

## The genus *Gynochthodes* (Rubiaceae, Rubioideae, Morindeae) in India

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**ABSTRACT.** The genus *Gynochthodes* Blume (Rubiaceae) in India is revised. Five species are recognised and described, including the new species *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan. *Gynochthodes cochinchinensis* (DC.) Razafim. & B.Bremer has been recorded for India but is excluded here. All names are typified.

**Keywords.** Endemic, *Gynochthodes nilagiriensis*, lectotype, *Morinda*, new species, Nilgiris

### Introduction

The genus *Gynochthodes* Blume (Rubiaceae, subfamily Rubioideae, tribe Morindeae) was first described based on the species *Gynochthodes coriacea* Blume from Java (Blume, 1826–1827). It comprises about 93 species and is native to Madagascar, tropical and subtropical Asia to the Pacific (Razafimandimbison & Bremer, 2011; POWO, 2022). In India it has hitherto been known from four species of which three species are recorded from Peninsular India. *Gynochthodes ridsdalei* Razafim. & B.Bremer is an endemic species restricted only to the Agasthyamalai hill ranges in Peninsular India, *G. macrophylla* Kurz is found in the Andaman and Nicobar group of islands, *G. umbellata* (L.) Razafim. & B.Bremer is distributed throughout India, and *G. villosa* (Hook.f.) Razafim. & B.Bremer is found in Northeast India, Andhra Pradesh and Odisha (Nayar et al., 2014; Murugan et al., 2016; Gangopadhyay et al., 2020). The genus has recently been re-circumscribed based on a molecular phylogenetic study (Razafimandimbison et al., 2009). It can be easily distinguished from genera in other tribes of Rubiaceae by their head-like inflorescences, massive T-shaped placentae inserted in the middle of the septum bearing two anatropous ovules per carpel, and pyrenes with a single lateral germination slit (Igersheim & Robbrecht, 1993). Razafimandimbison et al. (2009) demonstrated the paraphyly of the genus *Morinda* L. with respect to *Coelospermum* Blume, *Gynochthodes* Blume, *Pogonolobus* F.Muell. and *Sarcopygme* Setch. & Christoph., resulting in a number of species being moved from *Morinda* into *Gynochthodes*. With respect to the other genera in the tribe Morindeae, the genus *Gynochthodes* can be readily separated by characters such as mostly being lianas, inflorescences terminal or rarely axillary shoots, inflorescences

composed of 2 to 10 heads arranged into umbellate racemes or cymes, peduncles present or rarely sessile, and plants polygamous or dioecious (Razafimandimbison & Bremer, 2011).

As part of a project to revise the Rubiaceae in Peninsular India, the genus *Gynochthodes* has been revised throughout India based on herbarium specimens housed at the following herbaria: CAL, FRC, KFRI, MH, PBL, RHT and XCH, along with material available online at other international herbaria. All cited specimens have been seen unless otherwise noted; those that were seen only as digital images are marked with an asterisk (\*). In addition, three *Gynochthodes* species were collected from 2020 to 2022 from four different localities in the Western Ghats of Kerala and Tamil Nadu. After critical study of the type specimens (E, G-DC, K and MH) and perusal of pertinent literature (De Candolle, 1830; Kurz, 1872; Hooker, 1880; Gamble, 1920; Mohanan & Sivadasan, 2002), the new collections were identified as *Gynochthodes umbellata*, *G. ridsdalei* and *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan, a new species allied to *Gynochthodes rigida* (Miq.) Razafim. & B.Bremer and described below.

### Taxonomic treatment

*Gynochthodes* Blume, Bijdr. Fl. Ned. Ind. 16: 993 (1826–27). – TYPE: *Gynochthodes coriacea* Blume.

*Guttenbergia* Zoll. & Moritzi, Natuur-Geneesk. Arch. Ned.-Indie 2: 2 (1845). – TYPE: *Guttenbergia umbellata* (L.) Zoll. & Moritzi (= *Gynochthodes umbellata* (L.) Razafim. & B.Bremer).

*Sphaerophora* Blume, Mus. Bot. 1: 179 (1850), non (A.H.Hassall) J.Lindley. – TYPE: *Sphaerophora glomerata* Blume (= *Gynochthodes glomerata* (Blume) Razafim. & B.Bremer).

*Pogonanthus* Montrouz., Mem. Acad. Roy. Sci. Lyon, Sect. Sci. 10: 225 (1860). – TYPE: *Pogonanthus candollei* Montrouz (= *Gynochthodes candollei* (Montrouz.) Razafim. & B.Bremer).

*Tetralopha* Hook.f., Hooker's Icon. Pl. 11: 57, t. 1072 (1870). – TYPE: *Tetralopha motleyi* Hook.f. (= *Gynochthodes motleyi* (Hook.f.) Ruhsam).

*Imantina* Hook.f., Gen. Pl. 2: 120 (1873). – TYPE: *Imantina deplanchei* Hook.f. (= *Gynochthodes deplanchei* (Hook.f.) Razafim. & B.Bremer).

Evergreen or semi-evergreen, usually lianas or rarely shrubs or trees; branchlets terete or sub-terete, glabrous or pubescent. **Leaves** simple, opposite-decussate or rarely ternate, chartaceous or coriaceous; stipules triangular or sheathing, base slightly

connate or free; petiolate. **Inflorescences** terminal or axillary, solitary or in 2–10 heads in an umbel-like, racemose or cymose arrangement. **Flowers** hermaphrodite but functionally unisexual, or sometimes hermaphrodite (plants polygamous), sessile or sometimes pedicellate; corolla tubes shorter than corolla lobes, rarely as long as or longer than corolla lobes; stamens alternate to the corolla lobes, filaments included in corolla throat, linear, glabrous, white, anthers basifixed, ditheous, partly exerted, rarely included. Ovary inferior, globose, c. 1 mm long, 2–4-celled, two ovules in each cell; styles filiform, terete, thick; stigma bilobed, ovate or tongue-like, exerted. **Infructescence** globose or subglobose, syncarpous or drupaceous. Seeds ovate or sub-ovate, or reniform, cream, pale brown, 2–4 mm long, in pyrenes.

### Key to *Gynochthodes* species in India

- 1a. Branchlets glabrous or rarely glabrescent ..... 2  
 1b. Branchlets pubescent or villous ..... 4
- 2a. Leaves on both surfaces glabrous or sometimes glabrescent or midvein pubescent; peduncles very long, slender, up to 20 cm long; infructescence 6–10 mm diam. ....  
 ..... 4. *G. umbellata*
- 2b. Leaves on both surfaces glabrous; peduncles short, stout, up to 1 cm long; infructescence 8–15 mm diam. .... 3
- 3a. Stipules ovate or truncate; leaf laminas broadly elliptic or oblong-lanceolate, margins entire and slightly revolute; inflorescence axillary, in 4 globose heads, mostly 1-flowered per head ..... 1. *G. macrophylla*
- 3b. Stipules sheathing; leaf laminas linear-lanceolate or oblanceolate, margins entire or slightly wavy; inflorescence terminal, 4–5 heads, mostly 8–10 flowers per head ..... 3. *G. ridsdalei*
- 4a. Stems when young densely ferruginous villous and brown when dry; leaf laminas chartaceous or membranous, caudate at apex; lateral veins 6–12 pairs; infructescence 10–15 mm diam. .... 5. *G. villosa*
- 4b. Stems when young densely pubescent and black when dry; leaf laminas coriaceous, acuminate at apex; lateral veins 4–5 pairs; infructescence 15–20 mm diam. ....  
 ..... 2. *G. nilagiriensis*

**1. *Gynochthodes macrophylla*** Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 41(4): 314 (1872). – TYPE: India, Nicobar Islands, Nankowry, February 1875, *W.S. Kurz s.n.* (neotype K [K000763879\*], designated here).

Climbing shrubs; branchlets sub-terete or sub-quadrangular, young parts glabrous. **Leaves** opposite-decussate; lamina membranous, broadly elliptic or oblong-lanceolate,

6–18 × 2.5–6.5 cm, base cuneate, apex rounded to shortly acuminate, margins entire and slightly revolute, both surfaces glabrous, glossy, pale beneath; lateral veins 6–12 pairs, reticulate, with domatia; stipules shortly ovate or truncate, obtuse, caducous; petioles 1–1.5 cm long, terete. **Inflorescence** axillary, cymes, in 4 globose heads, mostly 1-flowered per head, subsessile or shortly pedunculate; peduncles when present 0.2–0.5 cm long, stout. **Flowers** greenish white, 4-merous; bracts and bracteoles absent. Calyx cupular, tube short, 4- or 5-toothed, teeth minute, caducous. Corolla salverform or campanulate, tube 2.5–4 mm long, 4- or 5-lobed; lobes 2.5–4 mm long, oblong, reflexed. Stamens 4 (or 5), just above the middle of the corolla tube, included; filaments c. 1 mm long; anthers oblong, c. 1.5 mm long. Ovary 2-celled; in each cell one ovule; style 1.5–3 mm long, slender; stigma bilobed. **Infructescence** axillary, a group of syncarps, globose or subglobose, 8–12 mm diam., pale green when ripe; seeds not seen.

*Distribution.* India (Andaman and Nicobar Islands), Thailand and Malaysia.

*Phenology.* Flowering and fruiting September to April.

*Specimens examined.* INDIA: **Andaman and Nicobar Islands:** North Andaman, Landfall Island, on the hill top, c. 40 m, s.d., *Kamble 30943* (PBL); South Andaman, Port Blair, 17 Jan 1959, *Thothathi 9082* (MH); Mount Harriet, 100 m, 10 Nov 1963, *Balakrishnan 1359* (CAL); Port Blair, 3 m, 13 Apr 1964, *Ellis & Ramamurthy 18779* (MH, PBL); Corbyn's cove, ± 20 m, 10 Oct 1973, *Nair 496* (PBL); ibidem, coastal forests, 31 Oct 1973, *Balakrishnan 552* (PBL); Rutland Island, along Ghasnullah towards mountain Ford, 22 Jan 1982, *Rao 8631* (PBL); Ferrargunj Reserve Forest, Bomboo Tikari, 15 May 2006, *Pandey 26054* (PBL); Nicobar Islands, Nancohry, 13 May 1966, *Thothari 11651* (CAL); North Nicobars, way towards Jula, Katchal, ± 25 m, 13 Aug 1974, *Chakraborty 2073* (PBL); Mildera, Katchal Island, ± 25 m, 17 Dec 1974, *Chakraborty 2203* (PBL); Kapanga, Katchal Island, 19 Jun 1977, *Chakraborty 6060* (PBL); South Nicobars, Kamorta Island, ± 20 m, 23 May 1977, *Bhargava 5059* (PBL); Kamorta Island, 25 Apr 1988, *Rao 13013* (PBL); ibidem, 26 Apr 1988, *Rao 13030* (PBL).

*Notes.* In the protologue, Kurz (1872) cited only the locality 'Andamans'. Kurz's types are known to be available mainly at CAL, and some Indian materials also at K and L. However, for the present study we have been unable to locate any original material from the Andamans and instead designate a Kurz specimen from the Nicobars in K [K000763879] as neotype.

## 2. *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan, **sp. nov.**

Closely allied to *Gynochthodes rigida* (Miq.) Razafim. & B.Bremer, but differs in the branchlets terete (vs branchlets sub-quadrangular or quadrangular); stipules sheathing or tubular (vs stipules triangular or ovate), leaf laminas elliptic or ovate, 3–8 × 3–4 cm, lateral veins 4 or 5 pairs, with domatia (vs leaf laminas elliptic to oblong, 4–15 × 3–7 cm, lateral veins 6–9 pairs, without domatia); inflorescence usually solitary,

15–25-flowered or sometimes 2–4 heads, with 6–8 flowers per head, usually sessile or rarely pedunculate, peduncles 0–3 cm long, terete (vs inflorescence in 2–4 heads, with 3–16 flowers per head, shortly pedunculate, peduncles 0.3–0.6 cm long, sub-terete or sub-quadrangular); flowers 3–8 × 4–5 mm (vs flowers 2.5–5 × 3–5.5 mm); fruits 15–20 mm diam., green to slightly golden brown, sparsely covered in stiff long hairs (vs fruits 10–15 mm diam., pale green, sparsely pubescent). – TYPE: India, Tamil Nadu, Nilgiris District, Thaishola, near Kinnakorai viewpoint, 11°12'45.1"N 76°38'39.6"E, ± 1700 m, 6 August 2021, *P. Murugan 145034* (holotype MH; isotypes CAL, MH). (Fig. 1–3; Table 1)

Evergreen, lianas; stem 8–15 cm diam., pale brown; branchlets terete, when young parts densely pubescent and black when dry; internodes 1–4 cm long. **Leaves** opposite-decussate; lamina coriaceous, elliptic or broadly ovate, 3–8 × 3–4 cm, base rounded or shortly acute, apex acuminate, margins entire when young, ciliate, adaxial surface pubescent, dark green, abaxial surface especially pubescent on veins, pale; lateral veins 4 or 5 pairs, with domatia, tertiary venation reticulate; stipules sheathing, 4–8 mm long, apex obtuse or acute, shortly connate at the base, pubescent, sub-chartaceous, caducous; petioles up to 1 cm long, sub-terete, channelled, pubescent. **Inflorescence** terminal heads, usually solitary, occasionally 2–4 heads, when solitary the head is 15–25-flowered, when branched it has 2–4 heads with 6–8 flowers per head, usually sessile (solitary head) or rarely pedunculate (branched head); peduncle 0–3 cm long, dull black powder-like dusty. **Flowers** usually 4-merous or rarely 3- or 5-merous, cream, greenish white or white, fragrant. Calyx limb tubular, 1.5–2 × 1–2 mm, sparsely pubescent outside; lobes indistinct. Corolla valvate, tube 3–4 mm long, cylindrical, both surfaces glabrous, throat lanuginose; usually 4-lobed or rarely 3- or 5-lobed, lobes lanceolate or oblong, 2–3 × 1.5–2.5 mm, deflexed, inner surface lanuginose, outer glabrous and apex with small protuberance with scattered hairs. Stamens 4 (3 or 5), epipetalous, included or partly exerted; filaments 1–2 mm long, slender; anthers 1.5–2 mm long, lanceolate or oblong. Ovary globose, 0.5–0.8 mm long, 2–4-celled, ovules one in each cell; style slender, 2–3 mm long, thick; stigma bilobed, flattened, oblong, exerted. **Infructescences** terminal, usually solitary or rarely in 2 to 4 heads, umbellate, globose or subglobose, 15–20 mm diam., syncarps composed of 4–20 fused fruitlets, sparsely pubescent with long stiff hairs; stalks sessile or 2–30 mm long, terete, pubescent. Seeds obovate to oblong or reniform, 3–5 × 3–4 mm, apically obtuse to rounded and basally acute to obtuse, glabrous.

*Distribution.* India (Kerala and Tamil Nadu).

*Habitat.* In evergreen forests above 1700 m growing with *Lasianthus venulosus* (Wight & Arn.) Wight, *Psychotria nilgiriensis* Deb & M.G.Gangop., *Syzygium montanum* Gamble, *Memecylon randerianum* S.M.Almeida & M.R.Almeida, *Tetrastigma leucostaphylum* (Dennst.) Alston, *Passiflora leschenaultii* DC., *Gnetum edule* (Willd.) Blume, *Cryptocarya neilgherrensis* Meisn. and *Litsea floribunda* (Blume) Gamble.



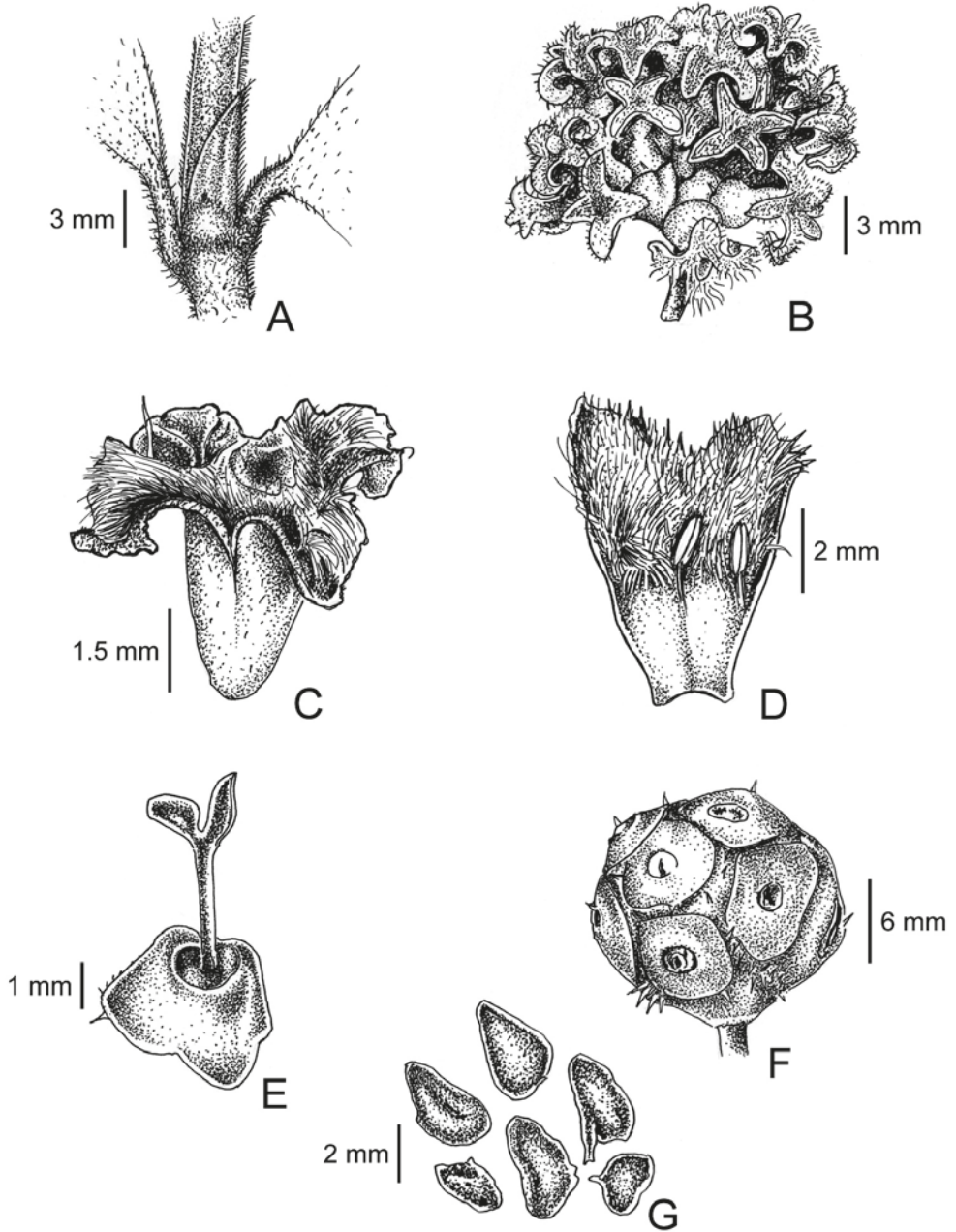


**Fig. 1.** *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan. Drawn by R. Suresh.

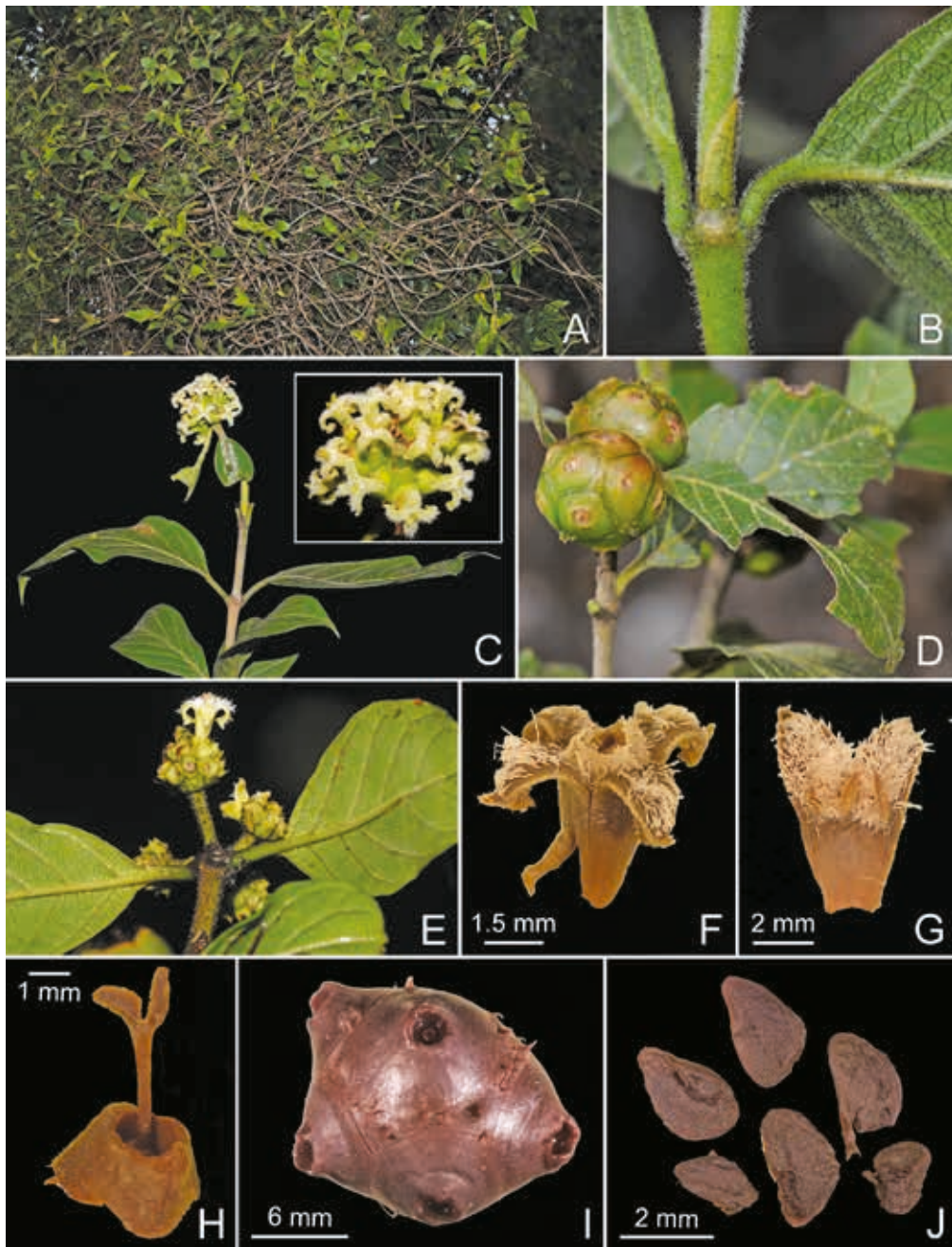
*Phenology.* Flowering and fruiting July to March.

*Etymology.* The specific epithet refers to the type locality, Nilgiri Biosphere Reserve, India.

*Additional specimens examined.* INDIA: **Tamil Nadu:** Nilgiris Distr., Bikkatty,  $\pm$  1800 m, 27 Jun 2017, *Ravichandran 139019* (MH); on the way to Kinnakorai near Thaishola,  $11^{\circ}12'59.9''$  N  $76^{\circ}38'40.6''$  E,  $\pm$  1700 m, 2 Mar 2020, *Murugan & Ravichandran 144890* (MH); Avalanche, on the way to Cauliflowershola,  $11^{\circ}17'53.5''$  N  $76^{\circ}35'06.2''$  E,  $\pm$  2000 m, 5 Aug 2021, *Murugan 145030* (MH). **Kerala:** Palakkad Distr., Silent Valley National Park, Sispara,  $11^{\circ}11'55.8''$  N  $76^{\circ}26'21.2''$  E,  $\pm$  2150 m, 2 Jan 2022, *Murugan 149311* (MH).



**Fig. 2.** Dissected parts of *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan. **A.** Stipule. **B.** Branch of inflorescence. **C.** Corolla with stamens. **D.** Corolla split open. **E.** Pistil. **F.** Fruit. **G.** Seeds. Drawn by R. Suresh.



**Fig. 3.** *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan. **A.** Habit. **B.** Stipule. **C, E.** Flowering twigs. **C (inset).** Close-up of inflorescence. **D.** Fruiting twig. **F.** Corolla with stamens. **G.** Corolla split open. **H.** Pistil. **I.** Fruit. **J.** Seeds. (Photos: A, C, E–J, P. Murugan; B, D, V. Ravichandran)



**Table 1.** Diagnostic differences between *Gynochthodes nilagiriensis* P.Murugan, V.Ravich. & Murugan and the morphologically similar species *G. rigida* (Miq.) Razafim. & B.Bremer and *G. umbellata* (L.) Razafim. & B.Bremer.

Characters	<i>Gynochthodes nilagiriensis</i>	<i>Gynochthodes rigida</i>	<i>Gynochthodes umbellata</i>
Branchlets	Terete, when young densely pubescent	Sub-quadrangular or quadrangular, when young densely hirsute or pubescent	Sub-terete to weakly angled, usually glabrous or sometimes glabrescent
Leaf lamina	Elliptic or broadly ovate, 3–8 × 3–4 cm; lateral veins 4–5 pairs and domatia present	Elliptic to oblong, 4–15 × 3–7 cm; lateral veins 6–9 pairs and domatia absent	Lanceolate or elliptic-lanceolate, 6–14 × 2–4 cm; lateral veins 6–10 pairs and domatia present
Inflorescence	Usually solitary, 15–25-flowered or sometimes 2–4 heads, 6–8 flowers per head; usually sessile or rarely pedunculate, peduncles 0–3 cm long, terete	2–4 heads, 3–16 flowers per head; peduncles 0.3–0.6 cm long, sub-terete or sub-quadrangular	4–8 heads, 5–9 flowers per head; peduncles up to 20 cm long, slender
Flowers	3–8 × 4–5 mm	2.5–5 × 3–5.5 mm	1.5–3 × 2.5–3 mm
Fruits	Globose, 15–20 mm diam., green to slightly golden brown, sparsely stiff long hairy	Globose or subglobose, 10–15 mm diam., pale green, sparsely pubescent	Globose, 6–10 mm diam., orange, glabrous

**3. *Gynochthodes ridsdalei*** Razafim. & B.Bremer, *Adansonia* 33(2): 297 (2011). – *Morinda reticulata* Gamble, *Kew Bull. Misc. Inform.* 1920: 248 (1920), non Benth. (1867). – *Morinda ridsdalei* (Razafim. & B.Bremer) V.S.Raju & J.Prak.Rao, *J. Econ. Taxon. Bot.* 43: 70 (2020). – TYPE: India, Kerala, Travancore [Thiruvananthapuram District], Merchiston, 600 m, 10 April 1895, *T.F. Bourdillon 591* (lectotype K [K000031579], first step designated by Razafimandimbison & Bremer (2011), second step designated here; isolectotypes K [K000031580\*], MH [MH00002205]). (Fig. 4, 6C)

Climbing shrubs or lianas; stem when young white and when dry pale yellowish white; branchlets terete, glabrous. **Leaves** opposite-decussate; lamina coriaceous, linear-lanceolate or oblanceolate, 10–15 × 2–5 cm, base attenuate, apex acuminate to caudate, margins entire or slightly wavy, adaxial surface glossy, abaxial surface pale



**Fig. 4.** *Gynochthodes ridsdalei* Razafim. & B.Bremer. Drawn by R. Suresh.

beneath; lateral veins 10–12 pairs, tertiary venation reticulate and prominent; stipules sheathing, obovate, obtuse at apex, caducous; petioles < 1 cm long, stout, sub-terete. **Inflorescence** terminal in 4–5 heads, with mostly 8–10 flowers per head, umbellate, bracteate; peduncles up to 1 cm long, terete, pale green. **Flowers** pale green, usually 4-merous or rarely 5-merous, fragrant, sessile; bracts foliaceous; bracteoles hairy on margins. Calyx truncate, limb forming a ring, fleshy, persistent. Corolla funnel-shaped, tube < 2 mm long, shorter than the lobes, throat lanuginose; usually 4-lobed or rarely 5-lobed, lobes 2–3 mm long, ovate, apex shortly mucronate, deflexed, whitish villous. Stamens 4 (or 5), included or partly exserted; filaments thick, very short; anthers linear, 1–2 mm long. Ovary globose, 4-celled, in each cell with one ovule; style stout, 2–3 mm long, slightly exserted; stigma bilobed, ovate, thick. **Infructescence** terminal,

in 4–5 heads, umbellate, globose or subglobose, 8–15 × 8–15 mm, syncarps composed of 6–10 fused fruitlets, orange, irregularly lobed, puberulous, with prominent scars of persistent calyx ring. Seeds oblong, white, 2–3 mm long, in pyrenes.

*Distribution.* India (Kerala and Tamil Nadu). Endemic to southern Western Ghats.

*Habitat.* Occasional along river banks in evergreen forests.

*Phenology.* Flowering and fruiting April to October.

*Specimens examined.* INDIA: **Kerala:** Quilon Distr. [Kollam Distr.], Thenmala forest Division, Naduvanoorkadavu on the way to coupe, 3 Jun 1964, *Subramanian 1585* (FRC); Thiruvananthapuram Distr., Kallar, ± 250 m, 20 Aug 1980, *Mohanani 69263* (MH); Kallar, ± 250 m, 11 Mar 1980, *Mohanani 66652* (MH); Merchiston to Kallar, 650 m, 6 Mar 1980, *Vivekananthan 66118* (MH); way to Bonaccord [Bonacaud], 650 m, 23 May 1979, *Mohanani 63228* (MH); Boneccord [Bonacaud], 600 m, 22 Mar 1978, *Mohanani 54747* (MH); on the way Bonacaud to Attayar Camp, ± 700 m, 28 Mar 2021, *Murugan 145022* (MH). **Tamil Nadu:** Kanniyakumari Distr., Way to Vallachithodu-lower Kodayar, ± 600 m, 3 Aug 1977, *Henry 49597* (MH); to Vallachithodu-lower Kodayar, ± 600 m, 28 Mar 1981, *Henry 70659* (MH).

*Notes.* Gamble (1920) originally described *Morinda reticulata* Gamble from *Bourdillon 591*, collected in Merchiston, and *Rama Rao 1281*, collected in Kulathurpolay. *Morinda reticulata* Gamble is a later homonym of *M. reticulata* Benth. Later, Razafimandimbison & Bremer (2011) transferred *Morinda reticulata* Gamble into the genus *Gynochthodes* based on a molecular phylogenetic study. They proposed the new name *Gynochthodes ridsdalei* Razafim. & B.Bremer because the Gamble name, as well as being illegitimate, is preoccupied in *Gynochthodes* by *G. reticulata* (Valeton) Razafim. & B.Bremer. Recently, Raju & Rao (2019) recognised a broadly defined *Morinda* and transferred *Gynochthodes ridsdalei* into the genus *Morinda* as *M. ridsdalei* (Razafim. & B.Bremer) V.S.Raju & J.Prak.Rao. We recognise the more narrowly defined *Morinda* and retain *Gynochthodes ridsdalei* in *Gynochthodes*. Razafimandimbison & Bremer (2011) typified the name on *Bourdillon 591* but there are two herbarium sheets at K [K000031579, K000031580] and one at MH [MH00002205]. Among the two sheets at K, the specimen K000031579 matches well with the protologue and also has the line drawing by Gamble on the sheet. It is hence designated here in a second step as the lectotype as per ICN Art. 9.3 (Turland et al., 2018).

**4. *Gynochthodes umbellata* (L.) Razafim. & B.Bremer, Adansonia 33(2): 296 (2011).** – *Morinda umbellata* L., Sp. Pl. 1: 176 (1753). – TYPE: Sri Lanka, s.d., *P. Hermann s.n.* (lectotype BM [BM000621833\*], designated by Smith & Darwin (1988)). (Fig. 5, 6B)

*Morinda padavara* Juss. ex Schult., Syst. Veg. ed. 15 bis, 5: 216 (1819). – TYPE: India, Malabar, s.d., s.coll. s.n. (lectotype P-JU, designated by Razafimandimbison & Bremer (2011)).

*Morinda scandens* Roxb., Fl. Ind. 2: 202 (1824). – TYPE: [Unpublished illustration] Drawing 2570 in *Icones Roxburghinae* (lectotype K, designated by Razafimandimbison & Bremer (2011)).

Lianas or climbing shrubs; bark bluish black to reddish brown; branchlets sub-terete to weakly angled, glabrescent. **Leaves** opposite-decussate; lamina subcoriaceous, lanceolate or elliptic-lanceolate, 6–14 × 2–4 cm, base cuneate, apex acute to acuminate, margins entire, both surfaces glabrous or sometimes glabrescent, glossy and especially midvein pubescent; lateral veins 6–10 pairs, tertiary venation reticulate, domatia present; stipules tubular, 2–6 mm long, membranous, minute puberulous, apex bristled on both sides, caducous; petioles 4–8 mm long, glabrescent or sparsely hirsute. **Inflorescence** terminal in 4–8 heads, with 5–9 flowers per head, fasciculate, umbellate or shortly racemiform, glabrescent; peduncles up to 20 cm long, slender. **Flowers** usually 4-merous or sometimes 5-merous, greenish white or white. Calyx subcampanulate, limb < 1 mm long, truncate to denticulate. Corolla shortly campanulate, tube 1.5–2 mm long, shorter than the lobes, throat densely villous; lobes usually 4 or sometimes 5, 2.2–3 mm long, narrowly oblong to ligulate, apically thick and rostrate. **Infructescence** terminal, in 4–8 heads, umbellate, subglobose or compressed globose, 0.6–1 cm diam., orange-red when ripe, glabrescent. Seeds oblong, 3–5 mm long, in pyrenes.

**Distribution.** India (Andaman and Nicobar Islands, Andhra Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu and West Bengal), Sri Lanka, China, Japan and Northern Australia.

**Habitat.** In deciduous forests and in plains.

**Phenology.** Flowering and fruiting January to March.

**Specimens examined.** INDIA: **Andhra Pradesh:** Chittoor Distr., Talakona Reserve Forest, ± 700 m, 27 Feb 1986, *Charyulu 288* (MH); Akkagairgudi-Tirumala hills, ± 1300 m, 29 Apr 1988, *Charyulu 2099* (MH); Gogarbhram Dam down-Tirumala hills, ± 800 m, 5 Jul 1987, *Charyulu 1575* (MH); Tirumalai, 1100 m, 17 Jun 1962, *Subbarao 31901* (CAL, MH); way to Japalathirtham, 933 m, 3 Mar 1959, *Subramanyam 7856* (MH); Cuddapah Distr., 4500 ft [1370 m], Jun 1884, *Gamble 15792* (MH); Hombalura dam, 4500 ft [1370 m], Jul 1881, *Gamble 15192* (CAL); Vishakapatnam Distr., on the eastern slope of Galikonda, 1200 m, 16 May 1964, *Subbarao 19657* (MH); Minumuluru towards Paderu, 1050 m, 30 May 1968, *Subbarao 30014* (CAL, MH). **Karnataka:** Mysore Distr., Bandipur Reserve Forest, 950 m, 21 Apr 1965, *Naithani 23860* (CAL, MH); North Canara Distr., Bangalore, Mar 1889, *Unknown s.n.* (MH). **Kerala:** Quilon Distr. [Kollam Distr.], 24 Sep 1913, *Unknown [illegible] 2254* (CAL); Oachira groves, sea level, 16 Feb 1980, *Mohanan 65050* (CAL, MH); Malabar Distr., 1864, *Beddome s.n.*





**Fig. 5.** *Gynochthodes umbellata* (L.) Razafim. & B. Bremer. Drawn by R. Suresh.

(MH). **Tamil Nadu:** Erode Distr., Dhimbam-Bazalatti forest, 850 m, 26 Aug 1984, *Vajravelu* 80695 (CAL, MH); Sathyamangalam forest division, Engineer road Dimbam, 1120 m, 23 Aug 2008, *Sathyaranarayana* 125663 (MH); Mamanatham, 1160 m, 24 Aug 2008, *Sathyaranarayana* 125679 (MH); Coimbatore Distr., Gaddesal, 30 Aug 1914, *Unknown s.n.* (MH); Vadakumalai, 1075 m, 8 Jun 1971, *M.V. Viswanadhan* 988 (MH); Thekkau kadu-Chothaukadu, 4000 ft [1219 m], 23 Aug 1929, *Narayanaswami* 19190 (MH); Marudamalai shola west Kolagathikallu, 24 Jun 1930, *Narayanaswami* 3089 (MH); Hassanur, 3000 ft [915 m], 9 Mar 1931, *K.C. Jacob* 157 (MH); Dindigul Distr., way to Sirumalai top, 967 m, 25 Apr 1958, *Subramanyam* 5772 (CAL, MH); Sirumalai, Aug 1913, *Unknown s.n.* (MH); Namkkal Distr., Kollimalai, 26 Jun 1916, *Unknown* 12965 (MH); Karavalli Reserve Forest, Kolli hills, 25 Jun 1966, *Subramanian* 2554 (FRC); Kolli hills, Semmedu-Nachiarkoil Shola, 1320 m, 17 Apr 1978, *Mohan RHT* 12980 & *RHT* 13004 (CAL); Kamarajar Distr. [Virudhunagar Distr.], way to Kurathividuthi estate, Seithur hills, 1100 m, 12 Nov 1989, *Srinivasan* 86987 (MH); Kurathividuthi estate, 1100 m, 12 Jun 1979, *Srinivasan* 63558 (CAL, MH); Nagariar estate, Seithur hills, 950 m,

15 Mar 1980, *Srinivasan 65957* (CAL, MH); Theni Distr., Sabarigiri River, 920 m, 22 May 1992, *Lakshmanan 99615* (MH); North Arcot Distr. [Vellore Distr.], way to Melpatti, 866 m, 16 Jul 1958, *Subramanyam 6131* (MH); Trichirapally Distr., way to top-Chengattupatti, 567 m, 20 Mar 1959, *Sebastine 7901* (MH); Tenkasi Distr., Courtallum, 21 Jul 1901, *Unknown s.n.* (MH); Courtallum, 6 Jun 1976, *Ridsdale 28* (MH); ibidem, Nov 1901, *Unknown s.n.* (MH); Therkumalai, Courtallum, 800 m, 24 Apr 1957, *Subramanyam 2912* (CAL, MH); Puliyaruvi-Courtallum, 133 m, 19 Mar 1958, *Subramanyam 5582* (MH); Mudaliar Uthu, 1050 m, 22 Jul 1965, *Vajravelu 24837* (MH); 8th block, Kallimalai estate, Sivagiri hills, 800 m, 22 Apr 1989, *Srinivasan 89534* (MH); Courtallam hills, Terkumalai estate to Kannadi Bunglow, 700–900 m, 21 Jun 1998, *Manickam 16153* (XCH); Ambasamudram, Kudamadi hills, 600 m, 29 Jun 1997, *Manickam 13195* (XCH); ibidem, valley opposite to lodge, 400–600 m, 28 Apr 1998, *Manickam 15627* (XCH); Kannikatty hills, road below Inchikuli, 300–500 m, 9 Jun 1997, *Manickam 13037* (XCH); Courtallam hills, forest above Tiger falls, 200 m, 16 Apr 1998, *Manickam 15533* (XCH); Courtallam hills, TME-ME-Attaikadu, 700–950 m, 22 Jun 1998, *Manickam 16186* (XCH); Courtallam hills, Tiger falls, 500 m, 7 Oct 1996, *Manickam 11469* (XCH); Kalakad hills, Sengaltheri Rest House to Kuliratti path, 900–1100 m, 27 Mar 1998, *Manickam 15273* (XCH); Sivagiri, Devipatnam-Kallimalai, 50–800 m, 29 Jun 1999, *Manickam 19781* (XCH); on way to Meyilodai, Courtallum, 400–500 m, 8 Jan 2003, *Murugan 114559* (MH); Salem Distr., Yercaud TK, Shevaroy's, Ladies seat path, 1475 m, 11 May 1978, *Mohan RHT 13549* (CAL); Kundur road Yercaud, 1365 m, 3 May 1965, *Karthikeyan 26817* (CAL, MH); Tirunelveli Distr., near Kallimalai, Estate Rest House, 1000 m, 3 Mar 1992, *Srinivasan 99185* (MH); way to Kannikatty, 550 m, 22 Jul 1989, *Gopalan 90630* (MH); near Thulukkanmottai, 400 m, 28 Mar 1991, *Gopalan 91727* (MH); Sengaltheri, 900 m, 19 Sep 1967, *Vajravelu 29139* (MH); Kodamady, Thirukurungudi, 325 m, 15 Feb 1972, *Karthikeyan 40118* (MH); 1 km from Thalaiyodai, 780 m, 29 May 1984, *Parthasarathy 825* (MH); Checkkalmoodu way to Kannikatty, 370 m, 21 May 1988, *Gopalan 88620* (MH); Nanguneri, Thirukurungudi hills, Nambikoil, 50–600 m, 11 Jul 1998, *Manickam 16509* (XCH); Chengalpattu Distr. [Chennai Distr.], Kodambakkam hills, 6 May 1913, *Unknown 8943* (MH); Nilgiris Distr., Coonoor Ghats, 4000 ft [1220 m], May 1884, *Gamble 14502* (CAL); Barliar, 3000 ft [915 m], May 1884, *Gamble 14323* (CAL); Coonoor Ghats, 30 Apr 1883, *Unknown s.n.* (MH); ibidem, May 1885, *Lawson s.n.* (MH); ibidem, 4000 ft [1220 m], Apr 1883, *Gamble 11375* (CAL); Sirur (Shola towards Ebnad), 1200 m, 3 Sep 1970, *Subbarao 36498* (MH); Jakkannery-Kunjapanai Reserve Forest, 1400 m, 4 Aug 1970, *Vajravelu 35197* (MH); ibidem, 975 m, 9 May 1971, *Vajravelu 38303* (MH); Singara Reserve Forest, 1050 m, 18 Apr 1971, *Ratha Krishnan 37953* (MH); Marappalam-Burliar road, 1200 m, 7 Sep 1970, *Sharma 36080* (MH); ibidem, 1000 m, 29 Apr 1971, *Ratha Krishnan 38144* (MH); Madanad Reserve Forest, 1500 m, 23 Jan 1972, *Vajravelu 39588* (MH); slopes of Segur Peak, 1050 m, 13 Mar 1972, *Subbarao 40209* (MH); Ronning town forest, 500 m, 25 Jun 1974, *Vajravelu 44940* (MH); Mamaram, road side, 1125 m, 25 Nov 1970, *Vajravelu 37073* (MH); Dharmapuri Distr., Harur Taluk, Kalrayans, Kallipparai, Kombukkaranparai, 800 m, 14 Jun 1978, *Mathew & Venugopal RHT 13980* (CAL).

**5. *Gynochthodes villosa*** (Hook.f.) Razafim. & B.Bremer, *Adansonia* 33(2): 296 (2011). – *Morinda villosa* Hook.f., *Fl. Brit. India* 3(7): 158 (1880). – TYPE: India, Khasia, s.d., *De Silva s.n.* [EIC 8425] (lectotype K [K000031581\*], designated here; isolectotypes E [E00143141\*], K-W [K001125487\*, K001125488\*]). (Fig. 6A)

*Morinda cochinchinensis* auct. non DC.: Rao et al., J. Econ. Taxon. Bot. 43: 65. (2019).

*Gynochthodes cochinchinensis* auct. non (DC.) Razafim. & B.Bremer: Kamila et al., J. Threat. Taxa 12(3): 15396 (2020).

Scandent shrubs; branchlets terete or sub-terete, leaf scars present, parts densely ferruginous villous when young and brown when dry. **Leaves** opposite; lamina chartaceous or membranous, narrowly elliptic-oblong or obovate-lanceolate, 8–14 × 2–5 cm, base rounded or sub-oblique or sometimes sub-cordate, apex caudate, margins entire, upper surface sparsely strigose or strigillose with pubescence denser along veins, lower surface densely ferruginous hirtellous; lateral veins 6–12 pairs, with domatia; stipules sheathing or tubular, partially fused, 2 apiculate at apex, 6–10 mm long, pilosulous or hirtellous; petioles 6–15 mm long, terete, densely ferruginous hirtellous. **Inflorescence** terminal in often 4 or sometimes 5–8 heads, with 6–8 flowers per head, umbellate; peduncles 3–10 cm long, slender, villous. **Flower** white or greenish white, usually 4- or rarely 5-merous, sessile; bracts 2 to several, subulate, 4–6 mm long; bracteoles linear, 0.2–0.5 mm long. Calyx campanulate, tube short, 4- or 5-toothed or lobed; lobes c. 1 mm long, rounded to obtuse. Corolla salverform or tubular, puberulous on outer surface, tube 10–12 mm long, cylindrical, densely barbate at throat within, 4- or 5-lobed; lobes 3–4 mm long, narrowly oblong, reflexed. **Infructescences** a group of syncarps, globose to subglobose, 1–1.5 cm diam., orange when ripe; seeds not seen.

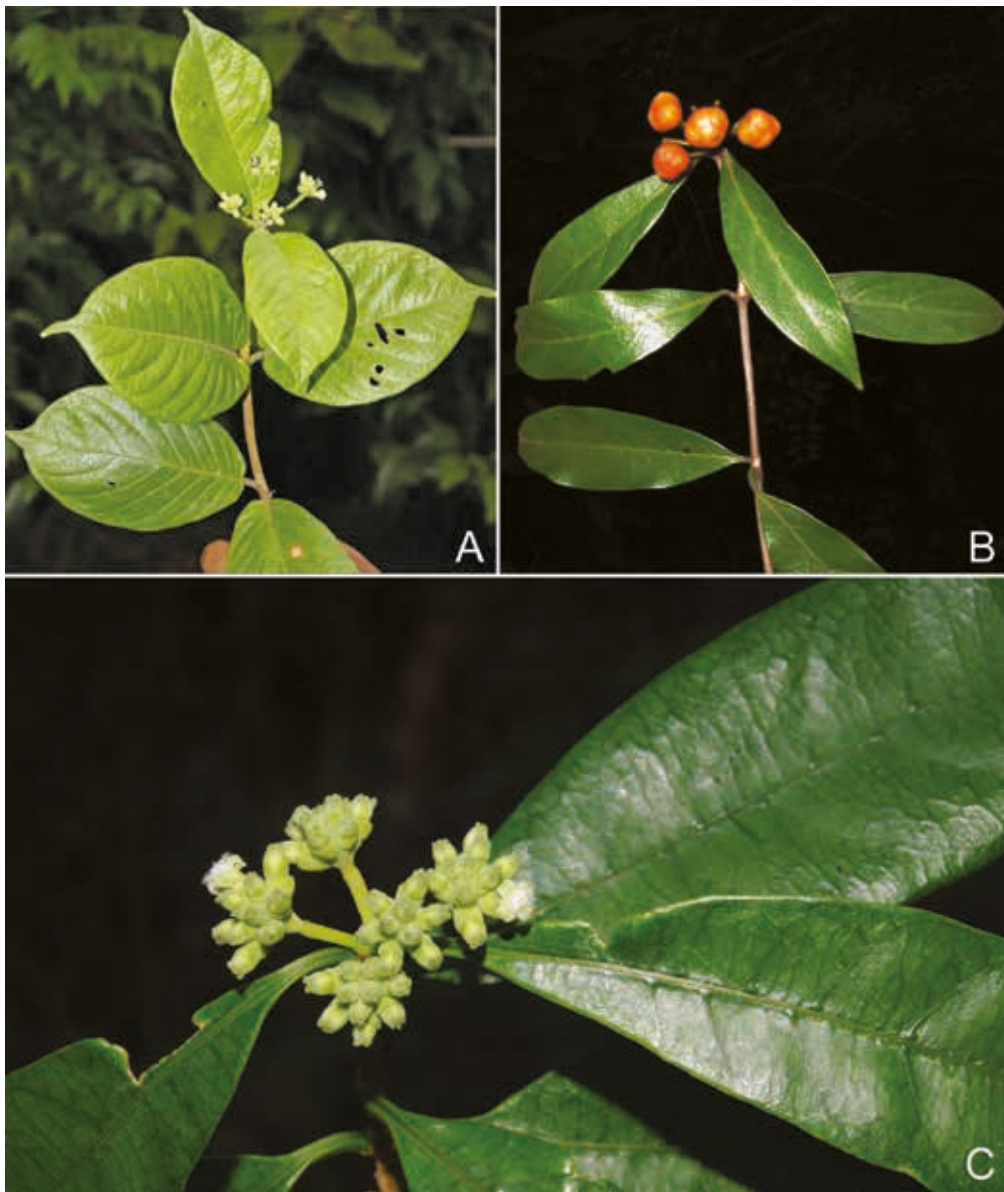
**Distribution.** India (Northeast). China, Thailand and Vietnam.

**Phenology.** Flowering May; fruiting July to September.

**Uses.** Local tribal people eat the fruits to treat fevers and reduce body weight. The bark is used for treating bowel problems and as animal fodder. The ripe fruits are eaten by birds and other animals (Kamila et al., 2020).

**Specimens examined.** INDIA: Khasia, 2000 ft [610 m], 4 Oct 1850, *Hooker & Thomson 2495* (K [K000763806\*]). **Andhra Pradesh:** Visakhapatnam Distr., Paderu Hills, Solabham village, 17°58'57.7"N 82°34'53.9"E, 1183 m, 2 Aug 2015, *Rao 20495* (AUV). **Odisha:** Mayurbhanj Distr., Similipal Biosphere Reserve, Nuagaon, Jenabil, 21°42'36"N 86°20'24"E, 887 m, 5 Sep 2016, *Kamila & Das 11038* (Regional Plant Resource Centre, Bhubaneswar).

**Notes.** Hooker (1880), when describing *Morinda villosa* Hook.f., mentioned the gathering 'Khasia Mountains by De Silva; at the Bor Panee river by J.D.Hooker & T.Thomson'. Recently, Razafimandimbison & Bremer (2011) transferred *Morinda villosa* to the genus *Gynochthodes* as *G. villosa* (Hook.f.) Razafim. & B.Bremer and cited the type as Wall. cat. n. 8425 at K but this is not a valid typification as the term 'designated here' or its equivalent was not used as has been required since 1 January



**Fig. 6.** **A.** Flowering twig of *Gynochthodes villosa* (Hook.f.) Razafim. & B.Bremer. **B.** Fruiting twig of *Gynochthodes umbellata* (L.) Razafim. & B.Bremer. **C.** Flowering twig of *Gynochthodes ridsdalei* Razafim. & B.Bremer. (Photos: A, J.P. Rao et al.; B, R. Kottaimuthu; C, P. Murugan)



2001 (ICN Art. 7.11). We traced five syntypes from two different herbaria, i.e., four sheets at K [K000031581, K000763806, K001125487, K001125488] and one sheet at E [E00143141]. The best-preserved specimen at K [K000031581], which matches well with the protologue and includes an annotation by J.D. Hooker, is designated here as the lectotype.

Recently, *Morinda cochinchinensis* DC. and the homotypic *Gynochthodes cochinchinensis* (DC.) Razafim. & B.Bremer were reported from Andhra Pradesh (Rao et al., 2019) and Odisha (Kamila et al., 2020) states in India. After critical examination of the specimens and photographs, we have concluded that this name has been misapplied to material of *G. villosa*. For this reason, *Gynochthodes cochinchinensis* is excluded from India and *G. villosa* has been added to the flora of Andhra Pradesh and Odisha states respectively.

### Typification of *Gynochthodes cochinchinensis*

***Gynochthodes cochinchinensis*** (DC.) Razafim. & B.Bremer, *Adansonia* 33(2): 288 (2011). – *Morinda cochinchinensis* DC., *Prodr.* 4: 449 (1830). – *Morinda umbellata* auct. non L.: Loureiro, *Fl. Cochinch.* 1: 140 (1790). – TYPE: [Published illustration] *Bancudus latifolia* in Rumphius, *Herb. Amb.* 3: 158, t. 98 (1743), lectotype designated here. (Fig. 7)

*Notes.* As noted above, *Gynochthodes cochinchinensis* does not occur in India. However, whilst we were investigating this question, we discovered that there was a problem with the typification of the name. Razafimandimbison & Bremer (2011) cited the type of *Morinda cochinchinensis* DC. as being the description of *Morinda umbellata* by Loureiro (1790), on which *Morinda cochinchinensis* was based. According to Turland et al. (2018), the type of a name must be a specimen or illustration, and hence the description cannot be considered as a type. As the only original material that could be found is Rumphius's illustration as cited by Loureiro (1790), it is here designated as the lectotype.

**ACKNOWLEDGEMENTS.** The authors are thankful to Dr A.A. Mao, Director, Botanical Survey of India, Kolkata, for constant support and encouragement and Dr M.U. Sharief, Scientist-F & Head of Office, Botanical Survey of India, Southern Regional Centre, Coimbatore for providing facilities. We are indebted to the curators of CAL, E, FRC, G-DC, K, KFRI, MH, PBL, RHT and XCH herbaria for providing digital images or access to consult the herbarium specimens. We are also grateful to the anonymous reviewers and journal editors for the betterment of our manuscript. Thanks are due to the Forest Departments of Kerala and Tamil Nadu for permission and necessary help during the field study and to the Ministry of Environment, Forest and Climate Change, Government of India, New Delhi, for financial support under the Flora of India project.



**Fig. 7.** Lectotype of *Morinda cochinchinensis* DC. (= *Gynochthodes cochinchinensis* (DC.) Razafim. & B.Bremer)

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