

GARICINIA –AN INTRODUCTION

Garcinia species are evergreen trees and shrubs, dioecious and in several cases apomictic. The fruit is a berry with fleshy endocarp, which in several species is delicious. Among neotropical *Garcinia* several species are dioecious (*G. leptophylla*, *G. macrophylla* and *G. magnifolia*), although female trees have often been observed to have some degree of self-fertility.

The dioecious genus *Garcinia* is the largest genus within the family Clusiaceae (formerly Guttiferae) and comprises nearly 250 species world over. *Garcinia* species are generally small or medium sized evergreen trees, (occasionally shrubs), and are distributed in pantropical regions, with high species richness in South-East Asia. The centre of diversity of *Garcinia* species is the Malaysian region, with some species reaching India and the Micronesian islands and also extending to tropical Africa and the Neotropics.



There are different varieties for the genus *Garcinia*. Some of them are given below:

1. Garcinia gummi-gutta var. papilla

- Evergreen tree up to 15 m high; exudation yellow.
- Leaves: Elliptic, 6-9 x 1.5-3cm.

- Male flowers: Tetramerous, 3-5 flowers in axillary fascicles, 1-1.5 x 1-1.2 cm; pedicels stout, 5-7 mm long; sepals ovate to oblong, margin membranous; petals oblong, brick red, margin membranous; stamens in a globose androphore; rudimentary pistil rarely present.
- Female flowers: Tetramerous, 1-3 flowers on solitary or fascicles, terminal or axillary, 1-1.2 x 7-10 mm; staminodes in a ring; ovary 6-8 locular, 1-ovule in each locule, sub globose, grooved, stigmatic rays 4-8.
- Fruits: Subglobose, yellowish green, ca. 6 cm in diam., 4-8 grooved with a terminal mamilla, pericarp very thick, fleshy.
- Seeds: 3-5, sub-triangular, 2-3 x 0.8-10 mm, enclosed in a thick mass of fibrous aril.
- Field identification characters
 - I. Young shoot and margin of leaf shows reddish tinge.
 - II. Fruit ovoid-oblong with 4-8 grooves and with terminal mamilla

2.Garcinia gummi-gutta var. conicarpa

- Evergreen tree up to 15 m high; exudation yellow.
- Leaves: Obovate-ovate, rarely oblong or broader beyond the middle, 6-10 x 4-8 cm.
- Male flowers: Tetramerous, solitary or 2-5 flowered fascicles, axillary or terminal, 1-1.5 x 11.2 cm, pedicels stout, ca. 5 mm long; sepals ovate, margin membranous with fimbrial like projection; petals yellow, oblong-orbicular, slightly membranous margin; stamens in a convex torus head; rudimentary pistil absent or present.
- Female flowers: Tetramerous, solitary or 2-3 flowered fascicles, terminal or sub terminal, 11.5 x 1-3 cm, sessile; staminodes in a ring; ovary 3-5 locular, ovule one in each locule, ovoid, grooved, stigmatic rays 3-5.

- Fruits: Usually conical, rarely ovoid, yellowish green, ca. 5 cm in diam., 3-5 grooves with a terminal mamilla, grooves, pericarp very thick, fleshy.
- Seeds: 2-4, ovate-oblong, 2-3 x 0.8-10 mm, enclosed in a thin fibrous aril.
- Field identification characters
 - i. Absence of leaf ligule on petiole.
 - ii. Shape of leaf broader beyond the middle. iii. Conical shape of fruit with 3-5 grooves.

3. Garcinia imberti

- Evergreen medium sized tree up to 20 m high; exudation white; branches horizontal spreading.
- Leaves oblanceolate, 6-12 x 2-6 cm.
- Male flowers: Tetramerous, 3-6 or 9 flowered fascicles, or rarely cyme or paired, terminal 5-6 x 4-5 mm, sessile; sepals sub orbicular, membranous; petals orbicular, pale yellow, membranous; stamens in a central globose mass, pistil rudimentary.
- Female flowers: Tetramerous, solitary, or rarely in pairs, terminal, 6-8 x 6 mm; ovary 2-loculed, globose, ovule one in each locule, stigma sessile, convex, capitate; staminodes many, united in a ring around the ovary.
- Fruits: Sub-globose, greenish, 2.2-2.5 cm in diam., smooth
Seeds: 1-2, enclosed in a fibrous aril.
- Field identification characters
 - i. Bark brown mottled with white.
 - ii. Leaves less than 12 cm long, oblanceolate with shortly caudate acuminate at apex. iii. Berry sub-globose, usually 1-2 seeded fruit, crowned by capitated stigma.

4. Garcinia indica

- Evergreen to semi-evergreen tree up to 15 m high; exudation milky; branches with conical crown or pendulous drooping.
- Leaves: Lanceolate or obovate-oblong, 6-12 x 1.5-5 cm,
- Male flowers: Tetramerous, 4-8 flowered fascicles, axillary or terminal, 5-9 x 5-8 mm, pedicel stout, ca. 4 mm long; sepals ovate-rotundate, membranous; petals orbicular, creamy white, membranous; stamens inserted on hemispheric, sub-quadrate torus; rudimentary pistil absent or if present as long as stamens.
- Female flowers: Tetramerous, solitary, terminal, sub-sessile; ovary, subglobose, stigmas convex, 4-8 rayed, coronate, sessile.
- Fruits: Spherical, orange-pink, deep purple when ripe, up to 4 cm in diam., pulp red, fleshy.
- Seeds: 5-8, compressed.
- Field identification characters
 - i. Branches with conical crown or pendulous drooping.
 - ii. Berries smooth, not grooved, deep purple when ripe.

5. Garcinia morella

- Evergreen medium sized tree up to 18 m high; exudation deep yellow, sticky.
- Leaves: Elliptic, ovate or obovate, 10-15 x 4-8 cm.
- Male flowers: Tetramerous, ca. 3 flowered fascicles, axills of fallen leaves, 1-1.2 x 5-10 mm, sessile or short pedicel, 4-6 mm long; sepals orbicular or elliptic, membranous; petals rotundate or orbicular, white to pink, membranous; stamens in a central sub globose mass; rudimentary pistil absent.

- Female flowers: Tetramerous, solitary, axillary, ca. 1 x ca. 0.5 cm, sessile; staminodes, connate at base into a ring around ovary; ovary 4-locular, sub-globose; stigma coronate, tubercled.
- Fruits: Sub-globose or globose, yellow with reddish tinge, 2.5-3 x 2-3 cm, smooth
Seeds: Ovoid-reniform, 4, laterally compressed and dark brown.
- Field identification characters
 - i. Petiole folding longitudinally above.
 - ii. Leaves with 8-12 pairs of lateral veins, midrib prominent below and margin revolute and wavy.
 - iii. Tubercles stigma.

6. *Garcinia pushpangadaniana*

- Evergreen to semi-evergreen medium sized tree up to 20 m high; bark exudation milky.
- Leaves: Elliptic-oblong, 14-20 x 6-8 cm.
- Male flowers: Pentamerous, ca. 2-10 flowered fascicles, axillary, 1-1.5 x 1 cm, pedicel 7-10 mm long; sepals orbicular-sub-orbicular, margin ciliate; petals orbicular, pinkish pale greenish white, membranous margin; stamen 5-phalangiata; rudimentary pistil present.
- Female flowers: Pentamerous, ca. 2-8 flowered fascicles, axillary, 1-1.5 x 1-1.3 cm; staminodes arranged in 5-phalanges; ovary 6-8 loculed, 6 mm in diam., globose, stigma 6-8 lobed, oblong, stellate.
- Fruits: Globose, pale yellowish brown, 13 x 11 cm, fleshy, without pulpy aril, irregularly ridged surface.
- Seeds: 1-4, plano-convex, whitish yellow, up to ca. 2 cm long.
- Field identification characters
 - i. Tree with pyramidal crown.
 - ii. Leaves 14-20 × 6-8 cm long, elliptic-oblong, thick coriaceous, lateral nerves 28-34 pairs.

- iii. Large fruits (600-750g), globose and irregularly ridged on the surface.

7. Garcinia rubro-echinata

- Evergreen tree up to 20 m tall; exudate brownish-white.
- Leaves: Sub-obovate to broadly elliptic, 8-15 x 3-8 cm.
- Male flowers Tetramerous, fascicled, axillary or terminal, pale green, 1.6-2 x 1.5 cm, sessile; sepal orbicular-obtuse, margin membranous; petals sub-orbicular to oblong, pale green, membranous; stamens in a tetragonous torus; pistil rudimentary.
- Female flowers: Tetramerous, solitary, terminal, pale green, 1.8-2.5 x 1.5-1.8 cm, sessile; staminodes ca.22, connate in to a ring at base, disc present at intercalary position; ovary 3-4 locular, covered with numerous fleshy scales; stigmas peltate, irregularly lobed.
- Fruits: Sub-globose or ellipsoid, dark red, 4-6 x 2.5-4 cm, covered with spines or broad tubercles.
- Seeds: 1-3, oblong, up to 4cm long with scanty aril.
- Field identification characters
 - i. Bark greenish white with yellow red or white mottles.
 - ii. Lamina usually obovate with numerous parallel lateral veins.
 - iii. Fruit covered with spines.

8. Garcinia talbotii

- Evergreen tree up to 20 m tall; exudate white, turning brownish after exposure.
- Leaves: Elliptic-ovate, oblong or ovate-oblong, 7.5-18 x 3-10 cm.
- Male flowers: Pentamerous, fascicled, axillary or terminal, creamy-white, 1.8-2.3 cm long, pedicel, ca. 1 cm long; sepal orbicular, margin membranous, rarely ciliate; petals orbicular obovate, rarely sub-orbicular, creamy-white or

greenish-yellow, margin membranous; stamens in to 5 phalanges; rudimentary pistil absent.

- Female flowers: Pentamerous, fascicled, axillary, creamy-white, 1.8-2.7 cm long, pedicel, ca. 1 cm long; staminodes in 5 delicate phalanges; ovary 3-locular, very rarely 4, globose, stigma peltate, 3 lobed.
- Fruits: Globose, greenish-yellow on ripening, 4-6 x 3.8-5 cm, fleshy, rind surface shows an yellow resins.
- Seeds: 1-3, oblong, ca. 3cm long with yellow pulpy aril.
- Field identification characters
 - i. Exudation milky, turning brownish after exposure.
 - ii. Leaves usually ovate.
 - iii. Fruit greenish yellow, ripe fruit pulp sweet-scented, stigmatic lobe 3.

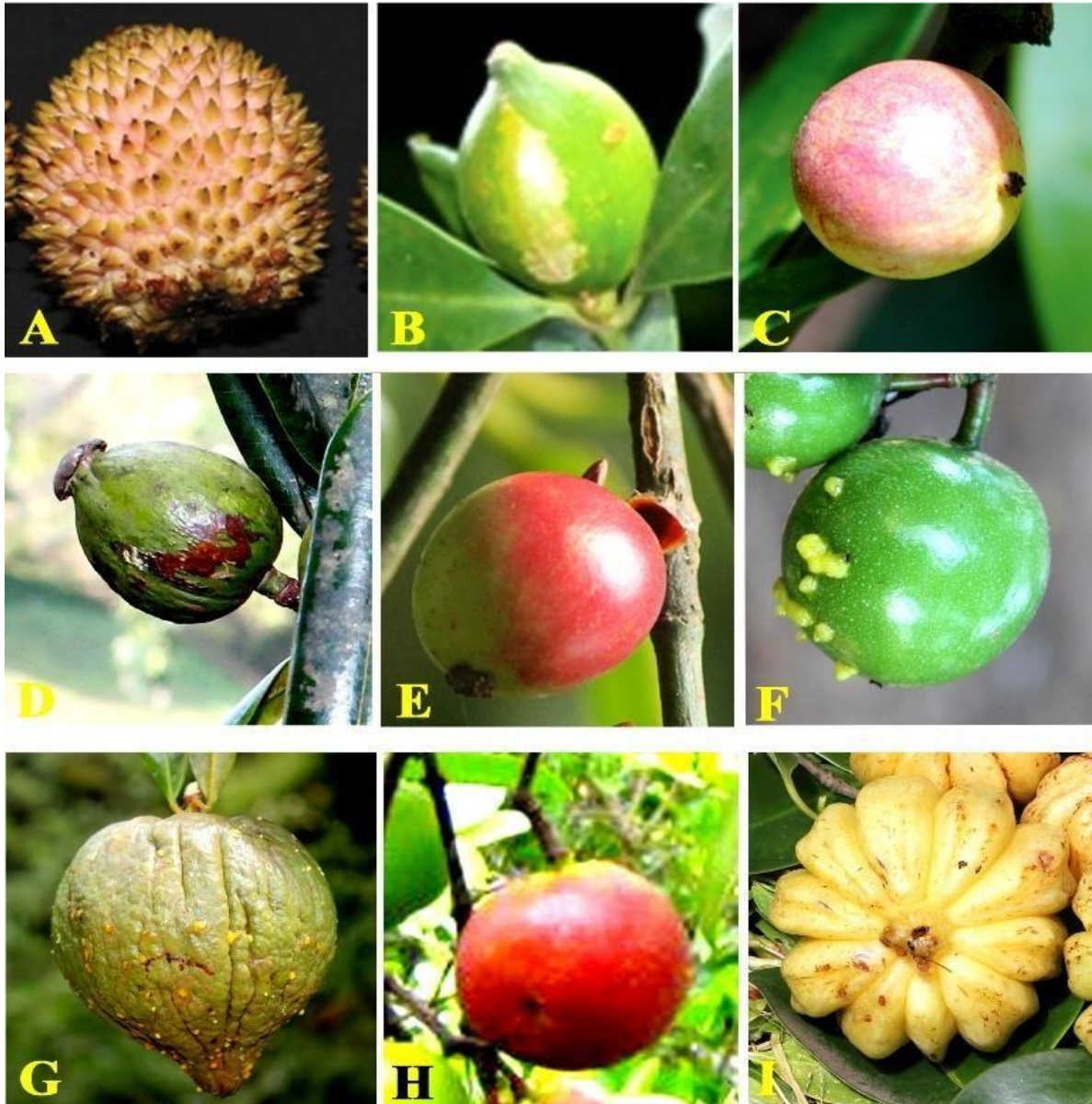
9. Garcinia travancorica

- Evergreen tree up to 15 m high; exudate yellow.
- Leaves: Linear-oblong, 5.5-10 x 1-2 cm.
- Male flowers: Tetramerous, trichotomous short cymes, terminal or sub terminal, 1.2-1.5 x 0.8-1 cm, pedicel short, ca. 2-3 mm long; sepals orbicular, margin membranous; petals orbicular, creamy white, membranous; stamens numerous in 4-tetragone masse; rudimentary pistil columnar, with a circular peltate stigma.
- Female flowers: Tetramerous, solitary or paired, terminal or sub terminal, 1.3-1.5 x 8-1.2 cm; staminodes in 5-phalanges; ovary 1-2 locular, sub globose or pyriform; stigma 3-lobed and spreading.
- Fruits: Ovoid-oblong, 2-3 x 1-2.5 cm, stigma persistent to fruit.
- Seeds: Usually 1, rarely 2, ovoid, up to 2-2.5 x 0.7-1 cm.
- Field identification characters

- i. Leaves narrow oblong, less than 3 cm broad with secondary nerves closely parallel and horizontal.
- ii. Male flowers trichotomous cyme.
- iii. Female flowers with broad yellow stigma.

10. Garcinia wightii

- Evergreen tree up to 15 m high; exudation deep yellow to orange yellow.
- Leaves: Linear-lanceolate, 6-14 x 1.5-3 cm.
- Male flowers: Tetramerous, solitary or 2-3 together, sometimes numerous, axillary, 1-1.2 x 0.8-1 cm, sessile; sepals orbicular, margin membranous; petals obovate, creamy white, membranous; stamens in tetragons head.
- Female flowers: Tetramerous, solitary, axillary, 1-1.5 x 5-7 mm, sessile; staminodes 4-phalanges; ovary 4-locular, globose; stigma 4-lobed.
- Fruits: Sub-globose, rose with pinkish tinged, 1.2-1.5 x 0.9-1 cm, smooth, with persistent stigma and sepals.
- Seeds: 4, up to ca. 9.5 x 4.5 mm long.
- Field identification characters
 1. Leaves less than 3 cm wide, linear-lanceolate tapering at both ends, secondary veins very oblique.
 2. Fruit colour rose with pinkish tinge.



Fruit morphology of *Garcinia* species in the Western Ghats (A. *G. rubro-echinata*, B. *G. imberti*, C. *G. wightii*, D. *G. travancorica*, E. *G. morella*, F. *G. talbotii*, G. *G. pushpangadaniana*, H. *G. indica* and I. *G. gummi-gutta*)

Of these varieties, *Garcinia gummi-gutta* is of greater importance in terms of its value added products in South India