J.Mycopathol.Res. 63(4) : 909-914, 2025, ISSN : 0971-3719 (Print), 2583-6315 (Online)
© Indian Mycological Society, Department of Botany,
University of Calcutta, Kolkata 700 019, India

A new species of *Echidnodella* from Pulikkunnu Sreedharma Sastha temple Kavu, Pandalam, Pathanamthitta District, Kerala

SOUMYA PRASAD[1] AND G.R. ARCHANA[2]

[1]PG and Research Department of Botany, Mahatma Gandhi College, Thiruvanan-thapuram 695004 Kerala

[2]Department of Botany, St. Gregorios College, Kottarakara, Kollam 691531, Kerala

Received : 20.08.2025 Accepted : 20.11.2025 Published : 29.12.2025

Sacred groves are tracts of virgin evergreen forests which are closely associated with local communities. They are the treasure house of floral and faunal diversity which are conserved by local people on the basis of cultural and religious beliefs. Sacred groves play a pivotal role in conservation ecology since it acts as storehouse of rare, endangered, endemic, medicinally and economically important plant species. Leaf surface forms a microhabitat where diverse microbial population are inhabited. The fungi which are inhabitants of leaf are called foliar fungi. They occupy the surface of leaf and produce spots such as rusts, smuts, mildews, scab etc. Black colony forming fungi are collectively termed as Black mildews. Black mildew infected leaves of *Connarus* species (Connaraceae) growing in Pulikunnu Sree dharma Shastha temple kavu, Panangadu, Pathanamthitta district, Kerala was observed and collected. Microscopic examination revealed that it is a new species of genus *Echidnodell a*namely, *Echidnodella connarii* sp. nov. and is described here.

Keywords : Appressoria, ascospores, *Connarus*, *Echidnodella*, foliar fungi, thyriothecia

INTRODUCTION

Sacred groves are preserved patches of virgin forest areas, which are dedicated to local deities, and are generally managed by local people on grounds of cultural and religious beliefs (Gadgil and Vartak, 1975).Sacred groves furnish optimal conditions for the growth and development of many fungal species particularly the leaf inhabiting fungi. Such leaf inhabiting fungi are known as phylloplane or foliicolous fungi (Moinuddin *et al*. 2016). Among them, black mildews are a group of parasitic fungi which produce black colonies on the surface of the host plant. They are obligate biotrophic parasites and infects wide range of angiosperms (Kirk *et al*. 2001; Barr and Huhndorf 2001; Taylor *et al*. 2005; Hofmann *et al*. 2010; Hyde *et al*. 2013).

They belong to different taxonomic groups namely;Meliolaceous fungi, Asterinaceous fungi, Schiffnerulaceous fungi, Hyphomycetous fungi (Hosagoudar 2011).

*Corresponding author : soumyaprasad355@gmail.com

Two new genera *Echidnodes* and *Echidnodella* under Asterinales was described by Theissen and Sydow in 1917.They proposed the genus *Echidnodes* based on type species *Echidnodes litura* (Cooke) Theiss. and Sydow and genus *Echidnodella* based on type species *Echidnodella linearis* (Sydow) Theiss. and Sydow. The genus *Echidnodella*are leaf parasites characterized by ectophyticexappresoriate mycelium; oval, ellipsoidal, X or Y shaped thyriothecium which dehisce longitudinally at the center; oval, octosporous, bitunicate asci and brown, conglobate, uniseptate ascospores.

During the survey of foliicolous fungi from sacred groves of Pathanamthitta district, black mildew infected leaves of *Connarus* species (Connaraceae) growing in Pulikunnu Sree dharma Shastha temple kavu, Panangadu, Pathanamthitta district, Kerala were observed. The material was thoroughly examined and microscopic examination of the fungus was carried out. The fungus revealed non-appressoriate, brown mycelium with elongated thyriothecium and uniseptate ascospores and thus belongs to the genus *Echidnodella* of family

Asterinaceae under Asterinales (Hongsanan *et al*. 2014). This forms the first report of genus *Echidnodella* on the host genus *Connarus*. Also, this is an unrecorded species of the genus *Echidnodella* and is proposed here as *Echidnodella connarii* sp. nov.

MATERIALS AND METHODS

Study area & Collection of specimens

This study was conducted in Pulikunnu sree dharma sastha temple kavu, located in Panangadu near Kulanada, Pandalam of Pathanamthitta district (Fig.1). The temple and the associated sacred grove extents over an area of 300 cents. Leaves showing black coloured colonies were collected (Fig. 2). They were then placed in polythene bags and field notes were prepared. These infected plant parts were pressed and dried in-between blotting papers.Such materials were later used for the microscopic study. Host identity was confirmed with the help of experts.

Permanent slide preparation, microscopic studies and herbarium preparation

In order to study the colonies in - situ, nail polish technique was used (Hosagoudar and Kapoor 1985). A drop of fine transparent nail polish was applied to the selected colonies and thinned with the help of a fine brush without mix up the colonies. When the nail polish dried completely, a thin, colourless film or coat was formed with the colonies securely embedded in it. In case of soft host parts, the flip was lifted off with a slight pressure on the opposite side of the leaves and just below the colonies. In case of hard host parts, the flip was removed with the help of a razor. A drop of DPX was placed on a clean slide and the flip was properly spread on it. One or two more drops of DPX were added over the flip and a clean cover glass was placed over it without forming air bubbles. These slides were labelled, after proper drying used for further microscopic studies. Observations were made under ALMICRO BM-6mo ultra compound microscope. Measurement was taken with the help of ocular micrometer on a calibrated microscope. Description of the fungal species were done. Photomicrographs were taken using CatCam E-Series 1.3 MP (CatCam CC-130- E) camera. (Fig.3)

Based on the morphological characters, micrometry and host specificity, the fungal identity was confirmed and is revealed that it is a new unrecorded species of genus *Echidnodella* and is proposed as *Echidnodella connarii* sp. nov.The fungal specimen was deposited in the Sree Narayana College Herbarium (SNCH), Kollam, Kerala and St. Gregorios College Herbarium (SGCH), Kottarakara, Kerala.

RESULTS AND DISCUSSION

Description to the species

Echidnodella connarii Soumya Prasad & G. R. Archana sp. nov. Index Fungorum Number: IF904463. Colonies epiphyllous, dense, scattered, up to 6 mm in diameter. Hyphae substraight to crooked, branching opposite to irregular at acute angles, loosely to closely reticulate, cells 18– 40 × 8 – 11 µm. Appressoria absent. Thyriothecia scattered to grouped, initially orbicular, elliptical at maturity, 408– 480 × 216– 264 µm, longitudinally dehisce at the centre, central portion sometimes dissolved, margin crenate to fimbriate, fringed hyphae compactly arranged, substraight. Asci globose to ovate, bitunicate, octosporous 54 – 61× 40– 54 µm. Ascospores conglobate, uniseptate, rounded at both ends, deeply constricted at the septum, one cell smaller and other one larger, 27 – 32.4 × 14.4 – 20 µm, wall smooth.Pycnothyriospores pyriform, pale brown, 9 -11 x 4 - 7 µm, wall smooth.

Materials examined

On leaves of *Connarus* sp.(Connaraceae), Pulikunnu Sree dharma Shastha temple kavu, Panangadu, Kerala, October 11, 2024; Soumya Prasad SNCH 5133 (holotype), SGCH 480 (isotype).

This is the first record of genus *Echidnodella* on the host plant *Connarus* species. The new species is characterized by substraight to crooked hyphae without appressoria, thyriothecia

Table 1 : A comparative account of morphotaxonomic characters of *Echidnodella connarii* sp. nov. *and Echidnodella vagamonensis* J. Thomas & Hina

Species	Colony	Hyphae	Thyriothecium	Asci and Ascopores
Echidnodella connarii sp. nov.	Colonies epiphyllous, dense, scattered, up to 6 mm in diameter.	Hyphae substraight to crooked, branching opposite to irregular at acute angles, loosely to closely reticulate, cells 18 – 40 × 8 – 11 µm.	Thyriothecia scattered to grouped, initially orbicular, elliptical at maturity, 408 – 480 × 216 – 264 µm, longitudinally dehisce at the centre, central portion sometimes dissolved, margin crenate to fimbriate, fringed hyphae compactly arranged, substraight.	Asci globose to ovate, bitunicate, octosporous, 54 – 61× 40 – 54 µm. Ascospores conglobate, uniseptate, rounded at both ends, deeply constricted at the septum, one cell smaller and other one larger, 27 – 32.4 × 14.4 – 20 µm, wall smooth.
Echidnodella vagamonensis J. Thomas & Hina	Colonies sub dense, spreading up to 5 mm diameter, confluent, amphigenous, mostly epiphyllous.	Surface hyphae straight to substraight, not undulating, septate, branching opposite to irregular at acute to wide angles, loosely reticulate, cells cylindrical 9–21 × 1–3 µm.	Thyriothecia elongated, 'X' or 'Y' shaped, scattered, forked, 192 – 471 × 96–198 µm, dark brown, longitudinally dehiscing at the center, margin fimbriate, fringed hyphae straight and parallel	Asci conspicuous, many, globose, bitunicate, 46–50 µm in diameter, eight spored; Ascospores 2 -celled, conglobate, 1 -septate, straight, ends rounded, lower cell sometimes slightly tapering, constricted at the septum, cinnamon brown, smooth-walled, 12 –14 × 5 –7 µm, upper cell ovate to globose, large; lower cell smaller, germinating ascospores not observed

showing longitudinal dehiscence and uniseptate ascospores with rounded ends.

Fungi are one of the most abundant microeukaryotes. Several researchers have recorded foliicolous fungi on different plants and from different habitats across various parts of the world. However, the diversity of foliicolous fungi from sacred groves is scantily studied. The documentation of these fungi provides a base for further work aimed at disclosing the diversity of foliar fungi of Pathanamthitta district of Kerala state. Fungi form the key component of every ecosystem and they are constantly associated with processes such as decomposition, recycling, and transportation of nutrients in various environments (Padhi *et al*. 2013). Since these fungi are host specific, disappearance of the host plant may lead to the total disappearance of fungi from the area. Moreover, the deterioration of sacred groves also pose threat to the discovery of fungi. So, there is a possibility for the extinction of species much before they have been discovered. In this context, the knowledge about the taxonomy of these black mildews is very relevant since it would help in the conservation of biological resources. In the present study, black mildew infected leaves of *Connarus* sp.were observed and collected. Detailed examination of the fungus revealed that it belongs to the genus *Echidnodella*. So far, thirty-six species belonging to genus *Echidnodella* has been reported, infecting the members of the family Annonaceae,Rubiaceae, Fabaceae, Sapotaceae, Ebenaceae, Myrtaceae, Myristicaceae, Lauraceae, Dipterocarpaceae, Melastomataceae, Polygal-aceae, Ericaceae, Myrsinaceae Menisper-maceae, Aquifoliaceae, Primulaceae, Asparaga-ceae. The genus *Echidnodella* has not been reported previously on present host and thus form the first report on the host genus *Connarus* of family Connaraceae. This resulted in the documentation of a new species under the genus *Echidnodella* of family Asterinaceae. Therefore, the present species *Echidnodella connarii* sp. nov. is proposed here as new one.The most recent record of this genus was documented in 2021 by Mohamed and Thomas during their exploration

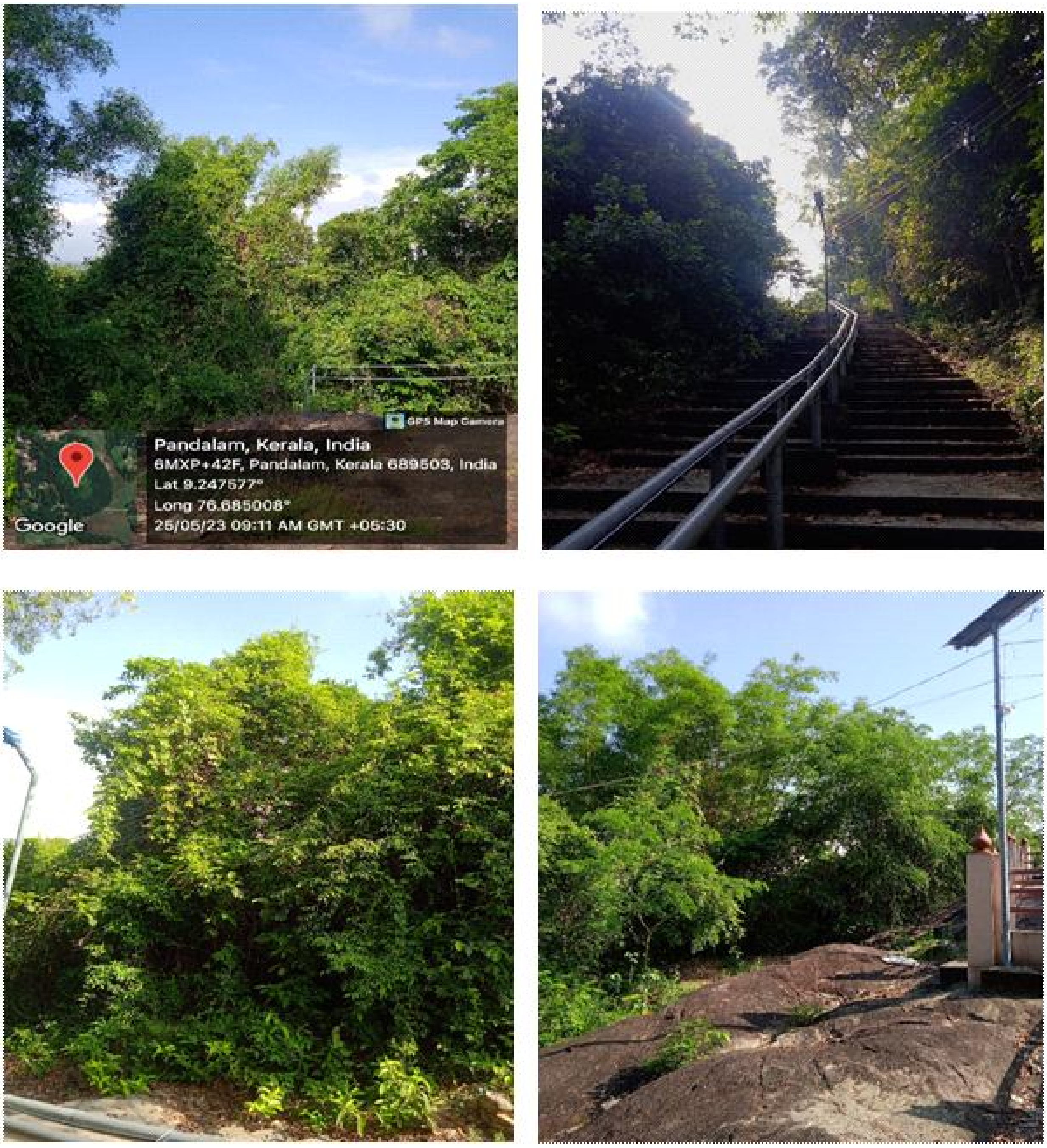

Fig.1: Pulikunnu Sree Dharma Saastha temple kaavu, Panangad, Kerala

of foliicolous fungi in Vagamon hills of Kerala. A comparative account on morphotaxonomic characters of *Echidnodella connarii* sp. nov.*and Echidnodella vagamonensis* J. Thomas & Hina infecting the leaves of *Xanthophyllu marnottianum* is provided here (Table1).

The present study reveals that there is still a great need to document the foliar fungal diversity of these sacred groves to the scientific community before the extinction of many unexplored fungal species.

ACKNOWLEDGMENTS

We express our sincere gratitude towards Council of Scientific and Industrial Research (CSIR) for providing financial assistance. Grateful thanks to Principal of Mahatma Gandhi College,

Fig. 2: *Echidnodella connarii* sp. *nov*. on leaves of *Connarus* species

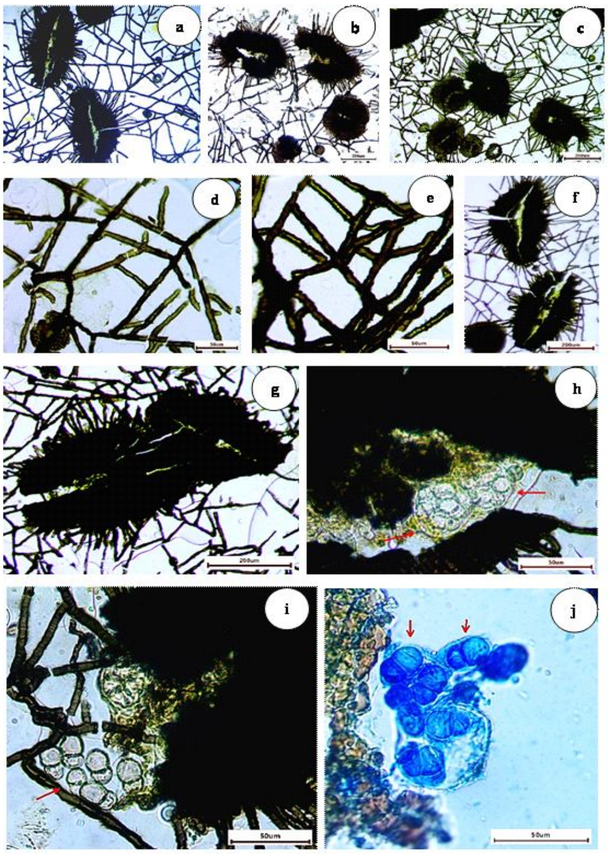

Fig.3: *Echidnodella connarii* sp. *nov.* a,b & c: Colonies; d & e: hyphae without appressoria; f & g: thyrothecia; h: dehiscing thyrothecium; i & j: ascus liberating ascospores

Thiruvananthapuaram and St. Gregorios College, Kottarakara for providing necessary facilities.

REFERENCES

Barr, M. E., Huhndorf, S. M. 2001. Loculoascomycetes. In: The mycota, systematics and evolution. (Eds. D. J. McLaughlin, E. G. McLaughlin, P. A. Lemke, Springer. Berlin, Heidelberg, 283–305.

Gadgil, M., Vartak, V. D. 1975. Sacred groves of India: A plea for continued conservation. *J. Bombay Nat. Hist. Soc*. **72**: 314 – 320.

Hofmann, T. A., Kirschner, R., Piepenbring, M. 2010. Phylogenetic relationships and new records of Asterinaceae (Dothideomycetes) from Panama. *Fungal Divers.***43**: 39–53

Hongsanan, S., Li, Y. M., Liu, J. K., Hofmann, T., Piepenbring, M., Bhat J. D., Boonmee, S., Doilom, M., Singtripop, C., & Tian, Q., Mapook, A., Zeng, X. Y., Bahkali, A. H., Xu, J. C., Mortimer, P. E., Wu, X. H., Yang, J. B. and Hyde, K. D. 2014. Revision of genera in Asterinales. *Fungal Divers.***68**: 1– 68.

Hosagoudar, V. B. 2011. The genus *Schiffnerula* in India. *Plant Pathology & Quarantine***1**: 131– 204.

Hosagoudar, V. B., Kapoor J. N. 1985. New technique of mounting Meliolaceous fungi. *Indian Phytopathol.***38**: 548 – 549.

Hyde, K. D., Jones, E. B. G., Liu, J. K., Ariyawansa, H., Boehm, E., Boonmee S, Braun U, Chomnunti P., Crous, P. W., Dai, D. Q., Diederich, P., Dissanayake A, Doilom M, Doveri F, Hongsanan, S., Jayawardena, R., Lawrey J. D., Li, Y.M., Liu YX, Lücking R, MonkaiJ, Muggia, L., Nelsen, M. P., Pang K. L., Phookamsak, R., Senanayake, I., Shearer CA, Suetrong S, Tanaka K, Thambugala K. M., Wijayawardene, N. N., Wikee S, Wu HX, Zhang Y, Aguirre-Hudson B, Alias, S. A., Aptroot A, Bahkali, A. H., Bezerra, J. L., Bhat, D. J., Camporesi, E., Chukeatirote, E., Gueidan, C., Hawksworth, D.L., Hirayama, K., Hoog, S. D., Kang J.

C., Knudsen, K, Li, W. J., Li, X. H., Liu, Z.Y., Mapook, A., McKenzie, E. H. C., Miller, A. N., Mortimer, P. E., Phillips, A.J.L., Raja, H.A., Scheuer, C., Schumm, F., Taylor, J. E., Tian, Q., Tibpromma, S., Wanasinghe, D.N., Wang, Y., Xu, J. C., Yan, J. Y., Yacharoen, S. and Zhang, M. 2013. Families of Dothideomycetes. *Fungal Divers.***63**: 1–313.

Kirk, P. M., Cannon, P. F., David, J. C., Stalpers, J. A. 2001. Ainsworth & Bisby's Dictionary of the fungi (9th edition) CABI, Wallingford.

Mohamed, H., Thomas, J. 2021. A new species of *Echidnodella* (Asterinales, Lembosiaceae) from Western Ghats of Kerala state, India. *Phytotaxa* **496**: 275– 280.

Moinuddin, M. K., Bagyanarayana, G., Thomas, J. 2016. *Asterinamaeruaicola* sp. nov. A new black mildew from Telangana state, India. *Res. J. Pharm., Biol. Chem. Sci*. **7**: 821- 825.

Padhi, L., Mohanta,Y. K., Panda, S. K. 2013.Endophytic fungi with great promises: A Review.*J. Adv. Pharm. Edu. & Res.* **3**: 152 – 170.

Taylor, A., Hardy, G. E., St. J., Wood, P., Burgess, T. 2005. Identification and pathogenicity of Botryosphaeria species associated with Grapevine decline in Western Australia. *Australas. Plant Pathol*. **34**: 187–195

Theissen, F., Sydow, H. 1917. SynoptischeTafeln. *Ann. Mycol.* **15**: 389 – 491.