



RESEARCH COMMUNICATION

A new variety of *Gymnosporia emarginata* (Celastraceae) from the Coromandel Coast of Peninsular India

Umamaheswari P^{1,2}, Balachandran N^{1*}, Kumaresan V² & Yuvarani K²

¹Ecology Department, French Institute of Pondicherry, Puducherry – 605001, India

²Department of Botany, Kanchi Mamunivar Government Institute for Postgraduate Studies and Research, Puducherry – 605008, India

*Email: balachandran.n@ifpindia.org



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Abstract

A new variety, *Gymnosporia emarginata* (Willd.) Thwaites var. *coromandelica* N.Balach. & P. Umamaheswari (Celastraceae) has been described from Tamil Nadu, India. The diagnostic characters of this variety are: long stamens, ovary immersed in the disc, style sessile and stigma lobes converged. Detailed descriptions, differences in characters between the 2 varieties, ITS based phylogenetic analysis and related images are provided for easy identification.

Keywords

Dry evergreen forest, *Maytenus*; Pondicherry, scrub vegetation, Tamil Nadu

Introduction

Gymnosporia (Wight & Arn.) Hook.f. is one of the largest genus of the family Celastraceae, globally represented by about 115 species (1, 2). Loesener delimited *Gymnosporia* to Old World species which are characterised by the presence of thorns and/or brachyblasts and fasciculate leaves, while similar plants that are unarmed with spiral or distichous (but not fasciculate) leaves are assigned to *Maytenus* Molina (4). Later Marais (5) and Robson (6-7) included all spine-bearing members under *Maytenus*. However, *Gymnosporia* has been reinstated by Jordaan, Jordaan & Van Wyk and Archer & Jordaan (8-11) and as per the circumscription established by them, the genus is characterised by 3-locular capsules with orange seeds. The other diagnostic characters to differentiate the taxa include growth form, pubescence of leaves, branches and peduncles, orientation of spines, presence and shape of stipules, colour of the flowers (white or red) and the shape of capsules.

On the basis of fruit morphology, seed characters and in addition to leaf anatomical evidences, the genus *Gymnosporia* is subdivided into eight sections. Jordaan and Wyk (16) included *G. emarginata* (Willd.) Thwaites under the section *Tenuispinae* Jordaan, comprising 49 species, six subspecies and two varieties. There are 16 species recorded in India, Sri Lanka and Myanmar (12). However, Ding Hou (13) merged the Indian *Gymnosporia montana* (Roth) Benth. with *Maytenus emarginata* (Willd.) Ding Hou against the study of Roxburgh (14) and Lawson (15). Meanwhile Jordaan and Wyk (16) revised the genus and treated the *G. emarginata* as a distinct species; according to them it is confined to the plains of SE India and Sri Lanka and it does not occur further eastwards. Ramamurthy recorded 18 species and two varieties in India (17), but recently Mao and Dash recognized 16 species and two varieties (18). Narasimhan included only seven species to

the state Tamil Nadu (19).

During the last four years of field exploration in and around the Puducherry region, as part of PhD program of the first author we came across few interesting deviations in the characters of the flowers of some samples of *Gymnosporia emarginata*. To know the evolutionary changes of the species Neighbor-Joining method (20) was inferred, evolutionary analyses were conducted using MEGA11 (21) software, followed by construction of phylogenetic tree based on ITS marker (OP680785.1 *Gymnosporia* sp.) and the optimal tree is presented (Fig. 1). Critical scrutiny of specimens of *G. emarginata* housed at AURO, HIFP, MH, RHT and K and study of literature (16, 17, 22-25) showed that the present specimens clearly differ from the typical form by certain constant characters (Table 1) which merit recognition as a distinct variety. Hence, the same is described here as a new variety with comparative field images (Fig. 2). A key to the species of *Gymnosporia* occurring in Tamil Nadu is appended to facilitate easy identification.

Taxonomic Treatment

Gymnosporia emarginata (Willd.) Thwaites var. ***coromandelica*** N.Balach. & P.Umamaheswari, var. **nov.**, differing from var. *emarginata* by the lax inflorescence with less number of flowers, 5-6 mm long staminal filaments, style sessile and the disc embracing more than half of the ovary (Table 1).

Type: INDIA, Tamil Nadu, Ossudu, Merveille, 11° 57' 48.24" N, 79° 45' 48.24" E, 26.02.2022, P.Umamaheswari & N. Balachandran 027883 (holotype HIFP!; isotype MH!). (Fig. 3).

Armed shrub, c. 2 m high; spines 2-3 cm long. Leaves obovate to oblanceolate, glabrous, coriaceous, 2.5-8.0 × 1.5-4.0 cm, lamina dark green above pale below, apex obtuse-emarginate, margin usually entire, rarely crenate, lateral nerves 5-6 pairs, obscure above, prominent below; petioles 2-12 mm long. Inflorescence solitary-corymbose (rarely dichasial) cymes, lax in the axils of the leaves, in a short condensed shoot, or on the spines; peduncle subsessile, to 5 mm long. Flowers 4-6 mm across, white, bracteate; pedicels slender, 5-12 mm long. Calyx lobes broadly ovate-orbicular, c. 1 mm long. Petals oblong, 3-4 × 1.0-1.5 mm, reflexed, margin revolute. Disc fleshy, sinuate. Stamens 5, filament 5-6 mm long, equal to petal, inserted at the base of disk; anthers broadly ovoid. Ovary immersed in the disk, style sessile; stigmas 3-lobed, convergence. Capsules broadly obovoid, 8-10 × 7-8 mm, 3-angled and

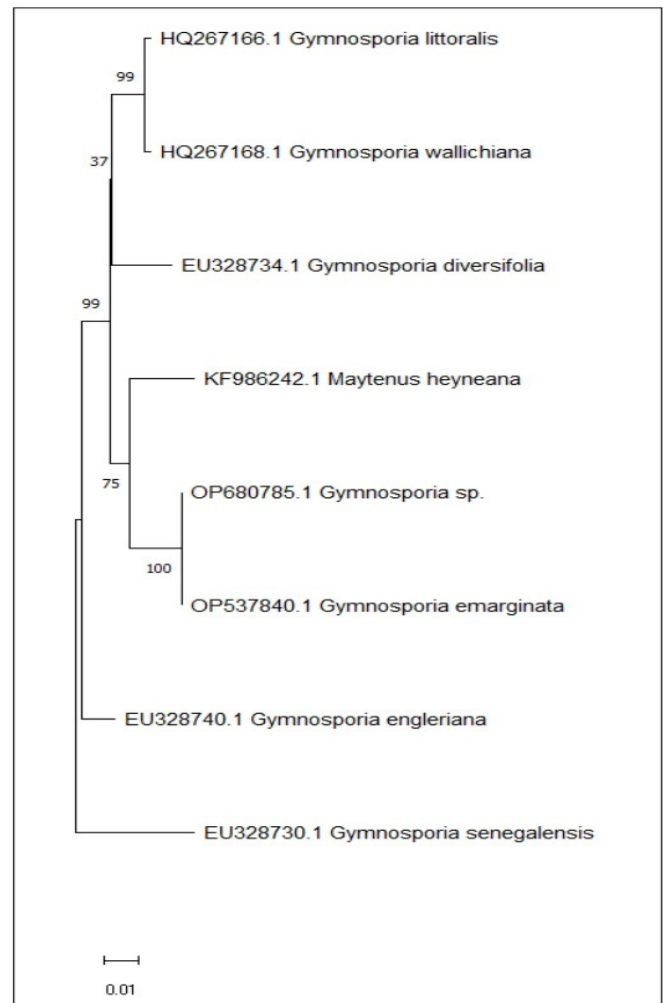


Fig. 1. Phylogenetic analysis among the species of *Gymnosporia* and *Maytenus*, showed the differences in the nucleotide sequences.

celled, seeds 2 per cell. Seeds red, ovoid or ellipsoid; aril fleshy, white, reduced to a rim at the base of the seed.

Phenology: Flowering: December – January (in very short period, 3-7 days, rarely in August-September); Fruiting: March-April.

Etymology: The specific epithet is derived from the study area Coromandel Coast, the region to which the species is largely confined.

Additional Specimen examined (paratypes): India, Tamil Nadu, South Arcot, Ulunderpet RF, 31.01.1975, K.Balasubramaniam, 004252 (HIFP!); Villupuram, Puthupet, 12° 03' N, 79° 53' E, 19.12.1995, W.F.Gastmans & C. De Riddar, 5475 (AURO!); Chengalpattu, Vallam RF, 12° 41' N, 80° 02' E, 40 m ASL, 07.01.1998, J.D.Hollander, P.Blanchflower & W.F.Gastmans, F 6281 (AURO!).

Table 1. Character differences between the two varieties of *Gymnosporia emarginata*.

No	Plant parts	var. <i>coromandelica</i>	var. <i>emarginata</i>
1	Stamen filament	5-6 mm long, longer than stigma	1-2 mm, shorter than stigma
2	Style	sessile	1-2 mm long
3	Stigma	lobes converged	distinct, lobes diverged
4	Disc	covered more than half of the ovary	Covered at base of the ovary

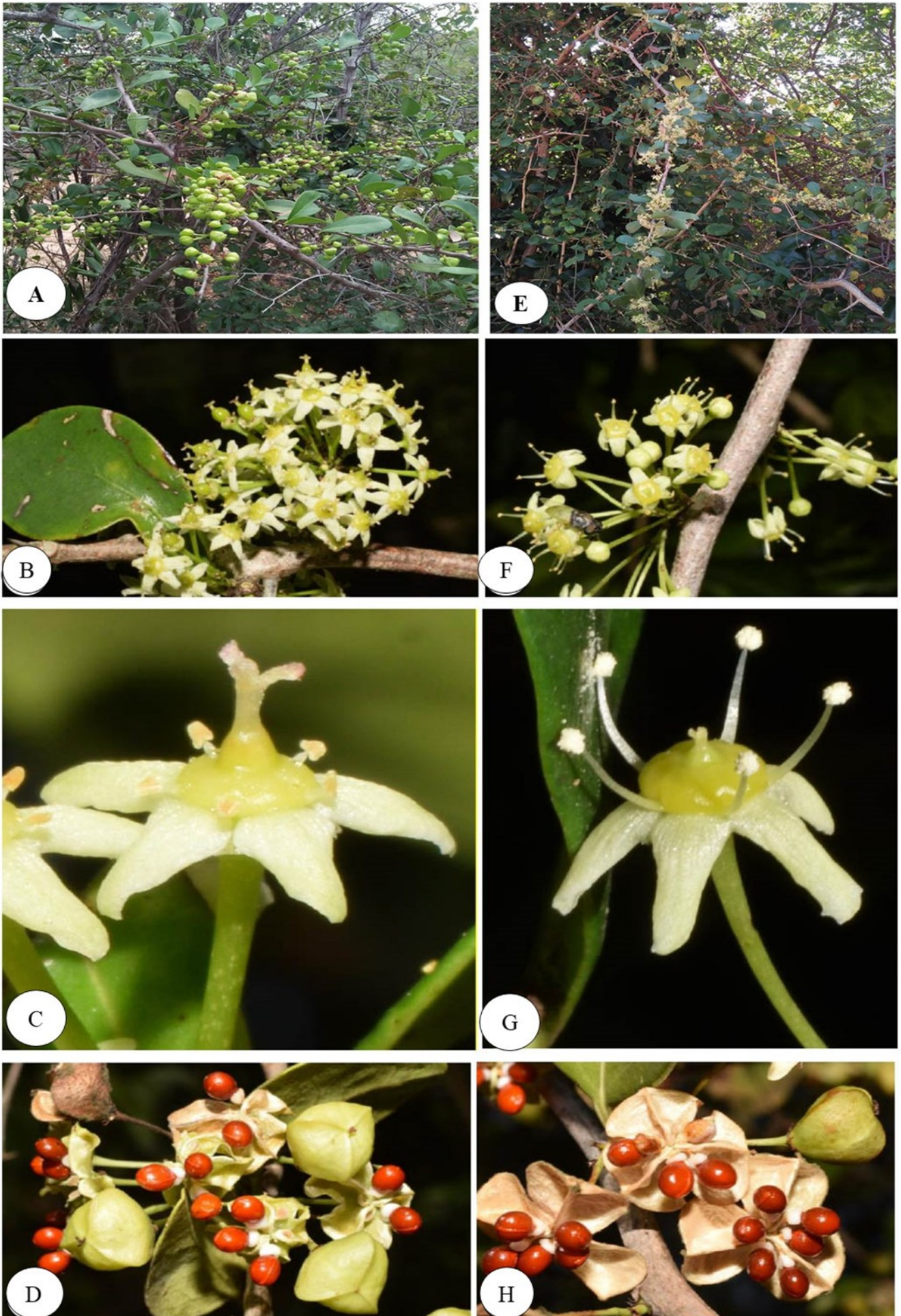


Fig. 2. *Gymnosporia emarginata* A-D: var. *emarginata*; E-H: var. *Coromandelica*.

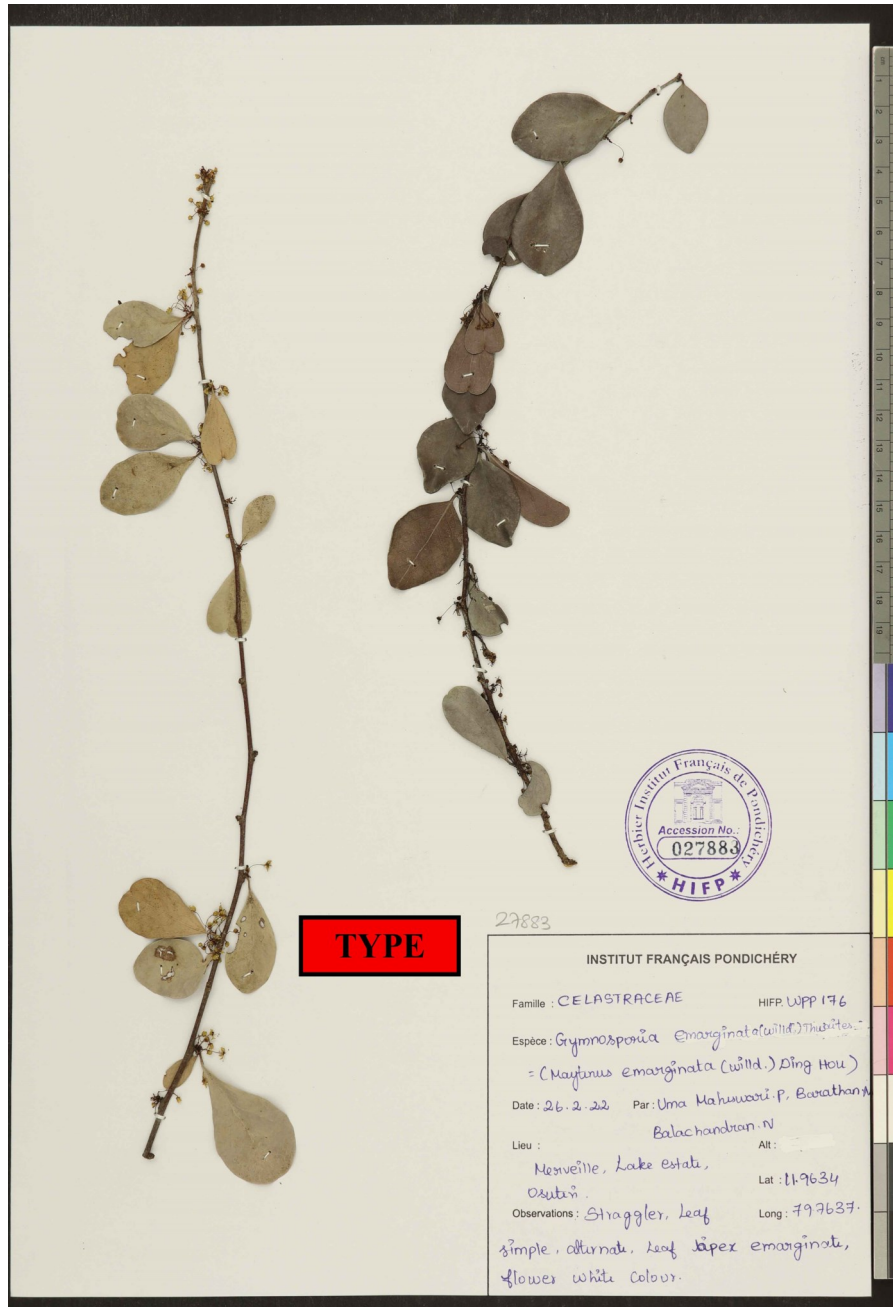


Fig. 3. Holotype of *Gymnosporia emarginata* var. *coromandelica* N.Balach. & P.Umamaheswari var. nov.

Distribution: India - endemic.

Habitat: Plains from the coast, sacred groves, reserve forest, scrub forests, and in unclassified vegetation to hillocks (0-750 m). Locally abundant, densely branched and profusely armed with spreading and interlocked branched and thus forming impenetrable thickets. This new taxon is associated with *Benkara malabarica* (Lam.) Tirveng., *Carissa spinarum* L., *Jatropha gossypifolia* L., *Gmelina asiatica* L., *Pterospermum suberifolium* (L.) Raeusch., *Memecylon umbellatum* Burm.f., *Hugonia mystax* L.

Conservation Status: Found growing side by side with the var. *emarginata*, fairly common and widely distributed along the Coromandel Coast of Southern India. Following the IUCN Red list criteria, Area of Occupancy and Extent of Occurrence (27) this taxon treated as Least Concern (LC).

Key to the species of *Gymnosporia* in Tamil Nadu

- | | |
|---|-----------------------|
| 1a. Spines bearing leaves and flowers | 2 |
| 1b. Spines not bearing leaves and flowers | 4 |
| 2a. Fruits globose; ovary 2-loculed; branchlets straight | |
| <i>G. senegalensis</i> | |
| 2b. Fruits turbinate; ovary 3-loculed; branchlets zig-zag | 3 |
| 3a. Inflorescences c. 2.5cm long; aril attached to the base of the seed | <i>G. wallichiana</i> |
| 3b. Inflorescences c. 1cm long; aril embracing the seed base | <i>G. emarginata</i> |
| 4a. Flowers in cymes only; fruits obcordate or turbinate | 5 |
| 4b. Flowers in cymes or in fascicles; fruits obovoid | <i>G. ovata</i> |
| 5a. Aril embracing about half the seed; leaves ovate-elliptic | |

G. heyneana

5b. Aril embracing the seed base only; leaves oblong or lanceolate

6

6a. Inflorescences reddish; cymes simple

G. rufa

6b. Inflorescences yellowish green; cymes dichotomous

S. G. acuminata

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Authors contributions

The first two authors conducted field survey, confirmed the identity and drafted the manuscript; KV and YK carried out the DNA extraction, participated in the sequence alignment and performed phylogenetic analysis. All authors read and approved the final version of the manuscript.

Compliance with ethical standards

Conflict of interest: The authors declare that there are no conflict of interest

Ethical issues: None.

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