

## Confirmation of *Morinda bracteata* (Rubiaceae) in New Guinea

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**ABSTRACT.** The tree species *Morinda bracteata* Roxb. is here confirmed for New Guinea after having been previously overlooked. A brief summary of its taxonomic history is given, along with its revised distribution which now appears restricted to the east of Huxley's Line when Palawan is included.

**Keywords.** Huxley's Line, New Guinea flora, new record, Palawan

### Introduction

Recent fieldwork in Papua New Guinea prompted a review of digitised New Guinea specimens of *Morinda* L. which allowed for the presence of *Morinda bracteata* Roxb. to be confirmed for the island. Often mistaken for the more widespread and cultivated *Morinda citrifolia* L., it can be differentiated by its smaller fruits and conspicuously enlarged bract-like calyx lobes (or calycophylls) subtending the basalmost flowers of the inflorescence. Previously reported from the Philippines, Moluccas, Sulawesi, and Australia (Pelser et al., 2001–), the range curiously seemed to 'skip' over New Guinea, despite several specimens having already been collected from the island. However, the species was likely overlooked due to its rather long and convoluted taxonomic history.

Initially published as *Morinda bracteata* by Roxburgh (1814: 15), it was validated with reference to a Rumphius plate based on a specimen from the Moluccas. That same plate was cited again to include 'bracteate' collections from India, where the name *Morinda bracteata* was listed by Roxburgh (1824: 198), who noted similarities in the calyx but could not say if the Indian specimens fully agreed with the Moluccan specimen depicted in Rumphius' plate. Subsequently, the species was rendered as a variety of *Morinda citrifolia* by Kurz (1877: 151). Separately, Miquel (1869: 212) published a new form of Roxburgh's species, *Morinda bracteata* f. *celebica*, based on a specimen collected by E.A. Forsten near Tondano, Sulawesi. Then, Valetton (1908) raised Miquel's form to varietal level as *Morinda bracteata* var. *celebica* and provided a detailed description of the taxon along with a full plate drawing of his specimen, observing that it and a living tree cultivated from seed originating in the Moluccas to be "certainly" (p. 180) and "undoubtedly" (p. 181) identical to Rumphius' plant. Nearly a century following its original publication, in his examination of Roxburgh's published names, Robinson (1912: 416), citing an incorrect plate, noted the validity

of *Morinda bracteata* before expressing “grave doubt as to its value as a species”. In his interpretation of Rumphius’ *Herbarium Amboinense*, Merrill (1917: 490) listed the varietal name *Morinda bracteata* var. *celebica*. A few years later, in his account on the Philippine flora, Merrill (1923: 572) accepted the name *Morinda bracteata* but placed the varietal name as its synonym. Since then, bracteate individuals collected from Southeast Asia have been variously attributed to *Morinda bracteata*, *M. bracteata* var. *celebica*, *M. citrifolia*, or *M. citrifolia* var. *bracteata*, leading to some nomenclatural confusion. A recent molecular study found Australian samples of the small-fruited bracteate *Morinda bracteata* var. *celebica* forming a distinct clade separate from that of the large-fruited non-bracteate *M. citrifolia* (Razafimandimbison et al., 2010). Following this, Turner (2013: 162), based on the work of Merrill (1917, 1923) and De Wit (1959), restricted the concept of *Morinda bracteata* to the “small-fruited species with enlarged calyx lobes” and in the process, formally designated the lectotype.

As a result of the confusion, the species ended up being excluded from a recently published checklist of New Guinea vascular plants as the authors considered it a synonym of *Morinda citrifolia* (Cámara-Leret et al., 2020: Suppl. Table 2). This likely stemmed from its former designation as a variety of *Morinda citrifolia* along with the similar morphology and taxonomic history as discussed above.

For the New Guinea region, this account raises the number of *Morinda* species present to two, with *M. citrifolia* also known from the island, where it is found primarily in cultivation or more rarely as a street tree. A potential third species, *Morinda schultzei* Valeton, is not yet verified whereas a fourth, *M. reticulata* Valeton, is considered an unplaced name (Cámara-Leret et al., 2020). In the Philippines, the presence of *Morinda bracteata* was initially reported by Merrill (1912: 453), who listed it separately from *M. citrifolia*. Its range there appears to extend as far west as the island of Palawan. Taking into consideration these records, the natural range of *Morinda bracteata* appears restricted to east of the revised Huxley’s Line, when Palawan is included (Van Welzen et al., 2011).

### The new record

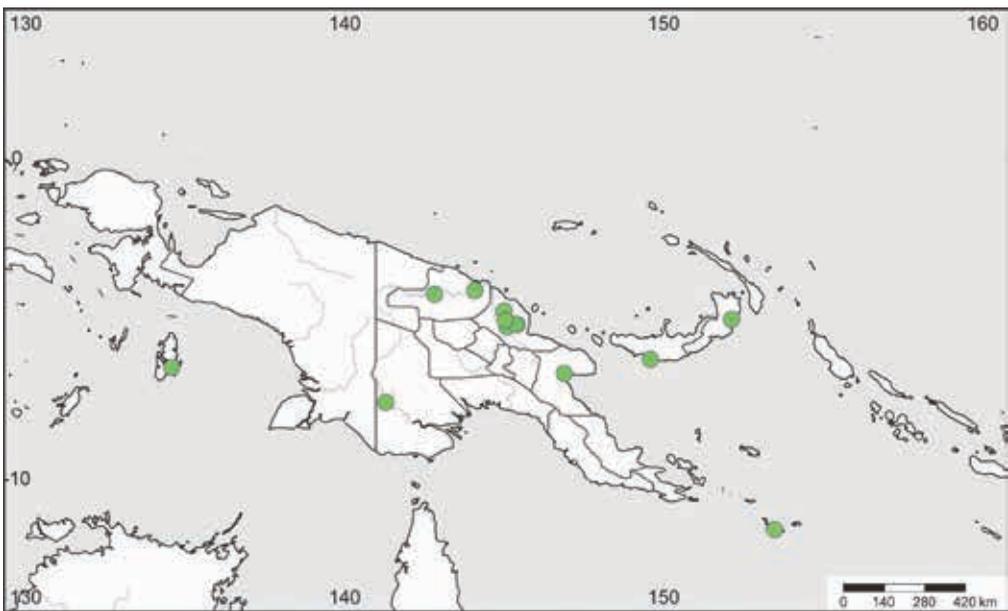
***Morinda bracteata*** Roxb., Hort. Bengal.: 15 (1814). – *Morinda citrifolia* var. *bracteata* (Roxb.) Kurz in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46: 151 (1877). – TYPE: [Published illustration] Rumphius, Herb. Amboin. 3: t. 98 (1743), lectotype designated by Turner (2013). (Fig. 1, 2)

*Morinda bracteata* f. *celebica* Miq. in Ann. Mus. Bot. Lugd.-Bat. 4(7): 212 (1869). – *Morinda bracteata* var. *celebica* (Miq.) Valeton, Icon. Bogor. 3: 179, t. 269 (1908). – TYPE: [Indonesia], Celebes [Sulawesi], [North Sulawesi, Minahasa Regency], “in de bossen rond Tondano”, May 1840, *E.A. Forsten s.n.* (holotype L [L.2926837]).

*Distribution.* Philippines (including Palawan), Sulawesi, Moluccas, New Guinea (including Bismarck Archipelago), and Australia (Northern Territory, Queensland).



**Fig. 1.** *Morinda bracteata* Roxb. from Madang Province, Papua New Guinea. **A.** Mature fruit. **B.** Immature fruit. From *Ezedin 974*. (Photos: Z. Ezedin)



**Fig. 2.** Distribution of *Morinda bracteata* Roxb. in the New Guinea region.

*Ecology.* In New Guinea, known from the lowlands to 250 m and presumably more widespread across the island than is currently known. This species is considered a shrub or small tree, with main stems rarely getting above 7 cm diam. Although not rare, it appears to be infrequently encountered in mature terra firme forest. In the Philippines, known from up to c. 700 m, in thickets and secondary forests.

*Additional specimens examined.* INDONESIA: **Maluku:** [Aru Islands Regency], Pulau Koba, 6°30'S 134°35'E, 5 m, 3 Nov 1994, *Van Balgooy 6804* (L). **Papua:** [No locality], 1 Jan 1920, *Lam 407* (L); [Mamberamo River], 21 Aug 1920, *Lam 857* (L); *ibidem*, 31 Aug 1920, *Lam 979* (U). **Sulawesi:** [No locality], *Forsten s.n.* (L [L.2926838, L.2926839]).

PAPUA NEW GUINEA: **East New Britain:** Napatah, Subprovince Kokopo, 5°S 152°8'E, 100 m, 2 Aug 1978, *Kerenga LAE 74260* (L). **East Sepik:** Lower Keram River near its junction with the Sepik River, 18 m, 12 Oct 1959, *Pullen 1891* (L); Mount Ambunti, Sak-sak swamp, 17 Sep 1990, *Takeuchi 6939* (L). **Madang:** Josephstaal, 4°45'S 145°0'E, 250 m, 1 Sep 1958, *White NGF 10232* (L); Gogol River, Madang Subdistrict, 5°10'S 145°25'E, 30 m, 28 Aug 1969, *Katik NGF 46501* (L); Gogol River sapi-catchment, 5.15S 145.35E, 30 m, 7 Dec 1977, *Rau 193* (L); Wanang, 5°2'S 145°2'E, 200 m, 10 Oct 2007, *Paul et al. LAE 87893* (L, NSW); Wanang village, 5.23088S 145.182E, 115 m, 10 Jul 2008, *Ctvrtecka 1447* (MIN); Banks of the Digitam River near Swire Research Station, Usino-Bundi Subdistrict, 5.23325S 145.08453E, 193 m, 1 Sep 2022, *Ezedin 974* (MIN); Wanang 50 ha Forest Dynamics Plot, tag no. 070443, 5°13'39"S 145°04'47"E, 80–180 m, 29 Oct 2022, *Ezedin 1204* (MIN). **Milne Bay:** Sudest Is., Joe Landing, 18 Aug 1956, *Brass 27737* (L). **Morobe:** Swamp forest along the Markham River, 6°41'S 146°53'30"E, < 20 m, 2 Jun 1993, *Takeuchi 8859* (L). **Western:** Lake Daviumbu, Middle Fly River, 1 Aug 1936, *Brass 7557* (L). **West New Britain:** 9 miles from Kandrian, [6°15'S 149°35'E], 152 m, 26 Jul 1965, *Buderus NGF 23916* (L). **Unknown:** [illegible], [Kaiser-Wilhelmsland], 16 Apr 1905, *Schlechter 17559* (L).

PHILIPPINES: **Palawan:** [No locality], January 1906, *Bermejos Bureau of Science 364* (US); *ibidem*, Mar–Apr 1906, *Foxworthy Bureau of Science 606* (US); *ibidem*, Mar–Apr 1906, *Foxworthy Bureau of Science 766* (US); *ibidem*, Mar–Apr 1906, *Foxworthy Bureau of Science 798* (US); *ibidem*, Apr 1906, *Curran FB 4126* (L); *ibidem*, Jun 1906, *Curran FB 4521* (L); Taytay, 1 May 1913, *Merrill Sp. Blanc. 280* (L, US); Tarateon River, Aborlan, Mar–Apr 1951, *Edano PNH 14168* (BR); Sagsangan, Arborlan, 200 m, 29 May 1955, *Celestinó & Ramos PNH 23091* (L); Limestone Hill, Lipuun Point, Quezon, 28 May 1963, *Gutiérrez & Espiritu PNH 80817* (L); Taglomot-Quezon, 21 Apr 1964, *Mendoza & Espiritu PNH 91171* (L); Sidanaw, 25 Apr 1964, *Mendoza & Espiritu PNH 91258* (L); Mangangas Island, 2 Sep 1964, *Mendoza & Espiritu PNH 91284* (L); Puerto Princesa municipality, Irawan River valley head, 150 m, 15 Mar 1984, *Ridsdale SMHI 87* (L); Langen (Malapakan) Island, south side of valley north of Malapakan Cove, 10–50 m, 16 Apr 1984, *Podzorski SMHI 849* (L); Quezon Municip., Tabon Island, 9°17'N 117°57'E, 0–5 m, 26 Jul 1988, *Soejarto & Madulid 6224* (L); Olympic Mines, N of Bivouac point, 26 Jan 1991, *Reynoso & Sagcal PPI 229* (L); Taytay, Pangkol, 1 Feb 1991, *Stone & Sagcal PPI 380* (L); Bagong Bayan, El Nido, 11°06.468'N 119°18.368'E, 200 m, 21 Apr 1997, *Madulid et al. PPI 27548* (L); On riverbank 1 km from Green Beaches resort, San Rafael, 9°48'N 118°56'E, 5 m, 25 Jan 1998, *Argent et al. 25483* (L).

*Notes.* Several of the Papuan and Philippine specimens were determined as *Morinda citrifolia* var. *bracteata* and others simply as *M. citrifolia*. This species may be easily distinguished from the more widespread and also cultivated *Morinda citrifolia* by the

smaller fruits (vs large, fleshy) with conspicuous bracts (vs without) found subtending the basalmost flowers of the whitish to yellowish green inflorescence. When sterile, *Morinda bracteata* may be differentiated from the latter in generally having leaf laminae that are thinner, flimsier, more herbaceous, shorter in width, and often with longer petioles. Like *Morinda citrifolia*, this species is economically important, being used by indigenous peoples in New Guinea and the Philippines. For the Philippine specimens, only those seen from the island of Palawan (westernmost extent of known distribution) are cited here; however, it should be noted that the species is reportedly found throughout the archipelago on most islands and provinces (Pelsner et al., 2011–). Here, I refer to the collection by E.A. Forsten from Sulawesi as the type of the varietal name *Morinda bracteata* var. *celebica*, which is a heterotypic synonym. This specimen is mentioned in the protologue by Miquel (1869), who notes the locality as being “in the forests around Tondano”. The label of the Forsten specimen chosen here, which is somewhat faded, appears to read “In de bossen rond Tondano” which translates to Latin as “in sylvis circa Tondano” as stated in Miquel’s protologue. This specimen does not appear to have been cited in previous accounts. Two other Forsten specimens from Sulawesi but without exact locality and attributed to “*M. bracteata* var. [blank]” were seen from L and are also cited here on account of their small bracteate fruits and similar leaf morphology; they are possible isotypes but we have no firm evidence of that.

According to the molecular study by Razafimandimbison et al. (2010), *Morinda bracteata* (represented by *M. bracteata* var. *celebica* sampled from Australia) is well-supported as sister to *M. latibractea* Valetton, with this clade then sister to *M. citrifolia* (including one *M. citrifolia* var. *bracteata* sampled from Thailand), and all three subsequently sister to *M. pedunculata* Valetton. Both *Morinda latibractea* and *M. pedunculata* are endemic to the island of Palau and are close relatives to *M. bracteata* and *M. citrifolia*; however, the former pair may easily be distinguished from the latter pair with fruiting specimens. *Morinda latibractea* has bracteate fruits similar to *M. bracteata* but the bracts are much expanded and almost leaf-like whereas *M. pedunculata* has non-bracteate fruits similar to *M. citrifolia* but the fruits are much smaller and are subtended by much elongated peduncles.

The large-fruited yet bracteate specimen from Thailand which was placed in the same clade as all other non-bracteate specimens of *Morinda citrifolia* is odd as it seems to fall outside the scope of *M. bracteata*. The authors of that paper appear to make a slight morphological distinction between the specimen from Thailand (not seen by the author here) and the two from Australia, describing the former as having “conspicuous bracts subtending the inflorescences” and the latter two instead as having “conspicuous enlarged calyx lobes” (Razafimandimbison et al., 2010: 523). Further investigation of the *Morinda citrifolia*–*bracteata* complex is necessary in order to ascertain placement of specimens which may fall outside the defined boundaries of either species.

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