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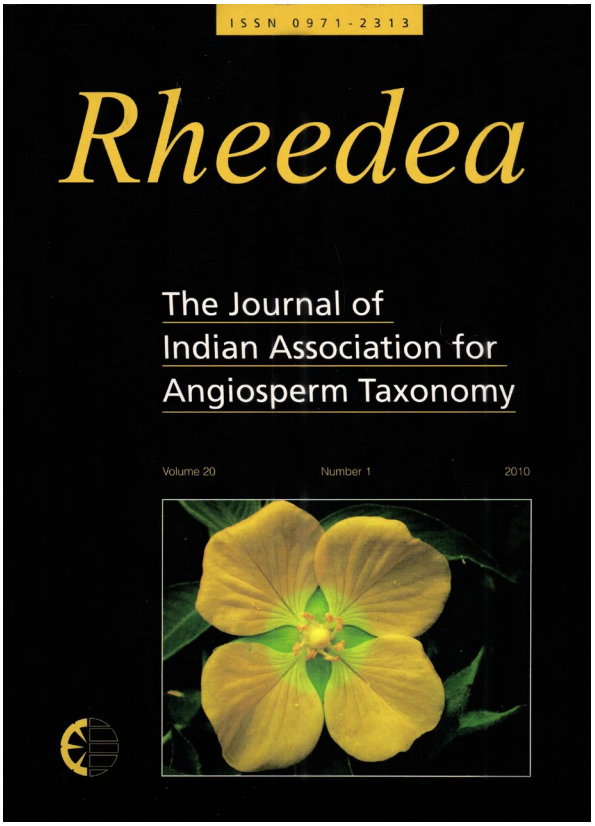

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A new variety of *Morus macroura* (Moraceae) from Arunachal Pradesh, India

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Abstract

Morus macroura Miq. var. *laxiflora* G.K. Upadhyay *et* A.A. Ansari, a new variety is described and illustrated. It differs from variety typical by the smaller size of leaves with serrulate-ciliate margin, two peduncular bracts above the base of male inflorescence and lax arrangement of mature male flowers on the racemose spike.

Keywords: Arunachal Pradesh, *Morus*, New Variety

Introduction

The genus *Morus* L. (Moraceae), represented by 13 species, is distributed almost throughout the world especially in temperate and tropical zones of Asia and Africa (Mabberley, 2008). In India, it is represented by 4 species distributed in the Himalayas and Andaman & Nicobar Islands (Hooker, 1888; Sanjappa, 1989; Tikader & Thangavelu, 2003). *Morus*, commonly known as Mulberry, is significantly associated with human civilization and spread of silk-culture from Asia to Europe, Africa and Latin America. One of its species, viz., *M. macroura* Miq. (tribe *Moreae*), is well known for its timber value (Gamble, 1881), as fodder and silkworm's feed. It is widely distributed in India (Andaman & Nicobar Islands, Assam, Bihar, Meghalaya, Rajasthan, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal) and other countries like Bhutan, Cambodia, China, Indonesia (Java and Sumatra), Myanmar, Nepal, Pakistan, Thailand and Vietnam (Berg *et al*., 2006). Commonly known as Indian Yellow Mulberry and is believed to be native to the Himalayan mountains in China.

Revisionary studies on the family Moraceae in India for "Flora of India" has been taken up since last four years. In this connection, field exploration trips were undertaken to various parts of Arunachal Pradesh during February – March, 2006 and a few interesting specimens of *Morus* were collected. A perusal of relevant literature (Hooker, 1888; Koidzumi, 1923, 1930; Corner, 1962; Sanjappa, 1989; Tikader & Thangavelu, 2003; Zhekun & Gilbert, 2003; Berg *et al*., 2006; Giri *et al*., 2008; Nepal, 2008) and critical examination of specimens at APFH, ARUN, ASSAM, BSD, BSI, CAL, DD and PBL helped the authors to recognize a new variety of *M. macroura*. Detailed description along with other relevant information are provided herewith for easy identification of taxon in field. A key to the varieties of *M. macroura* in India is also provided.

Key to the varieties

1. Leaves serrulate with cilia at margin, membranous; male flowers laxly arranged; peduncular bracts present in male inflorescence …… …… var. **laxiflora**
1. Leaves distantly serrate or dentate without cilia at margin, chartaceous; male flowers closely arranged; peduncular bracts absent in male inflorescence …….. var. **macroura**

Morus macroura Miq., Pl. Jungh. 1: 42. 1851, var. **laxiflora** G.K. Upadhyay *et* A.A. Ansari, ***var. nov.***

Fig. 1 – 3

Foliis brevioribus, margine serrulatis et ciliatis; bracteis pedunculi in masculo - inflorescentiam praesentis et masculo-floris in maturitem laxe dispositis differt.

Typus: INDIA, **Arunachal Pradesh**, Itanagar, Near BSI Office Gate, 280 m, 27.2.2006, *G.K. Upadhyay* 37445 ♂ (Holotypus, CAL; Isotypii, CAL, ARUN).

Deciduous, dioecious trees, up to 25 m high. Leaves distichous, ovate, 4 − 20 × 1.7 − 13 cm, cordate at base, serrulate with cilia at margin, acuminate at apex (acumen 0.5 – 1.5 cm long), membranous, puberulous above, softly tomentose below;

Fig. 1. *Morus macroura* Miq. var. *laxiflora* G.K. Upadhyay *et* A.A. Ansari: **a.** Young twig; **b.** Mature leaf; **c.** Stipules; **d.** Bud scales; **e.** Mature male inflorescence; **f.** Peduncular bracts on male inflorescence; **g.** Enlarged view of a bract; **h.** Staminate flower with pistillode; **i.** Perianth lobes; **j.** Stamen; **k.** Enlarged view of male flowers on a racemose spike (all from *G.K. Upadhyay* 37445, CAL); **l.** Mature female inflorescence; **m.** Pistillate flower (all from *R.K. Choudhary* 18481, CAL).

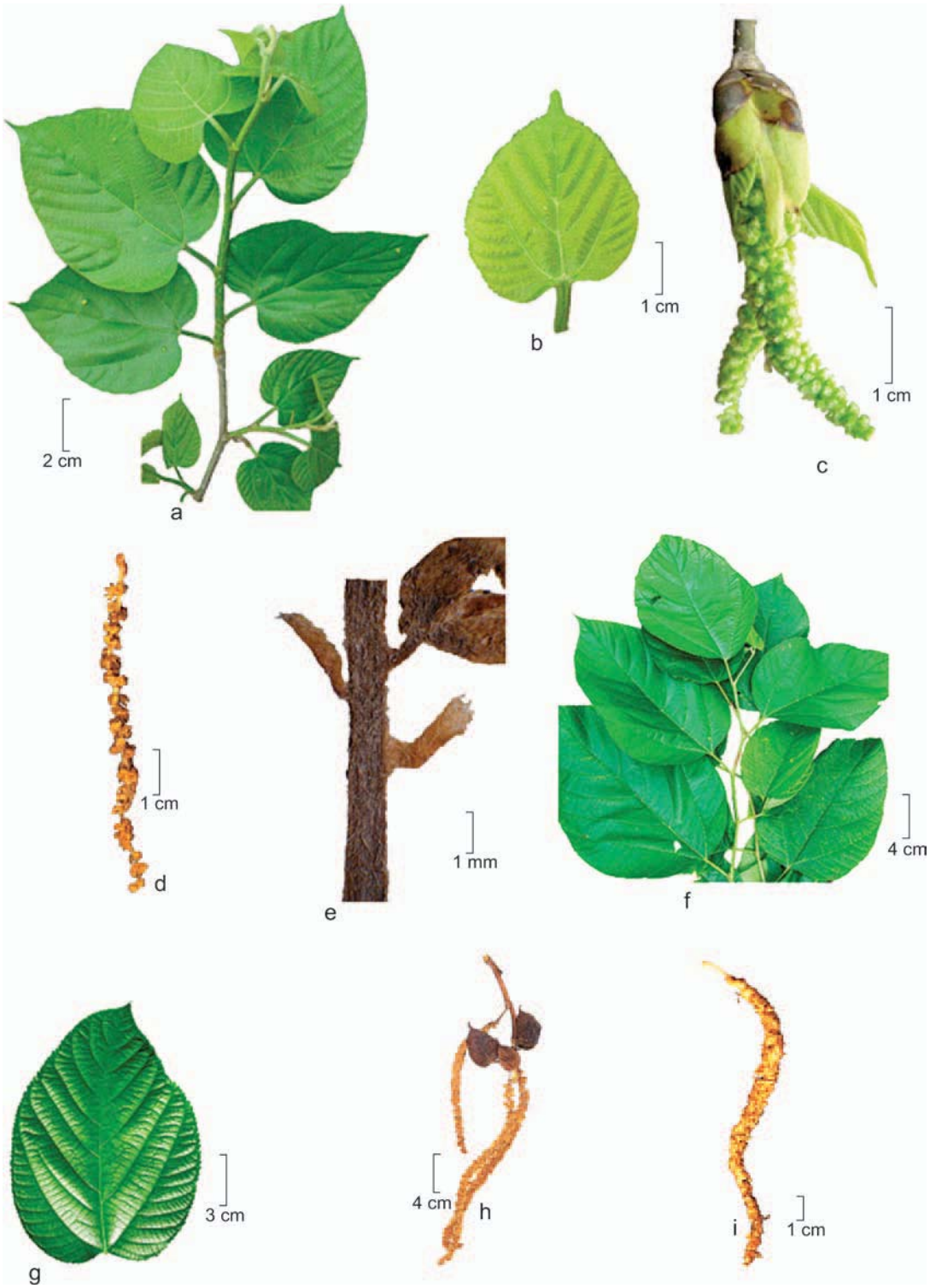

Fig. 2. *Morus macroura* Miq. var. *laxiflora* G.K. Upadhyay *et* A.A. Ansari: **a.** Young twig; **b.** Mature leaf; **c.** Young male inflorescence with bud scales; **d.** Mature male inflorescence; **e.** Enlarged view of bracts (**a** – **e** from *G.K. Upadhyay* 37445, CAL); *Morus macroura* Miq. var. *macroura*: **f.** Young twig; **g.** Mature leaf; **h.** Drooping paired and solitary male inflorescences; **i.** Mature male inflorescence (**f** – **I** from *L. Rasingam* 35926, PBL).

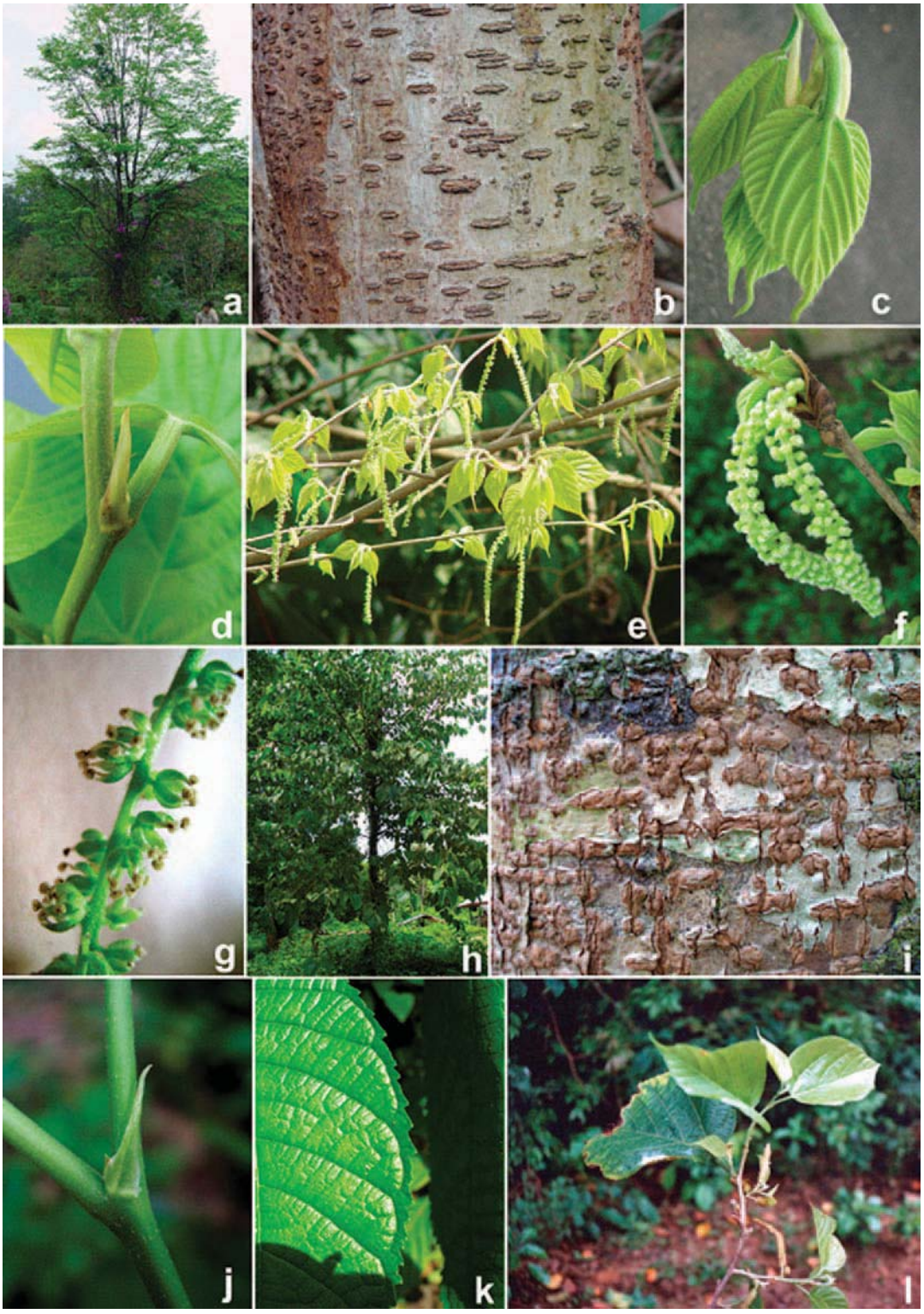

Fig. 3. *Morus macroura* Miq. var. *laxiflora* G.K. Upadhyay *et* A.A. Ansari: **a.** Habit; **b.** Bark with horizontal lenticels; **c.** Young leaves with ciliate margin; **d.** Stipule; **e.** Drooping male inflorescences; **f.** A close view of lax male flowers in a racemose spike; **g.** Close view of male inflorescence (**a** – **g** from Arunachal Pradesh); *Morus macroura* Miq. var. *macroura*: **h.** Habit; **i.** Bark with both horizontal and vertical lenticels; **j.** Stipule; **k.** Leaf with distantly serrate margin; **l.** A branch with male inflorescence (**h** – **l** from Little Andaman Island)

secondary nerves 4 – 7 pairs; internodes 1 – 4.5 cm apart; petioles 0.8 – 4.5 cm long, softly tomentose; stipules lateral on both sides of nodes and young buds, lanceolate or linear-subulate, 1 – 2 cm long, softly yellowish tomentose outside, glabrous inside, caducous. Male spikes solitary or in pairs, *c.* 25 cm long, pendulous; peduncle *c.* 2.5 cm long, villous; bracts 2, on upper side of peduncle and below the flowers, alternate, rarely opposite, ovate-oblong, *c.* 2 mm long, hairy outside, glabrous inside. Flowers many, alternate and distantly arranged, shortly pedicelled, sheathed to base of the racemose spike, 0.5 – 2 mm long, softly tomentose, pale yellowish. Perianth 4-lobed; lobes connate at base, ovate-oblong, 2 – 3 mm long, concave, tomentose outside, glabrous inside. Stamens 4; filaments 2 – 3 mm long, slender, tapering towards apex; anthers *c.* 1 mm long, 2-lobed, longitudinally dehiscing. Pistillode present. Female inflorescence solitary or in pairs, spicate, 10 – 12 cm long; peduncle 1 – 2 cm long, puberulous. Flowers numerous, sessile or subsessile, closely arranged. Tepals 4, free at base, *c.* 2 mm long, sparsely puberulous especially at margin, succulent and yellowish white at maturity. Style lateral, *c.* 2 mm long; stigma bifid, almost to base, *c.* 2 mm long, plumose. Ovary subglobose, *c.* 2 × 1.5 mm. Infructescence pale yellow; achenes ovoid; endocarp ellipsoid to ovoid, *c.* 2 mm long.

Flowering & Fruiting: December – May.

Habitat: Occurs both in wild and cultivated conditions. Grows on open hill sides on accumulated deep moist black soil in association with *Amomum subulatum* Roxb., *Alpinia malaccensis* (Burm.f.) Roscoe, *Callicarpa arborea* Roxb., *Clerodendron colebrookianum* Walp., *Eurya acuminata* DC., *Ficus hederacea* Roxb., *Macaranga denticulata* (Blume) Müll. Arg., *Mangifera sylvatica* Roxb., *Oreocnide fructescens* (Thunb.) Miq., *Pouzolzia viminea* Wedd. and *Trevesia palmata* Vis. Commonly found in tropical or subtropical evergreen forests of Arunachal Pradesh at an elevation up to 1050 m.

Distribution: India (Arunachal Pradesh).

Local Name: *Nuni Bola* (Nyishi).

Etymology: The specific epithet denotes the lax arrangement of the mature male flowers, which is very characteristic and distinct.

Paratypes: INDIA, **Arunachal Pradesh**, Papum pare district, Itanagar, SFRI Campus, 300 m, 28.2.2006, *G.K. Upadhyay* 37446 (♂); Potin, 450 m, 12.3.2006, *G.K. Upadhyay* 37524 (♂); Hawa Camp, 150 m, 13.3.2006, *G.K. Upadhyay* 37449 (♂); Upper Siang district, Mariyang, Yimkukute area, 1050 m, 16.4.2007, *R.K.Choudhary* 18481 (♀); West Kameng district, Tipi, Near Forest Guest House, 250 m, 7.3.2006, *G.K. Upadhyay* 37447 (Veg.) (CAL).

Uses: The timber is said to be very durable and is used by local tribes for house construction and for furniture, a probable reason for the depletion of its populations. The bark is used in paper industry. Fruits edible.

Notes: This variety can be easily distinguished from typical variety as shown in Table 1 and Fig. 2. The bracts appear tomentose in young stage and fall down after maturity. A good population of this new variety has been observed all over the Arbor hills and it is likely to be found in neighbouring parts of Assam. But the distribution of the female plants of this variety is very sporadic and only one specimen has been collected in flowering condition. It was also observed that this variety is relatively more villous than the typical variety especially in having ciliate leaf margin and young villous plant parts. This might be due to its distribution in temperate climatic regions as compared to its typical variety which grows at lower elevations in other parts of India, viz., Andaman Islands, Rajasthan and Uttarakhand.

Table 1. Morphological differences between *M. macroura* var. *laxiflora* and *M. macroura* var. *macroura*

Character	***M. macroura* var. *laxiflora var. nov.***	***M. macroura* var. *macroura***
Leaves size and margin	relatively small, 4 − 20 × 1.7 − 13 cm; margin serrulate, ciliate	relatively large, 8 – 30 × 6 – 20 cm; margin distantly serrate or dentate
Leaves texture and colour	relatively thin with both surfaces pale green in appearance	relatively thick with darker upper surface
Male inflorescence	*c.* 25 cm long	*c.* 15 cm long
Mature male flowers	pedicelled, laxly arranged	sessile or subsessile, closely arranged
Peduncluar bract	Present in male inflorescence	Absent in male inflorescence

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