

Occurrence, distribution and economic potential of seashore mangosteen (*Garcinia hombroniana* Pierre) in India

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Abstract Seashore mangosteen (*Garcinia hombroniana* Pierre), an important component of *Garcinia* gene pool, is useful as a rootstock and also in the genetic improvement of mangosteen. A brief description along with short notes on distribution and uses is given. Naturally occurring in Nicobar Islands and under cultivation in Tamil Nadu and Kerala, its germplasm needs to be collected and conserved for its potential horticultural value.

Keywords Economic potential · *Garcinia hombroniana* Pierre · Rootstock · Seashore mangosteen

Introduction

Mangosteen (*Garcinia mangostana* L.), nicknamed 'queen of tropical fruits', is a native of West Malaysia and has remained localized in cultivation mainly in its native habitat, probably due to its rather specialized ecological requirements. In addition, its establishment is relatively difficult since seedlings are slow to grow, even in their natural environment (Yacob and Tindall 1995). It is in this context that the spotting of wild mangosteen, *Garcinia hombroniana* Pierre in India assumes significance. Until recently, it was considered as the closest progenitor of cultivated mangosteen (Yacob and Tindall 1995). *Garcinia malaccensis* T. Anderson was also considered as a close relative of mangosteen (Verheij 1991). Recent studies using internal transcribed spacer (ITS) sequencing involving seventeen species of *Garcinia* L. showed *G. malaccensis* to be more closely related to mangosteen than *G. hombroniana* (Yapwattanaphun et al. 2004). However, *G. hombroniana* has significance in the Indian biodiversity scenario for its horticultural value as rootstock for mangosteen, as an avenue, ornamental or shade tree.

While engaged in the collection of mangosteen germplasm from Kanyakumari district of Tamil Nadu, bordering Thiruvananthapuram district of Kerala, the authors came across a bearing mangosteen tree strikingly similar to the cultivated but distinct for fruit morphology and appearance. Herbarium specimens, seeds and seedlings were

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collected from the garden. The herbarium specimens, upon detailed taxonomic investigation and morphological comparison at PBL (BSI herbarium, Port Blair), were confirmed as *G. hombroniana*. In an earlier collection mission, another accession (IC405665, IISR Kozhikode) of the same species was collected from Car Nicobar of Andaman and Nicobar Islands (Anonymous 2002). It is known as 'Puli mangosteen' ('puli' = sour in vernacular Malayalam) in Kerala and 'seashore mangosteen' in English. Being a rare plant not described in common floras of mainland India (except Singh 1993), a description of the plant based on actual field observations, herbarium studies and literature is provided for easy identification.

Description (also see Maheswari 1964, Singh 1993)

Diocious, evergreen, fast growing, medium sized trees, with rather stout, horizontal, opposite, decussate, 4-angular (tender stage) branches, flattened at petiole juncture; leaves yellowish green turning glossy green on maturity, opposite, decussate; lamina 12–12.5 × 3.25–6.25 cm, elliptic to oblong elliptic, subacute or shortly acuminate, cuneate at base, upper surface highly glossy, lower rather dull; midrib prominent on both sides; lateral nerves numerous up to 62, slender, ascending, running parallel to each other; petiole 10 mm long; male flowers: about 2.5 cm in diameter, axillary in fascicles of 3–6, pedicels 5–10 mm long, sepals thinly coriaceous, concave, outer pair orbicular, 6–8 × 3–4 mm, inner ovate oblong, 7–10 × 5 mm. Petals ovate-orbicular, 10 × 10 mm, concave, creamish yellow, stamens numerous, anther broad oblong, dehiscing vertically, inserted on a fleshy, slightly 4 lobed annulus, filaments united, pistil rudimentary, flat, 8 lobed, slightly protruding above the staminal mass; female flowers: solitary, axillary with sepals and petals like males; staminodes absent; ovary globose, 8 locular; stigma large, convex, recurved at tip when young, when mature with 8 shallow star like crenations; berry ash-green turning scarlet red on ripening (Fig. 1), subglobose about 20–30 mm in diameter, not mamillate, pericarp rather thin, subcrustaceous; sepals persistent; seeds about 6–8, 1–2 well developed, rest barren, oblong, 15 mm long, with soft juicy pale-creamish arillus (Fig. 2).

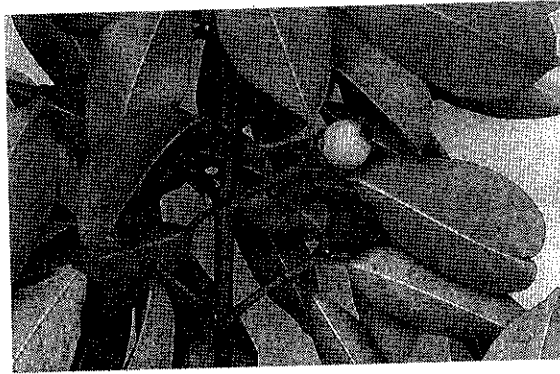


Fig. 1 Fruiting twig of *Garcinia hombroniana*

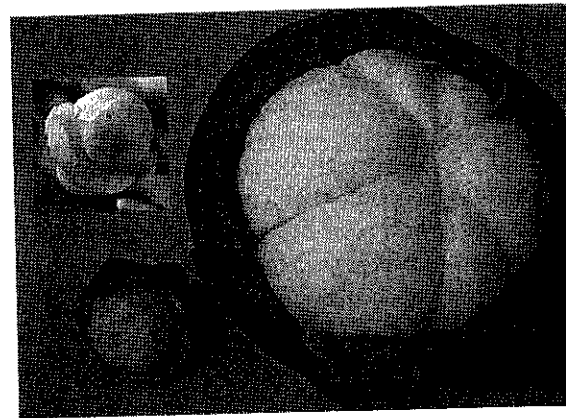


Fig. 2 Cross section of fruit of *G. hombroniana* (left) and mangosteen (right); female flower of *G. hombroniana* (inset)

Specimens examined

Vasudeva Rao 7509, Katchal Island, Andaman & Nicobar, 2.4.1979; Chakraborty 5219, Katchal Island, North Nicobar, A&N Islands, 15.2.1977; N.G.Nair 3529, Sawai, Car Nicobar, 24.2.1976; Vasudeva Rao 8617, Rutland Island, Andaman Islands, 21.1.1982; N.G.Nair 2653, Passa, Car Nicobar, 4.11.1977 (all PBL); Joseph & Suresh, JS 04-35, Kuzhitholu, Kanyakumari, Tamil Nadu 3.9.2004 (NHCP, NDL).

A few seedlings (IC439610) have been collected from Kanyakumari district of Tamil Nadu and established at NBPGR Farm, Vellanikkara and the Car Nicobar specimen (IC405665) has been planted at IISR, Farm, Kozhikode. The passport data is given in Table 1. Though this species resembles cultivated mangosteen very closely, it can be distinguished from the latter by its yellowish (tender) flush, scarlet red (ripe) fruits, sky blue translucent resin exudate and

Table 1 Passport data of *G. hombroniana* accessions

Coll. No.	IC No.	Collection locality	State	Latitude	Longitude	Altitude (m)	Soil type
JS-04-35	IC439610	Kuzhitholu, Kanyakumari	Tamil Nadu	8°11'74"	77°25'105"	54	Laterite loam
AC-12	IC405665	Car Nicobar, Nicobar	A & N Islands	9°14'48"	92°47'36"	5	Sandy loam

closer leaf venation. The mangosteen, on the other hand, has coppery flush, earthy brown (ripe) fruits, yellow opaque resin exudate and spaced leaf venation.

Distribution

Native to South East Asia, its distribution range is between Singapore and Malacca in Malay Peninsula and Andaman & Nicobar Islands. In India, the tree has been found occurring naturally in Car-Nicobar and North Nicobar Islands and under cultivation in Thiruvananthapuram district of Kerala and Kanyakumari district of Tamil Nadu (Fig. 3). The tree has also been spotted from Mannanam and Kumarakom (Kottayam), Mallappally (Pathanamthitta), Kallada (Kollam), and Koyilandi (Kozhikode), planted in few home gardens probably because of its mistaken identity as mangosteen.

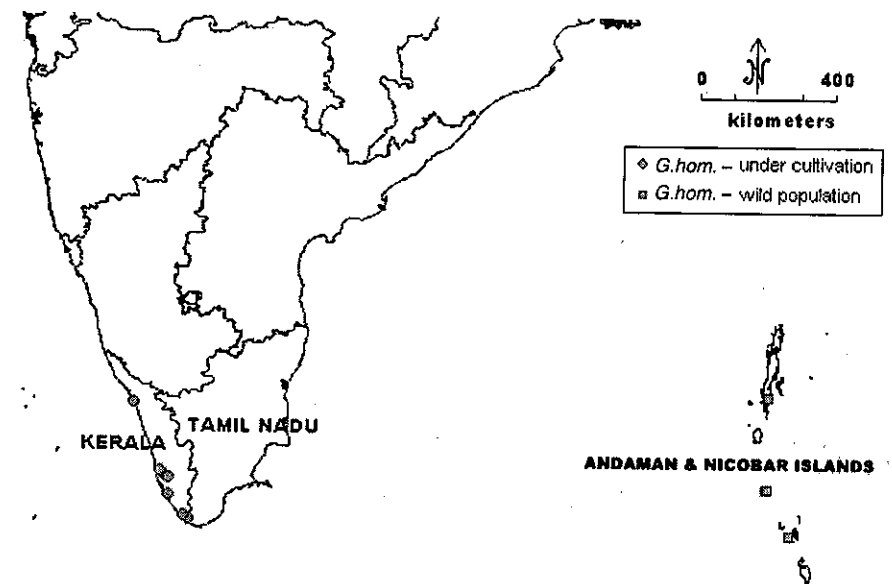
Uses

The pulp of ripe fruits is sour and edible (Pareek et al. 1998). Herbarium notes indicate sweet types occurring

in Nicobar Islands. Roots and leaves are used in the treatment of skin diseases in Malaysia. Timber is used for house building and making oars (Singh 1993). The resin exudate from the tree is copious and sky blue in colour and may hold potential as watercolour as in the case of other *Garcinia* species. This species has potential for improvement of other species in the genus by breeding and as a rootstock for mangosteen (Hammer 2001) and other slow growing economic species of *Garcinia* (Yacob and Tindall 1995). Grafted mangosteen trees were found to come to bearing within 5 years, even though canopy size is reduced. Yield can be increased by high density planting and has the added advantage of easy fruit harvesting.

In fact, innovative nurseries in Thiruvananthapuram and Kanyakumari districts have been found to use it as rootstock for soft wood grafting of mangosteen. By virtue of its well-developed root system and fast growth, it is ideal as rootstock. Graft compatibility is good and success rate is very high in polythene mist houses. By grafting to a highly adapted rootstock like *G. hombroniana*, the cultivation of mangosteen can be extended to diverse soil types especially laterite uplands of Kerala. This will

Fig. 3 Distribution of *G. hombroniana* in South India



boost the cultivation of mangosteen, which is gaining importance in the traditional and international markets as a table purpose fruit. The tree is ideal for promoting as an ornamental, avenue or shade tree. It is evergreen with shining, leathery leaves that are retained on the tree for more than two years. There is very less litter fall, thus it is an ideal choice for landscaping.

As there are reports of its cultivation in South East Asia as a fruit crop, there is a possibility of locating sweet and large fruited genotypes. An extensive survey in Nicobar Islands needs to be undertaken for collection of its variability.

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