Botanica
ISSN 2538-8657
https://doi.org/10.35513/Botlit.2026.4.5
2026, 32(4): 217–222

Communication

Ectropothecium anomalum (Hypnaceae, Bryophyta), formerly considered endemic to China, rediscovered in India after a century

Hridul Raj Thazhe Kandy[1], Pranav K. Surendran[1], Arun Parambath[1], Krishnanunni Chirakkal[1], Arfiya Korattayil[2], Amaljith James[3], Rajendran D. Arun Raj[4], Rajendran D. Anpin Raja[1]*

[1] Nirmalagiri College, Department of Botany, Kuthuparamba, Kerala, India
[2] Kannur University, Mananthavady Campus, Department of Botany, Wayanad, Kerala, India
[3] Government Brennen College, Department of Botany, Kannur University, Thalassery, Kannur, Kerala, India
[4] St. Dominic's College Kanjirapally, Department of Botany, Kottayam, Kerala, India
*Corresponding author. E-mail: anpinraja@gmail.com

Received: 8 September 2026. Accepted: 17 November 2026. Published online: 27 November 2026.

Abstract

Kandy H.R.T., Surendran P.K., Parambath A., Chirakkal K., Korattayil A., James A., Raj R.D.A., Raja R.D.A., 2026: *Ectropothecium anomalum* (Hypnaceae, Bryophyta), formerly considered endemic to China, rediscovered in India after a century. – Botanica, 32(4): 217–222. https://doi.org/10.35513/Botlit.2026.4.5

Ectropothecium anomalum (Thér.) Z.-Q. Yi & Y. Jia was recorded in India and the Western Ghats for the first time, bringing the total number of known *Ectropothecium* species in India to 18. Originally described in Fujian Province, China, this species has not been collected since 1925. This record marks both the rediscovery of the species after almost a century and its first report outside China. This record extends its known distribution beyond its previously recognised endemic range. This discovery further emphasises the biogeographical importance of the Western Ghats, a 1600 km mountain range along the western coast of India, which is recognised as one of the eight most important biodiversity hotspots in the world.

Keywords: bryophyte, mosses, pleurocarpous mosses, Western Ghats.

INTRODUCTION

Ectropothecium Mitt. (Hypnaceae) is a moss genus comprising 204 accepted species (Brinda & Atwood, 2026). These mosses are primarily epiphytic or lithophytic and are distributed mainly in tropical and subtropical forests. Many species occur at high elevations in mountainous regions characterised by high moisture and water availability (Norhazrina et al., 2020). The genus includes pleurocarpous mosses, which bear archegonia laterally on small branches at the terminal part of the stem. These branches become intertwined, forming large, characteristic plagiotropic mats on their respective substrates, a life form well suited to humid and foggy environments (Shaw & Renzaglia, 2004; Sreelakshmi et al., 2026). The genus *Ectropothecium* has been described by Mitten (1868), who noted that it has regularly and closely pinnately prostrate stems, falcate-secund leaves with double costae, linear and often prorate laminal cells, inconspicuous alar regions, elongate setae, tiny capsules and a perfect 'hypnoid' peristome (He & Ho, 2024).

The first species of *Ectropothecium* reported by Brotherus (1899) from Coorg, Karnataka, India, was *Ectropothecium cyperoides* (Hook. ex Harv.) A. Jaeger (Schwarz, 2013). According to the checklist of Indian mosses by Dandotiya et al. (2010), 17 *Ectropothecium* species have been recorded in India. Subsequently, Biju et al. (2017) have reported *Ectropothecium sodale* from the Western Ghats, bringing the total number of Indian species in the genus to 18. However, recent phylogenetic studies and taxonomic revisions (Kučera et al., 2019; Kučera & Ignatov, 2020) have transferred *Ectropothecium sikkimense* Renauld & Cardot to *Calohypnum* Sakurai as *Calohypnum sikkimense* (Renauld & Cardot) Jan Kučera & Ignatov, reducing the number of accepted *Ectropothecium* species in India to 17.

During the present study of bryophytes in the Thirunelli region of the Brahmagiri Hills in the Western Ghats, a specimen was collected and identified as *Ectropothecium anomalum* (Thér.) Z.-Q. Yi & Y. Jia. This represents the first record of the species from India, thereby increasing the number of *Ectropothecium* species currently known from India to 18. We provide a brief description and a photographic plate.

MATERIALS AND METHODS

We conducted a field survey of bryophytes in Thirunelli, a scenic forest village and high-altitude valley in Wayanad District, Kerala, India, from pre-monsoon to post-monsoon period (from April to July 2026). Thirunelli is located at the foothills of the Brahmagiri Hills (1608 m a.s.l.) in the southern Western Ghats (11.911714° N; 75.995842° E). Plants firmly adhering to their substrates were carefully scraped off with a knife or removed with a chisel along with the substrate. We took photographs as required and recorded notes on occurrence and habitat. We gently removed any extraneous material adhering to the specimens by washing, taking care not to damage morphological features.

We took microscopic photographs using an Olympus TG7 camera attached to a Leica EZ4 HD stereo microscope to examine the specimens in detail. We identified the specimen using the taxonomic treatment of Yi et al. (2022). We consulted all available literature on the species to confirm its distributional status (Thériot, 1932; He, 2019). The voucher specimen was processed and preserved in labelled brown paper packets (15 cm × 10 cm) before depositing it at the Herbarium of Nirmalagiri College, Kannur, Kerala, India (NGC).

RESULTS AND DISCUSSION

This report on *Ectropothecium anomalum* from Thirunelli in the Brahmagiri Hills of the Western Ghats is significant, as this species was previously considered endemic to China. Thériot (1932) originally described the species as *Glossadelphus anomalus* Thér., based on five specimens (H.H. Chung B102, B105, B144, B194 and B196), collected in 1925 from several locations in Fujian Province, China. These specimens are deposited at the Farlow Herbarium of Harvard University, USA (FH), the Muséum National d'Histoire Naturelle, France (PC), and the Conservatoire et Jardin Botaniques de la Ville de Genève, Switzerland (G). Yi et al. (2022) have recently designated H.H. Chung B102 (FH00060989) as the lectotype and transferred the species to the genus *Ectropothecium*. As no further collections of the species have been made since 1925, this specimen, collected around 4700 km from the previously known localities in China, represents the rediscovery of *Ectropothecium anomalum* after a century and the first record of the species outside of China. This extends the known distribution of the species beyond its previously recognised endemic range. Among Indian representatives, *Ectropothecium anomalum* is closely related to *Ectropothecium sodale* (Sull.) Mitt. and *Ectropothecium zollingeri* (Müll. Hal.) A. Jaeger, but can be easily identified using the following key.

Key to the species

1a. Leaves falcate; costa double; pseudoparaphyllia consisting of both filamentous and sub-foliose forms 2

1b. Leaves straight to weakly falcate; costa forked; pseudoparaphyllia consisting of both filamentous and foliose forms .....***Ectropothecium zollingeri***

2a. Pseudoparaphyllia linear-lanceolate, 1–3 cells wide at base; cells without papilla ....***Ectropothecium sodale***

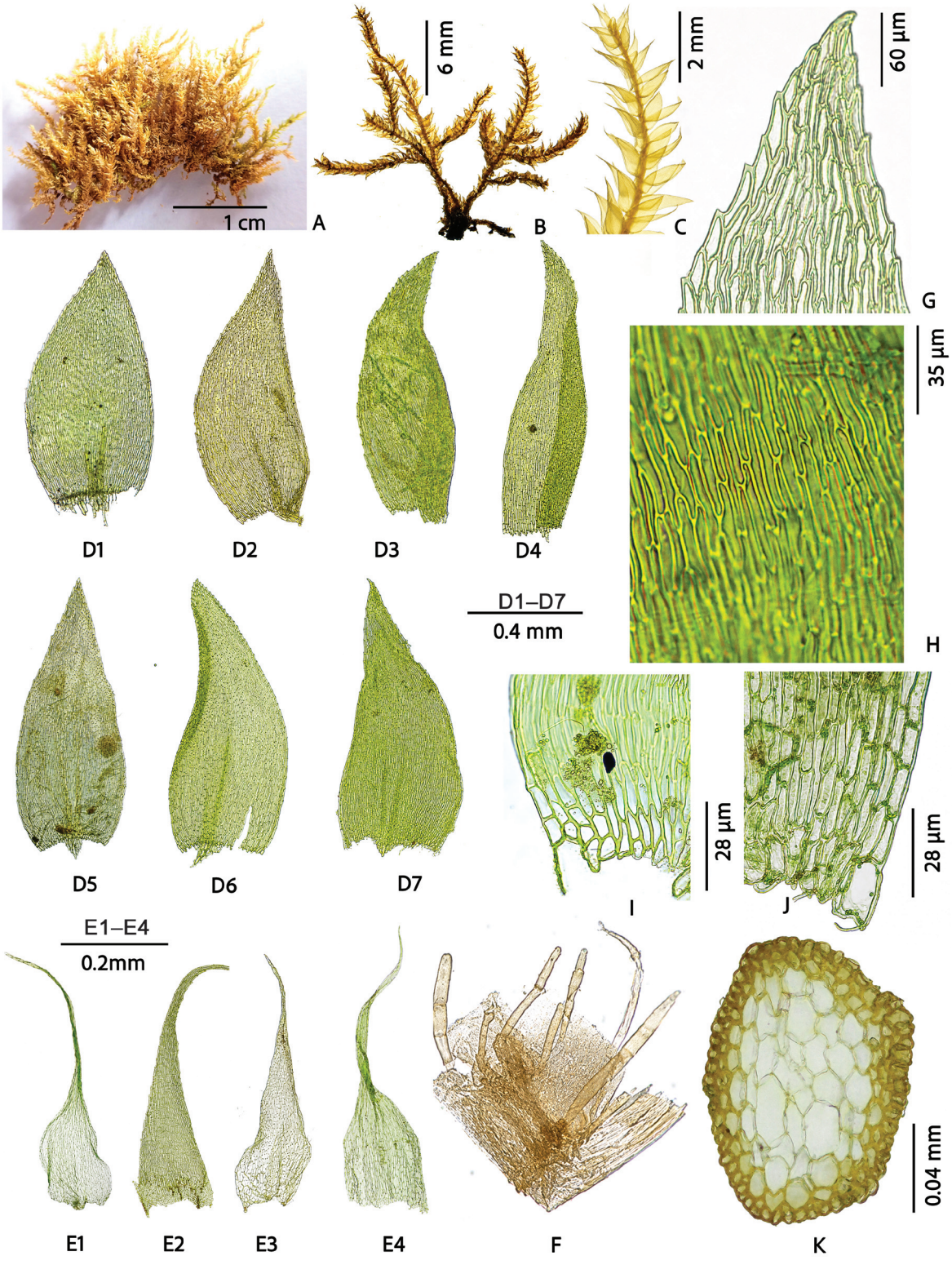


Fig. 1. *Ectropothecium anomalum*: A – habit; B – single plant; C – a branch; D1–D7 – branch leaves; E1–E4 – stem leaves; F – pseudoparaphyllia; G – apical cells; H – median cells; I–J – basal cells; K – cross section of stem (voucher specimen NGC 934).

2b. Pseudoparaphyllia consisting of both filamentous and sub-foliose forms; cells with a single apical papilla .....***Ectropothecium anomalum***

Ectropothecium anomalum (Thér.) Z.-Q. Yi & Y. Jia., Phytotaxa, 541(3): 230. 2022. *Glossadelphus anomalus* Thér., Ann. Cryptog. Exot., 5: 185. 1932. **Lectotype**: China. Fujian: Yenping, Buong Kang, on wet, shady rock by a stream, 700 m, 29 June 1925. H.H. Chung B102 (FH00060989).

Plants autoicous, in dense mats, glossy, yellow-green, slender, small to medium-sized. Stems creeping, 2.0–2.5 cm long, irregularly branched; rounded to ovate in cross-section, ca. 0.14–0.17 mm wide, with a faint central strand; cortex 3–4-layered, cells 4–11 × 8–14 µm, thick-walled, rounded-quadrate; medullary cells 12–18 × 14–28 µm, quadrate-hexagonal, thin-walled. Pseudoparaphyllia complex, consisting of both filamentous and sub-foliose forms, 1–2 cells wide at base. Stem leaves 0.4–0.6 × 0.2–0.3 mm, smaller and more distinctly falcate than branch leaves, acuminate; costa double, faint. Branch leaves 0.7–0.9 × 0.3–0.4 mm, ovate-lanceolate to lanceolate, slightly concave, asymmetrical, with an acute apex and denticulate upper margins; costae double, usually unequal in length, reaching 1/4–1/3 of the leaf length; apical cells linear, thin-walled, with a single papilla at the upper end of each cell, 22–44 × 2–3 µm; median cells 35–45 × 3–4 µm; basal cells 22–35 × 3–4 µm, irregularly rectangular; alar region weakly differentiated, with one inflated cell at the extreme base. Sporophytes not observed (Fig. 1).

Habitats. This moss occurs as a rupicolous species in evergreen forests at elevations of 820–1300 m a.s.l.

Distribution. This species is recorded in China and India. In India, it is found in the Wayanad district of the Western Ghats in Kerala (Fig. 2).

Specimens examined: 1. India, Western Ghats, Kerala, Wayanad, Thirunelli, 11.91167° N; 75.99583° E, 900 m a.s.l., leg. H.R.T. Kandy, 52, 20 December 2025 (NGC 934). 2. India, Western Ghats, Kerala, Thirunelli, Wayanad; leg. A. Korattayil, 2, Thirunelli, Wayanad, 15 February 2026 (NGC 988).

The recent discovery *of Ectropothecium anomalu*m sets a new record for the Western Ghats, a mountain range recognised as one of the most important biodiversity hotspots worldwide (James et al., 2026). This report highlights the potential for further bryological exploration across the Western Ghats. It reaf-

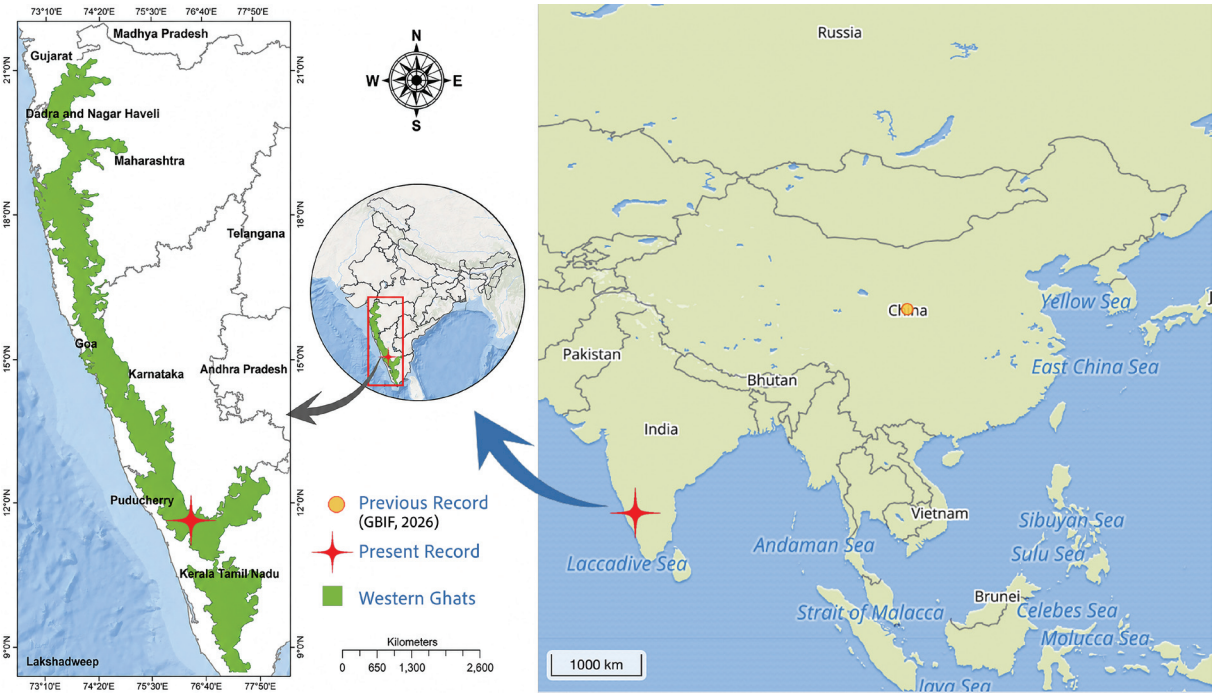


Fig. 2. Distribution of *Ectropothecium anomalum*.

firms the biological importance of this 1600 km-long mountain range running parallel to the western coast of India.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the Office of the Chief Wildlife Warden, Kerala Forest Department, Government of Kerala (Permission No. KFDHQ/7403/2025-CWW/WL10) for granting permission and facilitating specimen collection, and the Principal, Nirmalagiri College, Kuthuparamba, Kannur, for providing research facilities and academic support. The authors also thank Idea Wild, Fort Collins, Colorado, USA, for equipment support, and acknowledge the support provided under the Department of Biotechnology (DBT), Star College Scheme and the Department of Science and Technology (DST), Fund for Improvement of Science and Technology Infrastructure (FIST) schemes, Government of India.

Author contributions. HRTK and AK collected specimens, performed dissections, and preserved samples; PKS, AP, and KC performed specimen dissections and conducted the literature review; AJ wrote the original draft, performed dissections, and took photomicrographs; RDArR reviewed and edited the manuscript and performed image processing; RDAnR conceptualised the study, developed the methodology, identified the specimens, and supervised the work. All authors read and approved the final version of the manuscript.

REFERENCES

Biju P.M., Sreebha R., Daniels A.E.D., 2017: *Ectropothecium sodale* (Hypnaceae, Bryophyta) – new to India from the peninsula. – Acta Botanica Hungarica, 59(1–2): 9–12. https://doi.org/10.1556/034.59.2017.1-2.2

Brinda J.C., Atwood J.J., 2026: A synopsis of *Ectropothecium*. – The Bryophyte Nomenclator. https://www.bryonames.org/nomenclator?group=ectropothecium [accessed 14 July 2026].

Brotherus V.F., 1899: Report on a collection of mosses made by Dr. T.L. Walker in Coorg during the cold weather of 1897–98. – Records of the Botanical Survey of India, 1: 311– 329.

Dandotiya D., Govindapyari H., Suman S., Uniyal P.L., 2011: Checklist of the bryophytes of India. – Archive for Bryology, 88: 1–126.

He S., 2019: Disentangling the taxonomy and morphology of *Ectropothecium* (Bryophyta: Hypnaceae s.l.) with comments on its generic relationships, and *Neoptychophyllum*, a new name for the genus *Ptychophyllum*. – Bryophyte Diversity and Evolution, 41(1): 24–42. https://doi.org/10.11646/bde.41.1.3

He S., Ho B.C., 2024: Flora of Singapore precursors, 41. Taxonomic updates on the moss genus *Ectropothecium* and allied genera (Hypnaceae). – Gardens' Bulletin Singapore, 76(1): 55–83. https://doi.org/10.26492/gbs76(1).2024-03

James A., Prakash P.S., Raja R.D.A., Raj R.D.A., 2026: *Dicranum scoparium* Hedw. (Dicranaceae: Bryophyta) – A new addition to the moss flora of Peninsular India from Eravikulam National Park, Kerala. – Environment Conservation Journal, 27(1): 10–14. https://doi.org/10.36953/ECJ.33993141

Kučera J., Ignatov M.S., 2020: Corrigendum to: "A phylogenetic revision of the genus *Hypnum*: Towards completion" [in *Taxon* 68: 628–660. 2019]. – Taxon, 69: 1383. https://doi.org/10.1002/tax.12198

Kučera J., Kuznetsova O.I., Manukjanová A., Ignatov M.S., 2019: A phylogenetic revision of the genus *Hypnum*: towards completion. – Taxon, 68: 628–660. https://doi.org/10.1002/tax.12095

Mitten W., 1868: A list of the Musci collected by the Rev. Thomas Powell in the Samoa or Navigator's Islands. – Journal of the Linnean Society, Botany, 10: 166–195.

Norhazrina N., Aisyah M., Maideen H., 2020: An account of the moss genus *Ectropothecium* Mitt. (Hypnaceae) in Peninsular Malaysia. – Malayan Nature Journal, 72(3): 389–398.

Schwarz U., 2013: An updated checklist of bryophytes of Karnataka. – Archive for Bryology, 181: 1–42.

Shaw J., Renzaglia K., 2004: Phylogeny and diversification of bryophytes. – American Journal of Botany, 91(10): 1557–1581. https://doi.org/10.3732/ajb.91.10.1557

Sreelakshmi B., Amaljith J., Anpin R.R.D., Jyothi A., Prakash P.S., Arun R.R.D., 2026: Species

richness and habitat preferences of mosses in the semi-natural vegetation of Kuttikkanam in the Idukki district of Kerala. – Plant Science Today, 13(3): 1–10. https://doi.org/10.14719/pst.12684

Thériot I., 1932: Mousses de la Chine orientale. – Annales de Cryptogamie Exotique, 5: 167–189.

Yi Z.Q., Mu L.Q., Jia Y., 2022: Notes on *Glossadelphus* M. Fleisch. (Hypnaceae, Bryophyta) in China. – Phytotaxa, 541(3): 225–239. https://doi.org/10.11646/phytotaxa.541.3.2

HRTK https://orcid.org/0009-0007-7508-2492
PKS https://orcid.org/0009-0007-6870-0854
AP https://orcid.org/0009-0005-1275-7240
KC https://orcid.org/0009-0005-8978-6293
AK https://orcid.org/0009-0002-6699-8734
AJ https://orcid.org/ 0009-0003-6727-7741
RDArR https://orcid.org/0009-0000-1007-1134
RDAnR https://orcid.org/0009-0007-7700-0905

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.