



Additional records of foliicolous lichens to the state of Kerala, India

S.A. ZACHARIAH^{1*}, S. JOSEPH² AND K.A. ASHNAMOL¹

¹ Postgraduate and Research Department of Botany, Mar Thoma College, Tiruvalla - 689 103, Kerala, India

² Forest Botany Department, Forest Ecology and Biodiversity Conservation Division, KSCSTE - Kerala Forest Research Institute, Peechi - 680 653, Thrissur, Kerala, India

* sonia@mtct.ac.in

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ABSTRACT

Five species of foliicolous lichens growing on tropical evergreen trees in Pathanamthitta and Alappuzha districts of Kerala are reported as additions to the lichen flora of the state. *Coenogonium isidiiferum* (Lücking) Lücking, *Microxyphiomyces vainioi* (R. Sant.) Xavier-Leite, M. Cáceres & Lücking, *Porina andamanensis* Upreti & Ajay Singh, *Strigula antillarum* (Fée) Müll. Arg. and *Strigula subelegans* Vain. were identified and briefly described based on morphological and anatomical characters. With about 25 foliicolous lichens previously reported from Kerala, this article significantly contributes to the state's lichen flora, adding five new records that promote our understanding of the region's biodiversity.

Key words: Additional records, crustose thallus, foliicolous lichens, Kerala

INTRODUCTION

Foliicolous lichens, those that grow on the surfaces of green foliage of vascular plants. In India, 154 species and 185 taxa have been documented (Singh & Pinokiyo, 2014; Upadhyay et al., 2015; Subrahmanya & Krishnamurthy, 2015a, 2015b, 2016b; Gupta & Sinha, 2014, 2016; Jagadeesh Ram, 2015; Subrahmanya & Krishnamurthy, 2016a; Rashmi & Rajkumar, 2015; Randive et al., 2017, 2019; Haridas et al., 2021; Jagadeesh Ram & Sinha, 2022; Sinha et al., 2024).

Despite that Kerala harbouring a rich lichen diversity exceeding as much as 780 species (Sinha et al., 2024), foliicolous lichens remain still understudied. Publications on the state's lichen biota primarily focus on corticolous (bark-dwelling) and saxicolous (rock-dwelling) species (Kumar et al., 1999, 2000; Haridas et al., 2010, 2012, 2014; Zachariah et al., 2018, 2020; Anilkumar et al., 2022). A comprehensive study on foliicolous lichens is lacking, with only sporadic records for about 25

species documented (Singh & Sinha, 2010; Haridas et al., 2021; Sinha et al., 2024). This has to be given more emphasis considering Kerala's abundance of tropical evergreen trees with perennial leaves, an ideal habitat for foliicolous lichen growth.

During a study on lichen flora, conducted in the Pathanamthitta district of Kerala during 2014 to 2018, as well as in Sharngakavu (sacred grove) in the Alappuzha district in 2024, the authors collected and further identified five foliicolous lichen species new to the state. These findings pave the way for further research on foliicolous lichens and contribute to a better understanding of their distribution in Kerala and across the country.

MATERIALS AND METHODS

The specimens examined in this study were collected from Pathanamthitta and Alappuzha districts of Kerala and are housed in the herbaria of RHK (Regional Herbarium of Kerala, S.B. College, Changanacherry, Kottayam) and KFRI (Kerala

Forest Research Institute, Peechi, Thrissur). Morphological and anatomical characters were studied using a stereo zoom microscope (Olympus SZ61) and a light microscope (DM 2500) equipped with a camera and image analysis software. Hand-cut sections were mounted in distilled water and lactophenol cotton blue. All measurements were made from material mounted in distilled water. Plant identification was performed by examining the taxonomic characters and referring to the keys and descriptions referring to the literature (Aptroot et al., 2003; Pinokiyo & Singh, 2004; Jagadeesh Ram & Sinha, 2018; Sinha et al., 2024). Nomenclature was updated following Index Fungorum (2025).

RESULTS AND DISCUSSION

A total number of five species mentioned below were identified as new records for Kerala.

1. *Coenogonium isidiiferum* (Lücking) Lücking, Lichenologist 33(3): 201 (2001). $\equiv$ *Dimerella isidiifera* Lücking, Lichenologist 31(4): 367 (1999); Family: Coenogoniaceae (Fig. 1).

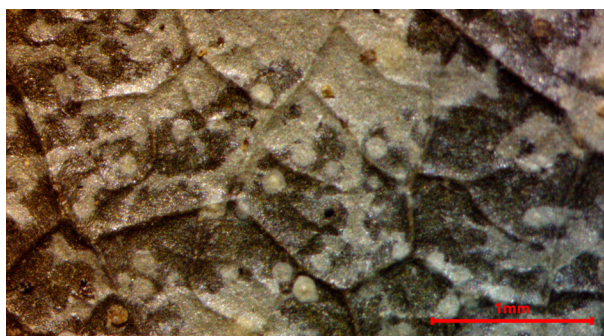


Fig. 1. *Coenogonium isidiiferum*

Description

Thallus crustose, epiphyllous, smooth, laciniate, greyish-greenish; thallodiscs numerous, disc-shaped, exfoliating thallodiscs leaving $\pm$ rounded holes in the thallus. Photobiont *Trentepohlia*, cells angular, arranged in irregular plates. Ascomata not seen.

Specimen examined

India, Kerala, Pathanamthitta district, Adoor, Koodal, elev. 74 m, 9°8'16"N 76°52'38"E, 07 November 2018, S.A. Zachariah L0449 (RHK).

Notes

The species is a new record to Kerala state and is previously known from Andaman & Nicobar Islands as *C. disciforme* Papong et al., (Jagadeesh Ram & Sinha, 2018). Kalb et al., (2016) synonymised *C. disciforme* under *C. isidiiferum*.

2. *Porina andamanensis* Upreti & Ajay Singh, Bot. J. Linn. Soc. 94(3): 399 (1987); Family: Trichotheliaceae (Fig. 2).

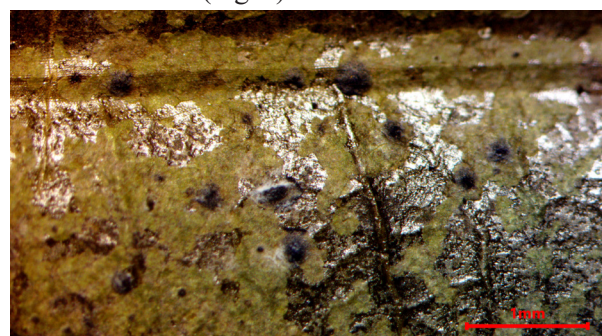


Fig. 2. *Porina andamanensis*

Description

Thallus crustose, epiphyllous, greenish grey, smooth, matt, occurs in small irregularly continuous scattered patches, hypothallus not seen. Photobiont *Phycopeltis*, cells arranged in non-radiating plates. Ascomata perithecia, very few, black; periderm differentiated into an involucrellum and excipulum, involucrellum black-brownish, spreading laterally, 5-20 μ m thick in upper part, excipulum dark coloured- brownish; paraphyses simple, colourless, 70-90 μ m high. Asci 8-spored, clavate, 58-75 $\times$ 10-15 μ m. Ascospores hyaline, transversely 7-septate, oblong or fusiform, 22-35 $\times$ 5-6 μ m.

Specimen examined

India, Kerala, Alappuzha district, Venmony, Sharngakavu, elev. 35 m, 3 May 2024, N 9°14' 37.7844" E 76° 37' 52.2876", Ashnamol KA 25-41264c (KFRI).

Notes

This species is a new record to Kerala state and is previously known from Andaman & Nicobar Islands (Sinha et al., 2024).

3. *Strigula antillarum* (Fée) Müll. Arg., Bot. Jahrb. 6: 379 (1885). $\equiv$ *Melanophthalmum antillarum* Fée, Essai Crypt. Exot. (Paris): xciv, c (1825); Family: Strigulaceae (Fig. 3).



Fig. 3. *Strigula antillarum*

Description

Thallus crustose, epiphyllous, whitish-green, dispersed into small, scattered, $\pm$ rounded patches. Photobiont *Cephaleuros*, cells rectangular to irregular in shape. Ascomata perithecia exposed, black; ostiole inconspicuous; periderm differentiated into outer involucrellum and inner excipulum, involucrellum blackish, 20-30 μ m thick, excipulum pale brown; paraphyses simple, colourless, 40-100 μ m high. Asci 8-spored, clavate, 50-90 $\times$ 8-10 μ m. Ascospores hyaline, transversely 1-septate, fusiform, with acute ends, 12-24 $\times$ 3-5 μ m. Pycnidia aggregated at the centre, black, wart shaped; macroconidia hyaline, 1-septate, bacillar, 10-16 $\times$ 3-5 μ m.

Specimens examined

India, Kerala, Pathanamthitta district, Adoor, Parakkodu, elev. 61 m, N 9°9'11" E 76°45'49"E, 07 November 2018, S A Zachariah L0451 (RHK); *ibid.*, Alappuzha district, Venmony, Sharngakavu, elev. 35 m, 3 May 2024, N 9°14' 37.80" E 76° 37' 51.92", Ashnamol KA 25-41268, 25-41274, 25-41277, 25-41281, 25-41282, 25-41284, 25-41287 (KFRI).

Notes

This species is a new record to Kerala state and is previously known from Andaman & Nicobar, Arunachal Pradesh, Assam, Goa, Meghalaya, Manipur, Sikkim, and W.B. (Sinha et al. 2024).

4. *Strigula subelegans* Vain., Ann. Acad. Sci. Fenn., Ser. A. 19: 23 (1923); Family: Strigulaceae (Fig. 4).

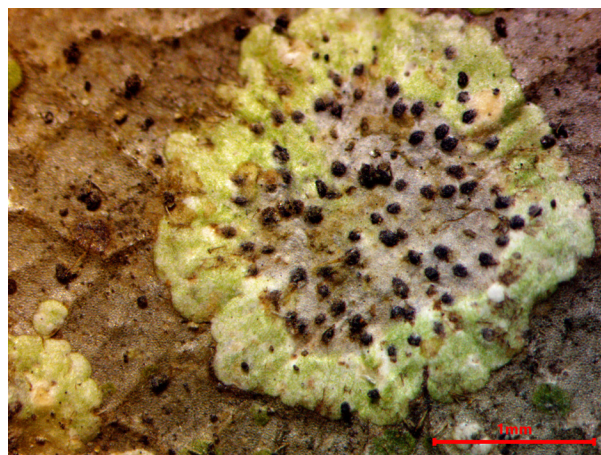


Fig. 4. *Strigula subelegans*

Description

Thallus crustose, epiphyllous, pale greenish-greyish-whitish, $\pm$ circular, sometimes irregular scattered patches, margin entire and lobed, lobes short. Photobiont *Phycopeltis*, cells rectangular, in irregular plates. Ascomata perithecia, semi-immersed, black, ostiole grey-white; periderm divided into outer involucrellum and inner excipulum, involucrellum blackish, 15-25 μ m thick, excipulum colourless; paraphyses simple, septate, colourless, 80-120 μ m high. Asci 8-spored, clavate, 45-90 $\times$ 10-15 μ m. Ascospores hyaline, fusiform, 1-septate, 14-26 $\times$ 3-6 μ m. Pycnidia immersed, blackish; macroconidia hyaline, 1-septate, bacillar, 10-18 $\times$ 2-4 μ m.

Specimen examined

India, Kerala, Pathanamthitta district, Konni, elev. 49 m, 9°13'54" N 76°50'39"E, 26 October 2018, S A Zachariah L0332 (RHK).

Notes

This species is a new record to Kerala state and are previously known from Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Goa, Karnataka, Manipur, Meghalaya, Nagaland, Sikkim, Tamil Nadu, and West Bengal (Sinha et al., 2024).

5. *Microxyphiomyces vainioi* (R. Sant.) Xavier-Leite, M. Cáceres & Lücking, Mycol. Progr. 22(12, no. 88): 12 (2023). $\equiv$ *Tricharia vainioi* R. Sant., Symb. Bot. Upsal. 12(1): 382 (1952); Family: Gomphillaceae (Fig. 5).



Fig. 5. *Microxyphiomyces vainioi*

Description : Thallus crustose, epiphyllous, small, smooth, greyish-green-greyish white, with numerous short sterile setae, setae black, stiff, slightly swollen at base, tapering upwards, up to 1.2 mm long. Photobiont green algae, cells rounded. Ascomata apothecia, sessile, rounded, very few observed. Asci 1-spored, clavate to ovoid, $40\text{--}70 \times 15\text{--}30 \mu\text{m}$. Ascospores hyaline, muriform, oblong-ellipsoid, $37\text{--}60 \times 13\text{--}27 \mu\text{m}$. Pycnidia not seen.

Specimen examined : Kerala, Pathanamthitta district, Puthukulam, elev. 139 m, $9^{\circ}17'54''$ N $76^{\circ}50'31''$ E, 12 November 2018, S.A. Zachariah L0452 (RHK).

Notes : Xavier-Leite et al. (2023) resurrected the genus *Microxyphiomyces* to accommodate the *Tricharia vainioi* clade. This species is a new record to Kerala state and is previously known from Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Karnataka, Mizoram, Nagaland, Sikkim, Tamil Nadu, and West Bengal (Sinha et al., 2024).

Flourishing populations of foliicolous lichens, known for their sensitivity to environmental conditions, can serve as bio-indicators of an area's

ecosystem. Entirely dependent on the surrounding atmosphere for survival and growth, these lichens have life spans closely connected to that of their host leaves of trees in-situ. Consequently, they exhibit rapid life cycles and respond quickly to changes in their environment (Lücking, 1997; Randive et al., 2017). The luxuriant lichen growth observed on many tropical crop land trees in Kerala presents a valuable opportunity for further investigation. Further, studying these lichens holds its potential for developing bio-monitoring programmes in the region.

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