugar, 2.3% protein, and 0.3% fat. The bast fiber is used for paper making; the roots are used medicinally for dysentery; and the seeds yield up to 20% oil.

