

Implications of mistaken identities in conservation of wild mangoes

When names get established on wrong subjects, the concerns related to the species on which these names are truly to be assigned get misplaced. This communication relates to mistaken/doubtful identities of four species of two closely allied genera of the family Anacardiaceae, three of them of *Mangifera* L. (*M. andamanica* King, *M. griffithii* Hook. f., *M. nicobarica* Kosterm.) and one of *Bouea* Meisn. (*B. oppositifolia* (Roxb.) Adelb).

The genus *Mangifera* is characterized by evergreen trees; leaves alternate (but clustered at branch tips); inflorescences usually terminal, panicate; flowers two kinds, male flowers with only one or (rarely) more fertile stamens and the remaining sterile; in bisexual flowers, fertile stamens 1–10 with no staminodes and well-developed pistil; ovary asymmetric with lateral style and inconspicuous and unlobed stigma; drupe, variously shaped¹. On the other hand, the genus *Bouea* is characterized by leaves opposite (with no clustering at branch tips); inflorescences in axillary and terminal panicles; flowers two kinds, stamens 3–5, all fertile in both kinds of flowers; ovary symmetric with terminal style and unequally three-lobed stigma; drupe ovoid–ellipsoid or spindle-shaped². *Mangifera* can be morphologically diagnosed from the allied *Bouea* by having leaves alternate (versus opposite), stamens mostly sterile with a few fertile ones (versus all fertile), and stigma simple (versus unequally three-lobed).

Species and issues (Figure 1).

M. andamanica: Trees up to 10 m high in hill forests; leaves obovate to narrowly elliptic–lanceolate, obtuse or acute at tip, lateral nerves 10–12 pairs; panicles terminal spreading with longer lower branches, twice or even thrice as long as leaves, glabrous; flowers four-merous, distinctly pedicelled, glabrous; sepals lanceolate; petals twice as long as sepals, ovate–elliptic, with five sub-confluent ridges on the lower half of the inner surface; drupe ellipsoid, fibrous with thin pulp.

In 1896, King³ described this species from a hilly jungle in the (South) Andaman Islands. It is a well-understood species, but was never collected after King, including Parkinson⁴, who made its reference in his flora based on King's col-

lections. A specimen from Mount Harriet (King collectors, 39, CAL) was designated as lectotype by Kostermans and Bompard⁵. Unfortunately, this specimen could not be traced now in CAL. At present, there are three specimens, all in flowering and without numbers, referable to King collectors in CAL (00000-24405, -24412, -24413) and designated as co-types. In Kew, there are two collections, one in flowering (<http://specimens.kew.org/herbarium/K000695011>) and the other in fruiting (<http://specimens.kew.org/herbarium/K000695010>) stage referable to King. Among the five collections, excepting one, all others are without details of locality (possibly faded away in the course of time) and merely stated as collection from S. Andamans. However, the one in fruiting has Hobdaypur 'as collection locality'. The database generated by Lieden herbarium also quotes a specimen from Geneva (G) which could not be seen in the on-line database. The

distribution is stated as spreading between Mount Harriet, Hobdaypur and Jirkatang. All the stated locations are within a spread of ca. 120 sq. km. Since there are no collections after the type materials, a focused exploration in these areas is a well-desired attempt, particularly in Jirkatang, which is part of the Jarwa Reserve.

Further, Kostermans described another species, *M. nicobarica* from the Great Nicobar Islands (Great Nicobar, near Galathea bridge, N. G. Nair 7184, L). He had realized the similarity between *M. nicobarica* and *M. quadrifida* regarding leaf shape, reticulation, flower size and ridges of petals as well as between *M. nicobarica* and *M. andamanica* with regard to leaf shape and apex. The fruits of *M. nicobarica*, which were not seen by Kostermans but claimed to have been collected recently by Murugan (pers. commun.), are relatively smaller and not comparable in colour and shape with *M.*

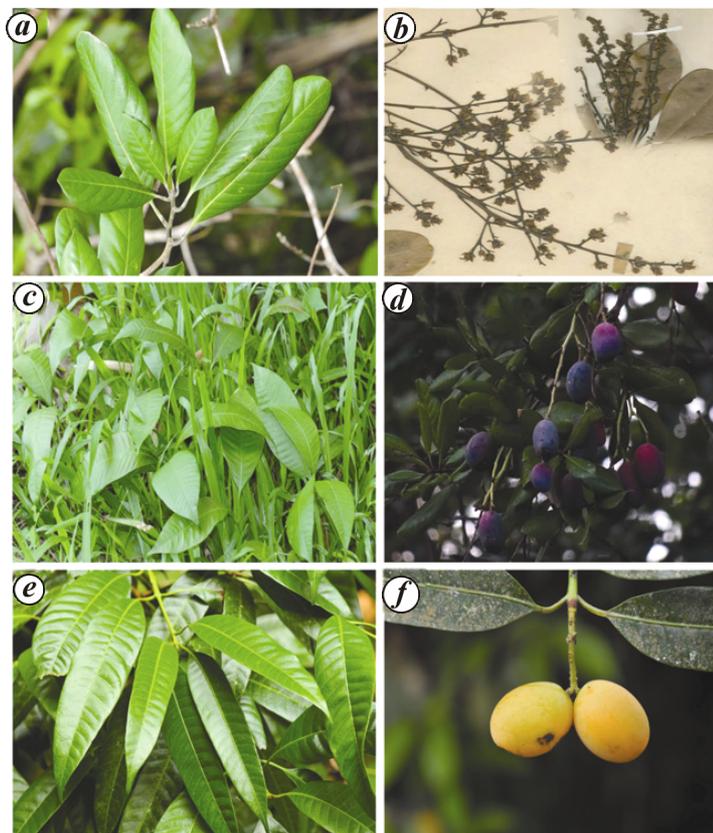


Figure 1 a–d, *Mangifera andamanica*. a, Twig; b, inflorescence (inset) of *M. griffithii* in Mount Harriet National Park; c, seedling growth under the tree; d, ripened fruits; e, f, *Bouea oppositifolia*. (e) Twig; (f) ripened fruits.

andamanica. It is very rare and variously cited, the name is under 'unresolved status'⁶ and as 'endemic to India and globally endangered'⁷. There is a need to study both the endemic species (*M. andamanica* and *M. nicobarica*) together to resolve their taxonomic identities/distinctions.

M. griffithii: While working on the Flora of Mount Harriet National Park, Sreekumar *et al.*⁸ reported the presence of *M. griffithii* based on a lone individual in the Park (11°92'43"N–92°43'60"E). On realizing that it was an unknown element, they had referred the specimens bearing fruits (*P.V. Sreekumar* 18146, 18152; *K. Veenakumari & P.V. Sreekumar* 18150) to Kochummen, a *Mangifera* expert from Malaysia, who confirmed its identity as *M. griffithii*, a species not recorded from the Indian subcontinent till then. Its known distribution is from Indonesia (Sumatra) and Malay Peninsula (Perak, Pahang, Selangor, Johora, Malacca, Singapore). Kochummen's confirmation (as *M. griffithii*) was based on immature fruiting material.

In fact, *M. griffithii* is a much taller tree, reaching up to 30 m height and is known to occur in swampy areas and never in hill forests. It is also cultivated in Indonesia and other Southeast Asian countries⁷ (Figure 1 b). The plant in Mount Harriet produces inflorescences similar to *M. andamanica* and not that of *M. griffithii*. In *M. griffithii*, the leaves are elliptic-oblong, tapering from the middle to both ends, apex is acute to bluntly acuminate, lateral nerves are in 14–16 pairs, inflorescence is axillary, 4–5 peduncles arising together, more racemose (unlike spreading panicles in *M. andamanica*), puberulous bearing sessile flower clusters all through (unlike glabrous peduncles and flowers limiting to terminal branchlets in *M. andamanica*); sepals are broadly ovate, pubescent, and petals slightly longer than the sepals, broadly obovate, with one or two thickened ridges near the base (sepals lanceolate, petals twice as long as the sepals, ovate-elliptic, with five sub-confluent ridges in *M. andamanica*); drupes subsessile, with colours changing from green to yellow to rose red to black on maturity with abundant pulp. In *M. andamanica*, drupes visibly stalked, colours

changing from green to rose-pink to violet on maturity. The lone individual which is said to be *M. griffithii* in Mount Harriet National Park exhibits greater similarity to *M. andamanica* in the stated features.

Both *M. andamanica* and *M. griffithii* are distinct species as they were dealt in detail initially by King in 'Materials for the Flora Malay Peninsula'. Kostermans (*l.c.*) agreed to the existence of *M. andamanica*, and had expressed its nearness to *M. nicobarica*, a species described by him. The authors had an impression that the species growing in Mount Harriet Park reported under the name *M. griffithii* requires a thorough taxonomic review as it might be true *M. andamanica*. Interestingly, what is popularly known as *M. andamanica* and cultivated and conserved in all nurseries in Andaman Islands may be a species of *Bouea*, i.e. *B. oppositifolia* (Figure 1 e and f). In Biological Park (South Andamans: Chidiyatapu), a well-known tourist destination, different *Mangifera/Bouea* species have been named as *M. andamanica*. It is unfortunate that such culturally and economically important taxa (*Mangifera/Bouea*) eluded taxonomic scrutiny for precise identities in earlier revisionary works^{9,10}.

M. andamanica is strictly endemic to the Andaman Islands. It was less known outside India because of its collections limited to type material and restricted distribution. More often, possibly due to misidentification, the more common *B. oppositifolia* is taken for conservation and propagation in forest nurseries in place of *M. andamanica*. The distribution of *M. andamanica* is to be thoroughly explored both in known type localities and other similar habitats. People can be educated and involved in the conservation of correct species, once these identities are established. Further, the protection and significance attached to a lone individual in the name of *M. griffithii* in Mount Harriet National Park is inconsequential, unless its identity is established on a priority basis and then taken up for re-introduction in natural habitats. We observed many seedlings of this species under the parent tree and these could be used for distribution in gardens and other conservatories.

1. Hooker, J. D., In *The Flora of British India, Vol. 1*, L. Reeve & Co, London, 1886, pp. 7–44.
2. Chayamarit, K., In *Flora of Thailand, Vol. 10. Part (3)*, Diamond Printing Co. Ltd., Bangkok, 2010, pp. 265–329.
3. King, G., *J. Asiat. Soc. Bengal, Part. 2*, 1896, **65**, 466–470.
4. Parkinson, C. E., In *A Forest Flora of the Andaman Islands*, Government Central Press, Simla, 1923, pp. 138–139.
5. Kostermans, A. J. G. H. and Bompard, J. M., *The Mangoes: Their Botany, Nomenclature, Horticulture and Utilization*, IBPGR Academic Press, London, 1993.
6. The Plant list 2013, version 1.1; <http://www.theplantlist.org/1.1/>
7. The IUCN Red List of Threatened Species.1998; <http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T31379A9622774.en>
8. Sreekumar, P. V. *et al.*, *Malay. Nat. J.*, 1996, **50**, 85–87.
9. Mukherjee, S. K., *Lloydia*, 1949, **12**, 73–136.
10. Chandra, D. and Mukherjee, S. K., In *Flora of India, Vol. 5* (eds Sharma, B. D. *et al.*), Botanical Survey of India, 2000, pp. 436–518.

ACKNOWLEDGEMENTS. We thank the Department of Biotechnology, Government of India for funds; the Director, Botanical Survey of India, Kolkata and the Principal, Nizam College, Osmania University, Hyderabad for facilities/support. We also thank the Curators of CAL, K and PBL for specimens/digital images.

Received 13 November 2015; revised accepted 19 January 2017

M. VENKAT RAMANA¹
P. VENU^{2,*}
M. SANJAPPA³

¹Department of Botany,
Nizam College, Osmania University,
Hyderabad 500 001, India

²Environment Protection Training
Research Institute,
91/4 Gachibowli,
Hyderabad 500 032, India

³University of Agricultural Sciences,
GKVK,
Bengaluru 560 065, India

*For correspondence.
e-mail: pvenu.bsi@gmail.com