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Two new varieties of *Garcinia morella* Desrousseaux (Clusiaceae) from the Tinsukia district of Assam, India

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Abstract

Garcinia morella Desrousseaux var. *cuspida* Ajima Begum, S.K. Borthakur & Jatindra Sarma and *G. morella* Desrousseaux var. *mucrona* Ajima Begum, S.K. Borthakur & Jatindra Sarma, the two new varieties are recognized from the Tinsukia District of Upper Assam, India. These two varieties are differing from the Type variety mainly in terms of shape and apex of leaves, shape of branchlets and shape of fruits.

***Key words*:** Assam, *Garcinia morella*, New varieties.

The genus *Garcinia* Linneaus (Clusiaceae) has about 350 species native to South Asia ranging southern parts of the Thailand and Peninsular Malaysia to Indonesia, distributed in South East Asian region (Sharma *et al*. 1993; Mabberley 2005; Stevens 2001); of these, there are 49 species of the genus in Peninsular Malaysia (Whitemore 1973; Stevens 2001). In India, 30 species were reported by T. Anderson (1874) in *Flora of British India*. Of the 35 species reported by Maheswhari (1964), 15 species are from North-East India. Kanjilal *et al*. (1934) reported nine species from undivided Assam. Species of *Garcinia* are mostly found in the warm and humid tropics of South and Southeast Asia as second storey trees. Species occurring wild are adapted to shade and mangosteens are regarded as a shade-tolerant tree (Ochse *et al*. 1961; Palma Gil *et al*. 1972; Verheij 1992). Different species of *Garcinia* are considered as general health tonic due to the presence of some antibiotic-like substances and, in India, the seed-coat extract of *G. morella* Desrousseaux is used for this purpose (Keeler & Tu 1983). *G. morella y*ields gamboge resin which is a strong purgative used in veterinary medicine and gamboges from *G. hanburyi* Hooker *f*. is used similarly in Indo-China (Howes 1949; Dastur 1964).

MATERIALS AND METHODS

The field survey was undertaken during March 2012 to August 2014 for taxonomic studies on the genus *Garcinia* Linneaus in Assam, India when some interesting specimens were collected. Perusal of relevant literature (Desrouss 1792; Anderson 1874; Choicy 1824; Thwaite 1858) and critical examination of specimens resulted in the recognition of two new varieties of *G. morella* Desrousseaux from Assam. Detailed description along with other relevant information are provided herewith for easy recognition of the new taxa.

Key to the varieties:

1a. Branchlets quadrangular; lamina elliptic, ovate; stigma distinctly 4 - 5 lobed; fruits 4 - 5 chambered …… …… ***G. morella*** var. ***morella***

1b. Branchlets terete; lamina obovate; stigma rounded or obscurely lobed; fruits 5 - 6 chambered …… ……. 2

2a. Blaze yellow with light pink irregular stripes exuding scanty yellow latex; lamina chartaceous with cuspidate apex; petiole slender, light brown; secondary veins prominent on upper surface only; fruits oblong, curved with 1 - 1.5 cm long tip …… …… ***G. morella*** var. ***cuspida***

2b. Blaze yellow exuding profuse yellow latex; lamina shiny, coriaceous with mucronate apex; petiole thick, light green; secondary veins prominent on both surfaces; fruits globose or subglobose with 5 - 6 mm long tip …… …… ***G. morella*** var. ***mucrona***

Garcinia morella Desrousseaux in Lamarck, Encycl. 3: 701, t. 405 f. 2. 1792, var. ***cuspida*** Ajima Begum, S.K. Borthakur & Jatindra Sarma, ***var. nov.*** **(PLATE - I)**

Blaze yellow or cream coloured with pink lines exuding turmeric yellow latex scanty; branchlets terete; lamina lanceolate or elliptic-oblong to obovate, margin of leaves curved downward, apex acuminate or cuspidate, base attenuate shiny dark green above and light green underneath,, chartaceous; petiole light brown, slender; very slender secondary veins slightly visible on upper surface only, obliquely parallel. Stigma round or indistinctly lobed. Mature fruits oblong, bend with 1 – 1.5 cm long with pointed tip.

Types: INDIA, Assam, Tinsukia, Borguri, Near Bherjan-Borjan Padumoni Wildlife Sanctuary, 18.04.2012, N-27^0 23$^/$ 23.4$^{//}$; E-095^0 24$^/$ 38.0$^{//}$; Alt-277 m, *Ajima Begum, Jatindra Sarma 101* (***Holotype*: GUBH; I*sotype*: ASSAM**). INDIA, Assam, Sivasagar district, homesteads of Nazira, 02.11.2012, N-26^{0}55$^/$56.3$^{//}$; E-094^{0}43$^/$10.0$^{//}$; Alt-125 m, *A. Begum 105*. (***Paratype*: GUBH**).

Trees 15 m tall with lax crown, fluted at the height of 1 meter. *Bark* light brown, smooth. *Blaze* light yellow with little pink colour, *Wood* whitish yellow or cream coloured exuding turmeric yellow latex scanty. *Branches* many, obliquely horizontal, slender, spreading and drooping; *branch lets* yellowish brown, terete. *Lamina* 7 - 13cm x 2.7 - 4.1 cm lanceolate or elliptic-oblong but some are broadly lanceolate and obovate, rntire curved downward, repund when young, acuminate (5 – 9 mm) or cuspidate-bend, base attenuate, shiny, chartaceous, dark green above and light green underneath, red when young, midvein raised abaxially, impressed adaxially; *secondary veins* 8 - 12 pairs , slightly visible on upper surface only, very slender, obliquely parallel forming 45^0 with 1^0 vein , joining together near margin, 5 – 6 mm apart. *petiole* light brown, slender, 8 – 11 mm long; Plants dioecious. *Female flowers* greenish white, 1 - 1.2 cm long, 1.2 cm diameter, terminal, axillary, solitary or in cluster of 2 - 4, sessile; a pair of bract of about 3 mm long is present at the base of inflorescence. Sepals 4, almost equal, polysepalous, green, sub-orbicular, thick, 2.5 – 3 mm x 2 - 3.5 mm; petals 4, imbricate, obovate-oblong, 8 - 8.5 mm x 4 - 4.5 mm, margin fimbriate, greenish white; *staminodes* 2 - 2.5 mm long, very slender united in lower half and enveloping ovary base, 4 - 8 at the four corners, it occurs singly or cleft into 2 separate anthers or 2 separate staminodes at each corner; filaments white, usually shorter than ovary; anthers dithecous, yellowish-orange; ovary

PLATE - I. ***Garcinia morella*** var. ***cuspida*** Ajima *et al*: **1.** Trunk showing bark and wood;

obovate, quadrangular, 5 - 6 loculed, not grooved; style very short; stigma white, indistinctly 5 - 6 lobed, not drooping downside, 1.5 - 2 mm diameter. Mature fruits oblong with 1 - 1.5 cm long pointed tip bearing pimply stigma, 5.8 - 8 cm x 5 - 6 cm, 5 - 6 chambered bearing 1 - 2 fertile seeds; persistent stigma round or indistinctly lobed, inserted at the top of fruit.

Flowers: April; *Fruits*: July – September.

Etymology: The varietal epithet '*cuspida*' denotes cuspidate apex of lamina which is a prominent characteristic of this variety.

Garcinia morella Desrousseaux in Lamarck, Encycl. 3: 701, t. 405 f. 2. 1792, var. ***mucrona*** Ajima Begum, S.K. Borthakur & Jatindra Sarma, ***var.nov.*** **(PLATE – II)**

Blaze light yellow or cream coloured exuding turmeric-yellow latex frequently. Branchlets yellow brown terete. Lamina 9 - 13.5 cm x 4.2 - 6.5 cm, obovate, elliptic with mucronate apex (7 – 8 mm), base cuneate, shiny, both surface light green, coriaceous, secondary veins 8 - 12 pairs, 1 - 1.2 cm apart, prominent on both surfaces; petiole thick, 1 - 1.2 cm long. Mature fruits sub-globose, 5 - 6.8 cm x 4.4 - 5.6 cm, with short pointed tip, orange-yellow, 5 - 6 chambered containing 2 - 5 fertile seeds in each, stigma round, irregularly lobed, 2 - 3 mm diameter.

Types: INDIA, Assam, Tinsukia, Digboi, Pangeri, 25.04.2013, N-27^0 24$^/$ 12.6$^{//}$; E-095^0 39$^/$ 22.8$^{//}$; Alt-160 m, *Ajima Begum, Jatindra Sarma & S.K. Borthakur 113* (***Holotype*****: GUBH**; ***Isotype:*** **ASSAM**). INDIA, Assam, Sivasagar district, homesteads of Nazira, near Geleki Reserve Forest, 10.07.2013, N-26^0 55$^/$ 59.9$^{//}$; E-094^0 42$^/$ 59.1$^{//}$; Alt-80 m, *A. Begum 116* (***Paratype*****: GUBH**)

Trees 13 m tall, fluted at the height of 1 meter. *Bark* light brown, somewhat rough. *Blaze* whitish yellow or cream-coloured, frequently exuding turmeric-yellow latex. *Branches* many, obliquely horizontal, slender, spreading and drooping; *branchlets* yellowish brown, terete. *Lamina* obovate – elliptic, 9 - 13.5cm x 4.2 - 6.5 cm, entire, mucronate (7 – 8 mm), base cuneate, shiny, thinly coriaceous, both surfaces light green, midvein raised abaxially, impressed adaxially; *secondary veins* 8 - 12 pairs, prominent on both surfaces, obliquely parallel, joining together near margin, 5 – 8 mm apart; *petiole* light green, thick, 10 – 11 mm long. Plants dioecious. *Female flowers* greenish white, 1 - 1.2 cm long, 1.2 cm in diameter, terminal, axillary, solitary or in cluster of 2 - 4, sessile; a pair of bract of about 3 mm long is present at the base of inflorescence; sepals 4, almost equal, polysepalous, green, sub-orbicular, thick, 2 - 2.3 mm x 2 - 3 mm; petals 4, imbricate, obovate-oblong, 7 – 8 mm x 3 - 4.3 mm, fimbriate, greenish-white; *staminodes* 4 – 8 at the four corners, 2 - 2.5 mm long, very slender, united in lower half and enveloping the ovary base, it occurs singly or cleft into 2 separate anthers or 2 separate staminodes at each corner; filaments white, usually shorter than ovary; anthers dithecous, yellowish-orange; ovary obovate, quadrangular with very short style, 5 - 6 loculed, ovary not grooved; stigma white, indistinctly lobed, not drooping downside, 2 - 3 mm diameter. *Mature fruits* 5 - 6.8 cm x 4.4 - 5.4 cm, orange yellow, globose or subglobose with 5 - 6 mm long beak bearing stigma, 5 - 6 chambered bearing 2-4 fertile seeds in each; stigma in fruit round or indistinctly lobed, not inserted at the top of fruit.

Flowers: April; *Fruits*: July – September

Etymology: The varietal epithet '*mucrona*' denotes mucronate apex of lamina which is a prominent characteristic of this variety..

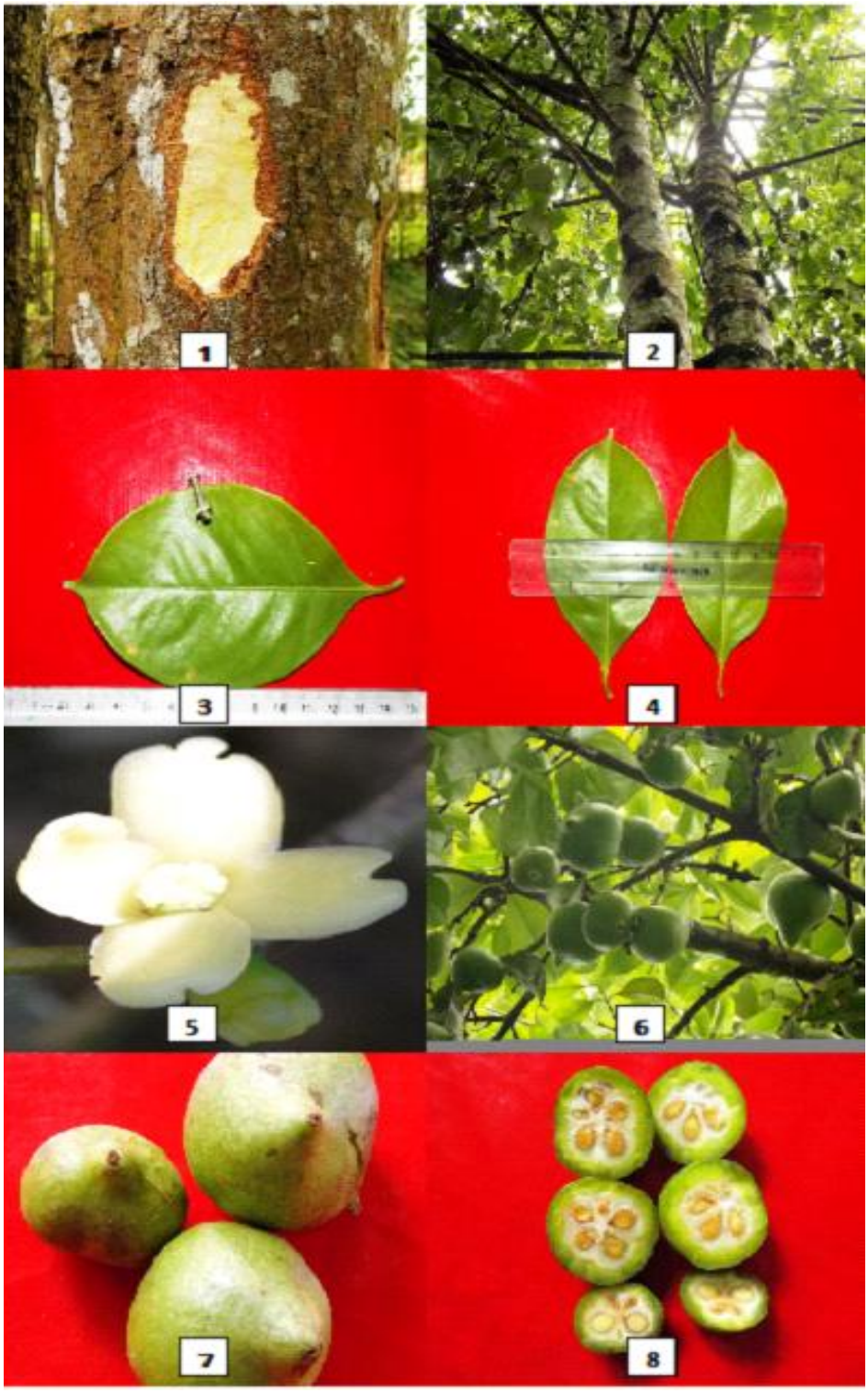

PLATE – II. ***Garcinia Morella*** var. ***mucrona*** Ajima *et al:* **1**. Trunk showing bark and wood; **2**. Branches; **3-4**. Leaves; **5.** Flower; **6**. Fruiting branch; **7**. Fruit showing stigma; **8.** Locules of fruit

Uses: The fruits of both the varieties of *G. morella* Desrousseaux are used for treating dysentery and diarrhoea in general by the villagers. The fruits are sliced into pieces, dried in sun till moisture is reduced to the barest minimum and preserved in containers for future use. The dried rinds are soaked overnight and salt, sugar is added to ones taste when the filtered water turns brownish before consumption as drinks. This practice is generally adopted on hot summer days to relish thirst and to avert sun-stroke. The Moran community in Upper Assam preserve the dried rinds in bamboo calms with salt added to it for future use. While the fruits are tender, the rinds are directly used in curries prepared with pulses to avert dehydration in hot and sunny summer days.

DISCUSSION

Though these two varieties has been found in good numbers in Tinsukia district of Assam but a good number of individuals has also been observed in the village homesteads of many places of Sivasagar district, Assam. Due to contiguity of its habitat it may be available in other parts of N. E. India. They are mostly growing in tropical wet evergreen forests and tropical semi-evergreen forests. Since these two varieties are extensively used by the villagers as a local medicine for treatment of stomach disorders and it has potential economical value so these varieties should be conserved through plantation in large scale.

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