

Detailed floral morphology of *Garcinia pedunculata* Roxburgh ex Buchanan-Hamilton (Clusiaceae) from Northeast India

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Abstract

Garcinia pedunculata Roxburgh ex Buchanan–Hamilton (Clusiaceae) is a medicinal plant from Indian Eastern Himalayan region. Detailed observation on the morphology of its male and female flowers along with photographs are presented in this article to facilitate easy and proper identification of the species.

Key words: *Garcinia pedunculata*, Floral morphology, Arunachal Pradesh

INTRODUCTION

Garcinia Linnaeus is the largest genus of Clusiaceae. The genus is distributed mainly in the tropical regions of Asia, Africa and Polynesia (Ridley 1922; Whitmore 1973). The number of accepted species for *Garcinia* is 390 with a total of 611 species and subspecies were documented in the www.theplantlist.org. However, Steven's (2001) estimation of 200 species for the genus was much lesser than the 400 species as earlier approximation by Whitmore in 1973 (Saleh 2006). Xi-wen *et al.* (2007)-recorded 20 species in China with 13 endemic and one introduced species. Among the 35 species reported by Maheshwari, (1964) from India, 15 species are occurring in North Eastern region of India. Kanjilal *et al.* (1934) and Hajra *et al.* (1996) have described 9 species from Arunachal Pradesh (as well as for Assam). Species of *Garcinia* produces edible fruits and vegetables and also used in traditional medicines (Baruah & Borthakur 2012).

During the field survey in East Siang and Papum Pare districts of Arunachal Pradesh, during October 2014 – April 2015 and October 2015 – April 2016, the authors came across the reproductive parts of *G. pedunculata*, which is now explained in much more detailed and supported with photographic evidences as compared from the earlier accounts. Although Parthasarathy and Nandakishore (2014) carried out the floral morphology of some Indian *Garcinia* species but the pictographic floral descriptions of *G. pedunculata* have been poorly reported and available only for the female reproductive parts. As the flowers of this species were only briefly described and illustrated earlier that is why through the present attempt the flowers of this species, both male and female, are presented in greater details along with colour photographs (Figure 1 & 2). The voucher specimens of the species were deposited at the herbarium of the Botany Department of Rajiv Gandhi University, Arunachal Pradesh, India.

FLORAL DESCRIPTION

Plants dioecious. Flowers 4-merous.

Male flowers: 8 – 10 in an erect 8 – 9 cm terminal cyme; pedicels robust 5 – 7 cm long, green, 3 – 4 mm thick; bracts 2, suborbicular, 3 mm long; sepals 4, equal, broadly ovate or suborbicular, thick, fleshy, brownish green, 6 – 7 mm long, with no indumentum; petals 4,

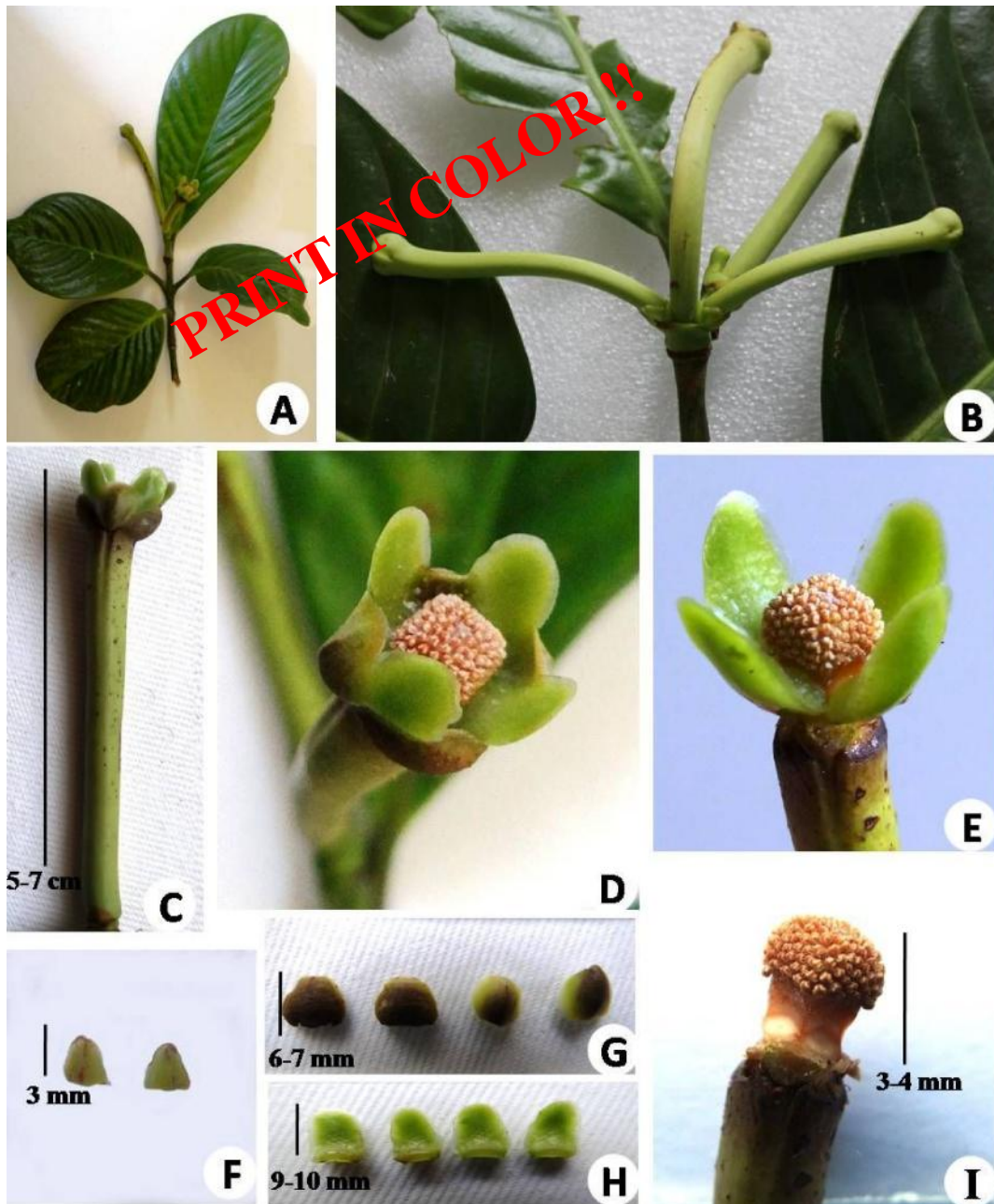


Figure 1. *Garcinia pedunculata* Roxburgh ex Buchanan–Hamilton: Male flower. A. Flowering twig; B. Terminal cyme; C. One pedicellate flower; D. Complete flower; E. After removal of sepals; F. Bracts, G. Sepals; H. Petals; I. Stamens united in a capitate structure

oblong-lanceolate, 9 – 10 mm long, light green; stamens fascicled, connate in a capitate structure, ca. 3 – 4 mm high; anthers sessile, 2-celled, longitudinally dehiscent; stigma in pistilode peltate, inconspicuously tuberculate. **[Figure 1]**

Female flowers: 4 – 4.3 cm, usually in pairs or solitary at the tip of branchlets; pedicels robust with 2 suborbicular bracts 5 mm long; sepals 4, yellowish green, broadly ovate or suborbicular, thick, fleshy, 1-1.2 cm long; petals 4, yellow, oblong-lanceolate 1.2 cm long; staminodes 40 – 80, basally united in a number of bundles surrounding ovary, upper part of filaments free; ovary 9 mm, subglobose, 8 – 10-loculed; stigma sessile, radiate, 8 – 10-lobed, papillate. **[Figure 2]**

Fruits: green in young; large, oblate, concave on both ends, pale yellow on ripening, 10 – 15 × 11 – 17 cm, smooth; fruiting pedicel 5 – 6 cm. Seeds 8 – 10, reniform.

Flowering: September – December; **Fruiting:** December – April

Exsiccatae: INDIA, Arunachal Pradesh, Papum Pare (Male specimen near Rajiv Gandhi University), East Siang District (Female specimen near Jawaharlal Nehru College, Pasighat), 300 – 600 m, 11.11.2014 and 24.12.2015, *G. Gogoi* 59 and 60 (RGU).

Ecology: Growing in humid shady area within the elevation 300 – 600 m

Distribution: India (North Eastern states, Andaman & Nicobar Islands), China, Bangladesh, Myanmar and Malaysia.

DISCUSSION

The reproductive organs are very rarely observed in *Garcinia pedunculata* as there is no pictographic illustration has been reported till now. From the present study it has been confirmed that the species dioecious in nature. Floral morphology of the species has been illustrated in details. From the collection surveys it has been observed that though many *Garcinia* species exist in Arunachal Pradesh, but the population density of *G. pedunculata* is seriously low and is restricted to one or two trees in a given location and thus making the species survival extremely difficult. This is further effected by the fact that seeds fail to produce seedlings due to various physiological conditions and environmental factors making impracticable in development and protection of these species (Parthasarathy & Nandakishore 2014).

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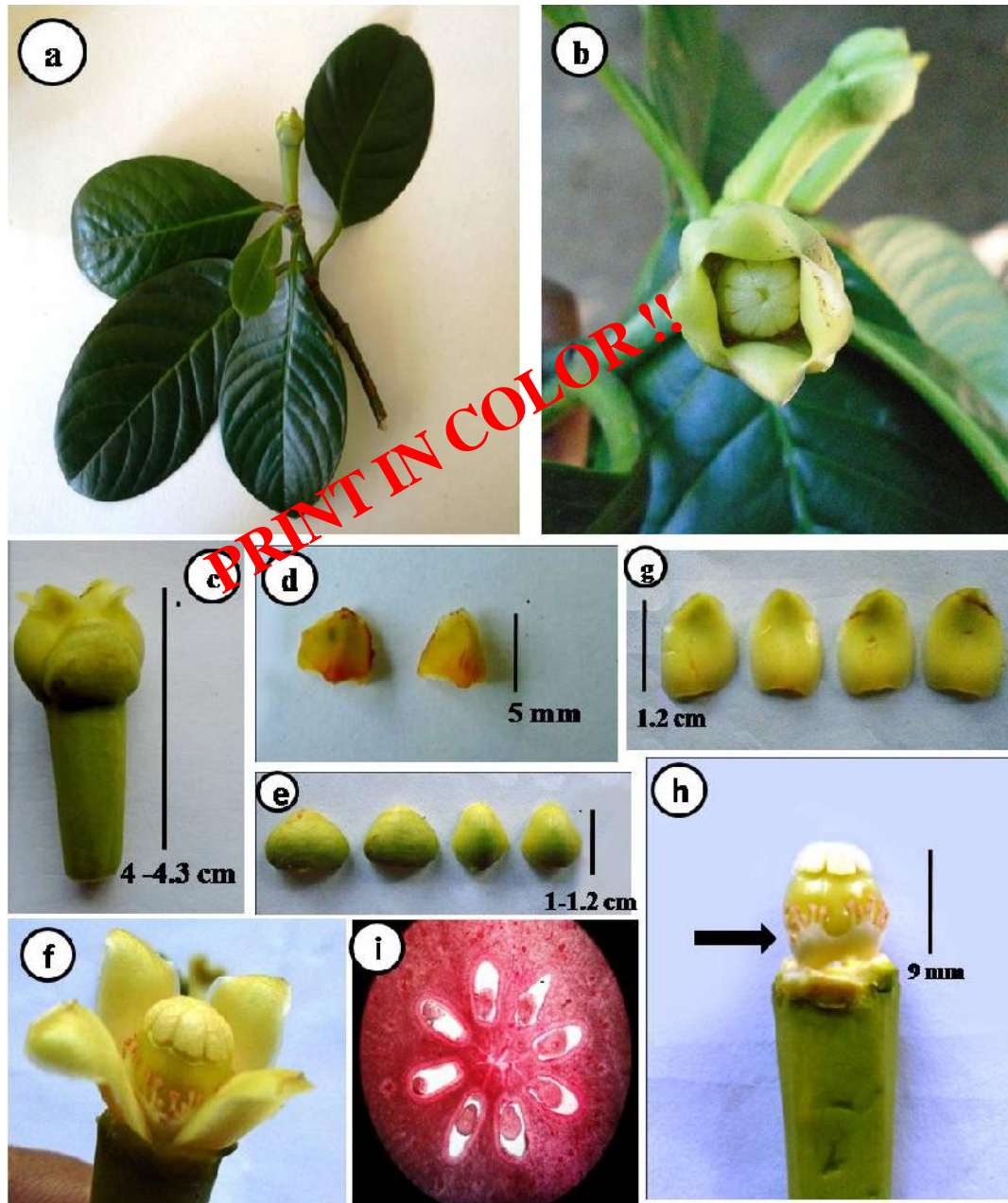


Figure 2. *Garcinia pedunculata* Roxburgh ex Buchanan–Hamilton: **Female flower.** **a.** Flowering twig; **b.** Close front view; **(c)** Close lateral view; **d.** Bracts; **e.** Sepals; **f.** After removal of sepals; **g.** Petals; **h.** Stamines (arrow) surrounding ovary; **(i)** T.S of ovary showing locules.

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