

A new species of *Argyreia* (Convolvulaceae) from the southern Western Ghats, India

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Abstract: *Argyreia manjolaiensis* (Convolvulaceae), a new species from the southern Western Ghats of Tamil Nadu, is described and illustrated. Detailed description, photoplates, and distribution map are provided. Information on population status and ecology is also presented to facilitate the identification and conservation of the species.

Keywords: Endemic species, Morning glory, Tamil Nadu, Taxonomy

Introduction

The genus *Argyreia* Lour. (Convolvulaceae) is native to continental Asia, almost all taxa primarily distributed across the tropical and subtropical regions of southeast Asia, China, and the Indian subcontinent, comprising approximately 143 species (Staples & Traiperm, 2017; Traiperm & Suddee, 2020; POWO, 2024). Among these, only four species are confined to Madagascar with disjunct distribution (Deroin, 2001). In India, the genus is represented by 40 species of which 17 are endemic (Lawand, 2019; Lawand *et al.*, 2019). A total of 24 taxa have been reported from the Western Ghats among which 13 are endemic to the region (Nayar *et al.*, 2014). Recently, Lawand *et al.* (2019) conducted a taxonomic revision of *Argyreia* from India. Since then, couple of new species were described from the Western Ghats of India: *A. lakshminarasimhanii* S. Shalini, Sujana,

Arisdason & D. Maity (Shalini *et al.*, 2020) and *A. sharadchandrajii* Lawand & Shimpale (Lawand & Shimpale, 2021).

A recent molecular phylogenetic study on the genera *Argyreia* and *Ipomoea* (Muñoz-Rodríguez *et al.*, 2019) suggested the merging of *Argyreia* under *Ipomoea*. However, both genera have already been well established as distinct entities by several authors (Clarke, 1883; Cooke, 1908; Ooststroom & Hoogland, 1953; Lawand, 2019; Shalini *et al.*, 2020; Lawand & Shimpale, 2021). In light of this, we have chosen to follow the traditional classification, treating *Argyreia* as a separate genus. This distinction is supported by clear morphological differences and a number of prominent features that differentiate *Argyreia* from its allied genera (Lawand & Shimpale, 2021). Additionally, the two genera are clearly separated by their geographical distribution and cytogenetic evidences (Sampathkumar & Ayyangar, 1981; Mabberley, 2018).

Materials and Methods

During the floristic explorations of the southern Western Ghats of Tamil Nadu in India, the authors collected some interesting specimens of the genus *Argyreia* from Manimuthar waterfalls, on the way to Manjolai, Tirunelveli district, Tamil Nadu. The specimens were examined using relevant taxonomic literatures (Hooker, 1885; Gamble, 1925; Karthikeyan *et al.*, 2009; Nayar *et al.*, 2014; Lawand *et al.*, 2019; Shalini *et al.*, 2020; Lawand & Shimpale,

2021) but could not be identified. Therefore, the specimens were compared with type specimens and digital images in online herbaria databases (CAL, CALI, E, GDC, K, L, LINN, MH, P and SGH). After critical observations on specimens deposited at all above herbaria, it is concluded that the present species does not match with any described species of the genus *Argyreia* hence, it is described here as new. Detailed morphological observations were recorded and described using terms of Beentje (2016). The herbarium specimens were prepared and deposited in the SGH, The department of Botany, The Madura College, Madurai. Authors have generated the distribution map using QGIS ver. 3.32.3 (QGIS Development Team, 2022), based on geocoordinates of collection localities. The Area of Occupancy (AOO) and Extent of Occurrence (EOO) were estimated using GeoCAT (Bachman *et al.*, 2011), and a provisional conservation status was assessed according to the IUCN Red List Categories and Criteria (IUCN, 2024).

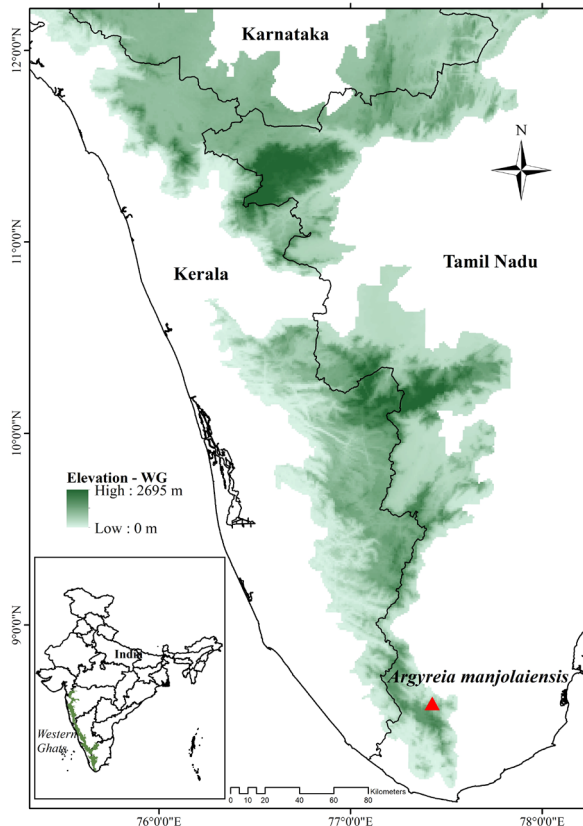


Fig 2. Map showing the distribution of *Argyreia manjolaiensis* Karupp. Bharath & P.S.S.Rich. (Map prepared by P. Bharath Simha Yadav using QGIS 3.32.3).

Taxonomic treatment

Argyreia manjolaiensis Karupp., Bharath & P.S.S.Rich., **sp. nov.** Fig. 1 & 2

Morphologically similar to *A. fulgens* Choisy but can be easily distinguished from 2–2.5 cm long petiole (*vs.* 3–7 cm long), a cordate lamina base (*vs.* rounded), a hairy abaxial surface of the lamina (*vs.* glabrous), 12 secondary veins (*vs.* 18–22), 10–12-flowered inflorescence (*vs.* 5–7-flowered), 3 bracts (*vs.* 2), subequal or unequal sepals (*vs.* equal) and a corolla tube that is pale purple at the base and milky white at the throat (*vs.* dark purple throughout). A detailed morphological comparison is provided in Table 1.

Type: INDIA, **Tamil Nadu**, Tirunelveli, Manimuthar falls, on the way to Manjolai, above 684 m, 20.08.2023, Karuppusamy, Bharath & Richard 3121 (holo SGH!; iso MCCH! MH!).

A woody climbing shrub, grows up to 24 m or more. Stems terete, green, sericeous. Leaves dorsiventral, alternate; petioles terete, 2–2.5 cm long, green, sericeous as in stem, shallowly grooved; lamina ovate, 5.6–6.8 × 4–4.5 cm, base cordate, apex acute to acuminate, margins entire, ciliate, partially hairy adaxially, densely silvery shiny tomentose abaxially, secondary veins 12 pairs, raised prominently below. Inflorescence an axillary, 10–12-flowered, capitate cyme; peduncles 2.5 cm long, green, hairy like stem, slightly longer than petioles. Bracts 3; outer bract oblong-lanceolate, 2–2.5 × 0.6 cm; inner two lanceolate or falcate, 1.5–1.8 × 0.4 cm, densely sericeous outside, except overlapped areas, hairy inside, minutely 5–9 veined inside, margins entire, apex acute. Flowers subsessile; pedicels *c.* 0.2 cm long, hairy. Sepals 5, ovate-lanceolate, subequal or unequal; outer two narrow, 1–1.2 × *c.* 0.4 cm; inner three broad, *c.* 0.6 × 0.5 cm, margins entire, hyaline, apex acute, glabrous inside, sericeous all over outside except overlapped areas. Corolla infundibuliform, *c.* 5 cm long, *c.* 5 cm across, purple at the base, milky white near throat; tube dark purple inside, hairy on mid-petaline bands. Stamens 5, unequal, 3 short, 2 long; longer stamens *c.* 1.5 cm long; shorter stamens 0.8–1 cm long; filaments white,

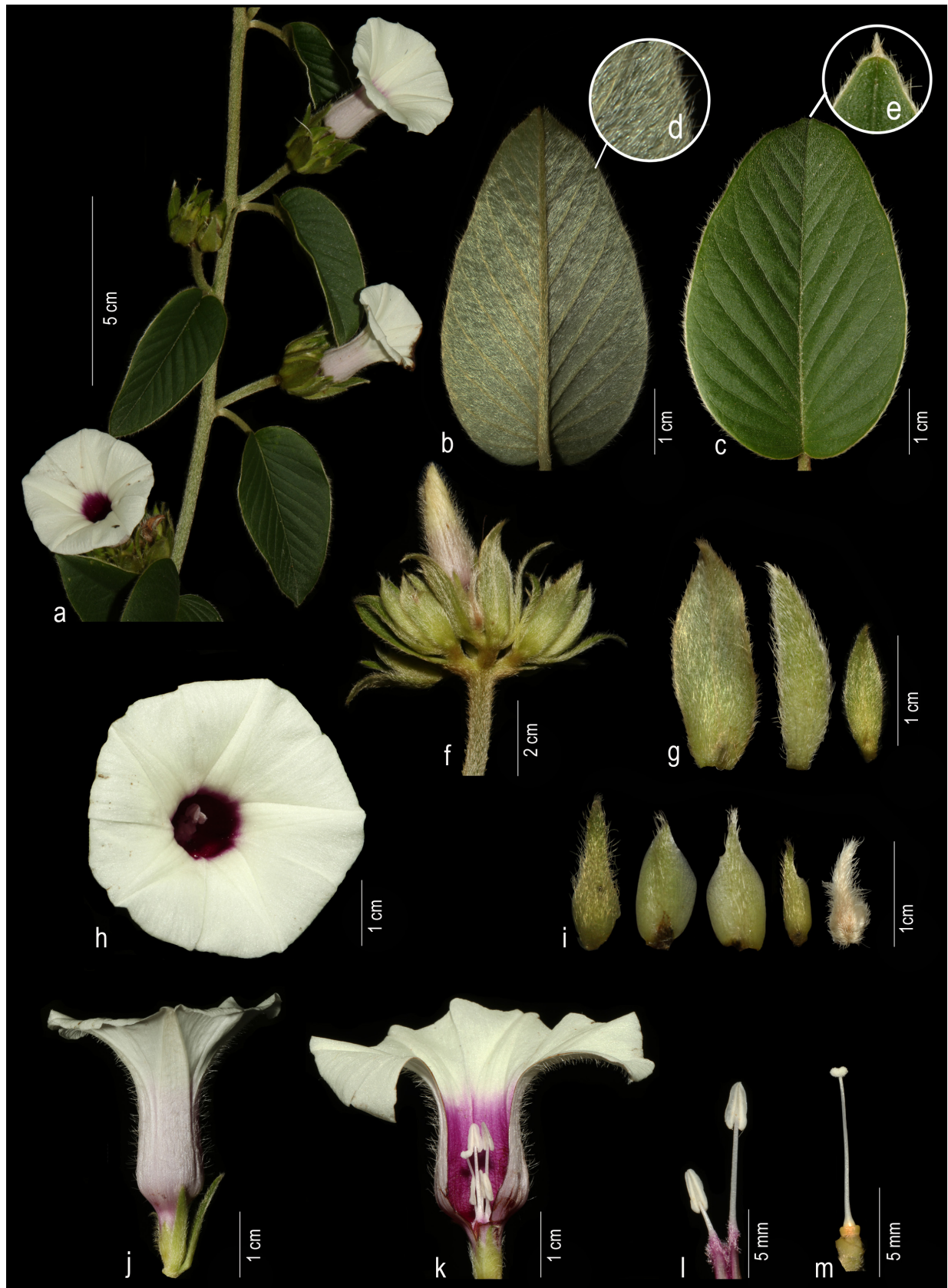


Fig. 1. *Argyreia manjolaiensis* Karupp., Bharath & P.S.S.Rich.: **a.** A flowering twig; **b.** Leaf-abaxial view; **c.** Leaf-adaxial view; **d.** Leaf abaxial surface—Closeup view; **e.** Leaf-tip; **f.** Inflorescence; **g.** Bracts; **h.** Flower—frontview; **i.** Sepals; **j.** Flower—side view; **k.** Flower cut open showing stamens and pistil; **l.** Stamens; **m** Pistil (Photos P.S.S. Richard)

Table 1. Comparison of morphological characters between *Argyreia manjolaiensis* and *A. fulgens*

Characters	<i>A. manjolaiensis</i> sp. nov.	<i>A. fulgens</i> Choisy
Petioles	2–2.5 cm long, without any glands	3–7 cm long, with two protuberances like glands at point of attachment with lamina
Lamina	Cordate at base; hairy abaxially	Rounded at base; glabrous
Secondary veins	12, green in young leaves	18–22, purple in young leaves
Inflorescence	Capitate cyme, 10–12-flowered	Dichotomously branched cyme, 5–7-flowered
Peduncles	Equalling or longer than petioles	Shorter than the petioles
Bracts	3, oblong-lanceolate	2, linear-oblong
Sepals	Subequal or unequal, 1–1.2 × 0.4 – 0.5 cm	Equal, 0.5–0.7 × c. 1 cm
Corolla	c. 5 cm long, 5 cm across; tube purple at the base, throat milky white	2.5–3.5 cm long, 2–2.5 cm across; tube purple throughout

with few glandular trichomes at the base; anthers basifixed, c. 0.4 cm long. Ovary ovoid-ellipsoid, pale green, encircled by annular ring; style single, c. 1 cm long; stigma biglobose, white. Fruit a globose berry, 1.5–2 cm across, topped by remnant of style base, yellow when ripened. Seeds 4, ellipsoid to obovoid, 1.5–2 × 3.5–6 mm, white, glabrous.

Flowering & Fruiting: Flowering from July to September; fruiting from August to November.

Ecology: The species occurs in tropical dry deciduous and semi-evergreen forests at elevations of 450–600 m, inhabiting exposed areas of the forests and climbing over trees. Some of the associated taxa include *Nothopegia heyneana* (Hook.f.) Gamble, *Semecarpus anacardium* L.f. (Anacardiaceae), *Careya arborea* Roxb. (Lecythidaceae), *Cleistanthus travancorensis* Jabl. (Phyllanthaceae), *Filicium decipiens* (Wight & Arn.) Thwaites (Sapindaceae), *Grewia tiliifolia* Vahl (Malvaceae), *Capparis diversifolia* Wight & Arn. (Capparaceae), *Strobilanthes parvifolia* J.R.I.Wood (Acanthaceae), *Eugenia calcadensis* Bedd. (Myrtaceae), *Terminalia anoegissiana* Gare & Boatwr. (Combretaceae), and *Tectona grandis* L.f. (Verbenaceae).

Distribution: Presently known only from the type locality of Manimuthar waterfalls, on the way to Manjolai, Tirunelveli district, Tamil Nadu, India (Fig. 2).

Etymology: The new species is named after the type locality, Manjolai estate in Kalakadu-Mundanthurai Tiger Reserve of southern Western Ghats.

Conservation status: Fewer than 25 mature individuals of *Argyreia manjolaiensis*, with an extent of occurrence (EOO) of 30 km², area of occupancy (AOO; AOO based on user defined cell width [3 km]) 63 km² have been found at the type locality. According to the latest IUCN conservation status assessment guidelines (IUCN Standards and Petitions Committee, 2024 ver. 2024-1), *Argyreia manjolaiensis* is provisionally assessed here as Critically Endangered (CR).

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Literature Cited

- BACHMAN S., MOAT J., HILL A.W., DE LA TORRE J. & B. SCOTT 2011. Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *In: SMITH V. & L. PENEV* (eds.), e-infrastructures for data publishing in biodiversity science. *ZooKeys* 150: 117–126. <https://doi.org/10.3897/zookeys.150.2109>
- BEENTJE H. 2016. *The Kew plant glossary: an illustrated dictionary of plant terms*. Second edition. Kew Publishing, Royal Botanic Gardens, Kew.
- CLARKE C.B. 1883. Convolvulaceae. *In: HOOKER J.D.* (ed.), *The flora of British India*. Volume 4. L. Reeve & Co., London. pp. 179–228.
- COOKE T. 1908. *Flora of the Presidency of Bombay*. Volume 2. Taylor & Francis, London.
- DEROIN T. 2001. Convolvulaceae. *In: MORAT P.* (ed.), *Flore de Madagascar et des Comores* 171: 11–287.
- GAMBLE J.S. 1925. *Flora of the Presidency of Madras*. Volume 2(7). Adlard & Sons Ltd., London.
- HOOKER J.D. 1885. *The Flora of British India*. Volume IV. L. Reeve & Co., London.
- IUCN 2024. The IUCN Red List of Threatened Species. Version 2024-1. Available at: <https://www.iucnredlist.org>. (Accessed on 05.09.2024).
- KARTHIKEYAN S., SANJAPPA M. & S. MOORTHY 2009. *Flowering Plants of India Dicotyledons, Volume 1 (Acanthaceae – Avicenniaceae)*. Botanical Survey of India, Kolkata, p.365.
- LAWAND P.R. & V.B. SHIMPALE 2021. *Argyrea sharadchandrajii* (Convolvulaceae), a new species from the Western Ghats, India. *Rheedea* 31(1): 18–24. <https://dx.doi.org/10.22244/rheedea.2021.31.01.03>
- LAWAND P.R. 2019. *Taxonomic revision of Argyrea Lour. (Convolvulaceae) from India*. Ph.D. Thesis (unpublished), Shivaji University, Kolhapur.
- LAWAND P.R., GAIKWAD S.V., GURAV R.V. & V.B. SHIMPALE 2019. Karyomorphological studies in three species of *Argyrea* Lour. (Convolvulaceae) from India. *The Nucleus* 62(1): 71–75. <https://doi.org/10.1007/s13237-018-0252-9>
- MABBERLEY D.J. 2018. *Mabberley's Plant-Book: a portable dictionary of plants, their classification and uses*. First South Asia edition. Cambridge University Press, Cambridge. <https://doi.org/10.1017/9781316335581>
- MUÑOZ-RODRÍGUEZ P., CARRUTHERS T., WOOD J.R.I., WILLIAMS B.R.M., WEITEMIER K., KRONMILLER B., GOODWIN Z., SUMADIJAYA A., ANGLIN N.L., FILER D., HARRIS D., RAUSHER M.D., KELLY S., LISTON A. & R.W. SCOTLAND 2019. A taxonomic monograph of *Ipomoea* integrated across phylogenetic scales. *Nature Plants* 5: 1136–1144. <https://doi.org/10.1038/s41477-019-0535-4>
- NAYAR T.S., BEEGAM R.A. & A. SIBI 2014. *Flowering Plants of the Western Ghats, India*. Volume 2. Jawaharlal Nehru Tropical Botanic Garden.
- OOSTSTROOM S.J. VAN & R.D. HOOGLAND 1953. Convolvulaceae. *In: VAN STEENIS C.G.G.J.* (ed.), *Flora Malesiana*, Series I, Volume IV. Noordhoff-Kolff, Djakarta. pp. 388–512.
- POWO 2024 (continuously updated). *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. Available at: <http://www.plantsoftheworldonline.org/> (Accessed on 05.09.2024).
- QGIS DEVELOPMENT TEAM 2022. Quantum GIS geographic information system. Version 3.32, Lima.
- SAMPATHKUMAR R. & R.K. AYYANGAR 1981. A critical appraisal of the karyophyletic taxonomy of Convolvulaceae. *Journal of Cytology and Genetics* 16: 89–99.
- SHALINI S., SUJANA K.A., ARISDASON W. & D. MAITY 2020. A new species of *Argyrea* (Convolvulaceae) from the southern Western Ghats, Tamil Nadu, India. *Rheedea* 30(4): 444–449. <https://dx.doi.org/10.22244/rheedea>
- STAPLES G.W. & P. TRAIPEM 2017. A nomenclatural review of *Argyrea* (Convolvulaceae). *Taxon* 66(2): 445–477. <https://doi.org/10.12705/662.12>
- TRAIPEM P. & S. SUDDEE 2020. A new species of *Argyrea* (Convolvulaceae) from Thailand. *PhytoKeys* 149: 109–115.