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NOTE

ELEVEN NEW RECORDS OF LICHENS TO THE STATE OF KERALA, INDIA

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Eleven new records of lichens to the state of Kerala, India

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In the present state of knowledge, Kerala comprises ca. 782 species of lichens which were made through various publications and contributions (Vohra et al. 1982; Patwardhan 1983; Kumar 2000; Easa 2003; Sequiera 2003, 2007; Singh & Sinha 2010; Biju et al. 2010, 2014a, b; Pandit et al. 2012; Joshi et al. 2016, 2018; Bajpai et al. 2018; Zachariah et al. 2018, 2019). The Pathanamthitta District of Kerala State consists of three different natural geographical regions; the highlands—part of Western Ghats that cover thick forests and tall hills with an average elevation of 800m; the midland—that covers areas with small hills with an elevation ranging from 20–100 m; and the lowlands with less than 20m elevation and wetlands that remain closer to the western coastal boundaries. The highland comprises of reserve and plantation forests while the midland and lowlands include human-inhabited and cultivated lands. The reserve forest area of the district is 1385.27km² that comprises 50% of the

total area of the district and is completely devoted for the conservation of biodiversity. The area experiences a tropical climate with temperature ranging from 20–39 °C and the south-west and north-east monsoons provide good rain. About 75% of the annual rainfall is received during the south-west monsoon. A total of 83 species of lichens were reported from Pathanamthitta District till date (Kumar 2000; Easa 2003; Zachariah et al. 2018, 2019). During the ongoing studies on the lichen mycota of Pathanamthitta District, we came across eleven lichen species which are new to the state of Kerala.

Specimens were collected from various cropland areas of Pathanamthitta District and identification was conducted at the Lichenology laboratory, CSIR-National Botanical Research Institute (CSIR-NBRI), Lucknow. Morphological characters were studied using a stereo zoom Leica S8APO microscope whereas the anatomical details were examined with Leica DM2500 compound

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microscope attached with camera and image analysis software. Chemical studies were carried out by spot tests and TLC using solvent system C following Orange et al. (2001). Awasthi (2007) and Lendemer (2013) were followed for identification of the species, and new records were confirmed by comparing with the checklists and other relevant literature (Easa 2003; Singh & Sinha 2010). Identified specimens were deposited at the Regional Herbarium of Kerala (RHK), Department of Botany, SB College, Changanacherry, Kerala and one set of voucher specimens at herbarium LWG of CSIR-NBRI.

1. *Cladonia praetermissa* A.W. Archer

Muelleria 5: 273. 1984. (Cladoniaceae) (Image 1)

Specimens examined: RHK L0613, L0614, L0615, L0616; LWG 35848, 22.ii.2019, Kerala, Pathanamthitta District, Pachakkanam, on soil, 9.487°N & 77.144°E, 895m, coll. S.A. Zachariah.

Distribution: In India, the species was earlier known from Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Sikkim, and Uttarakhand (Rai & Upreti 2014).

2. *Collema japonicum* (Müll. Arg.) Hue

Nouv. Arch. Mus. Hist. Nat., ser. 3, 10: 220. 1898. (Collemataceae) (Image 2)

Specimens examined: RHK L0573, LWG 35833, 30.i.2019, Kerala, Pathanamthitta District, Upper Moozhiyaar, on bark, 9.308°N & 77.127°E, 912m, coll. S.A. Zachariah.

Distribution: In India, the species is widely distributed in Sikkim, Uttarakhand, and West Bengal (Rai & Upreti 2014).

3. *Heterodermia hypochraea* (Vain.) Swinscow & Krog

Lichenologist 8: 119. 1976. (Physciaceae) (Image 3)

Specimens examined: RHK L0078, 28.x.2017, Kerala, Pathanamthitta District, Ranni forest division, Goodrickal range, Anathode, on bark, 9.342°N & 77.153°E, 974m, coll. S.A. Zachariah; RHK L0121, 24.v.2018, Kerala, Pathanamthitta District, Ranni forest division, Goodrickal range, Kakki, Attappara, on bark, 9.348°N & 77.157°E, 1108m, coll. S.A. Zachariah; RHK L0603, 22.ii.2019, Kerala, Pathanamthitta District, Ranni forest division, Goodrickal range, Pachakkanam, on bark, 9.458°N & 77.141°E, 964m, coll. S.A. Zachariah.

Distribution: In India, this species was earlier known from Karnataka and Nagaland (Singh, 2018).

4. *Leptogium coralloideum* (Meyen & Flot.) Vain.

Suomal. Tiedeakat. Toim., ser. A, 6(7): 110. 1915. (Collemataceae) (Image 4)

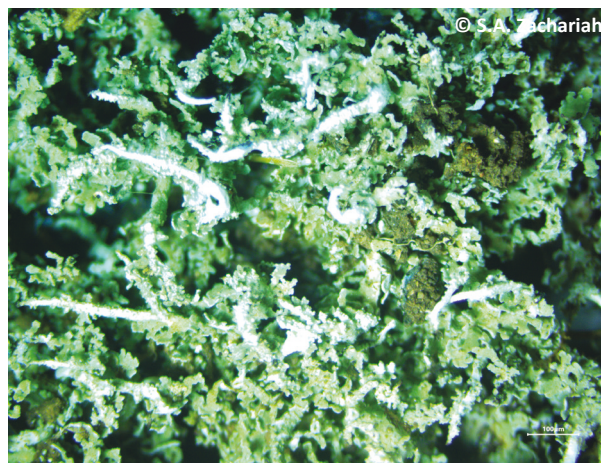


Image 1. *Cladonia praetermissa* A.W. Archer



Image 2. *Collema japonicum* (Müll. Arg.) Hue



Image 3. *Heterodermia hypochraea* (Vain.) Swinscow & Krog

Specimens examined: RHK L0221, 9.x.2018, Kerala, Pathanamthitta District, Tiruvalla, Niranam, on bark of *Garcinia mangostana*, 9.347°N & 76.523°E, 8m, coll. S.A. Zachariah; RHK L0247, 10.x.2018, Kerala, Pathanamthitta District, Tiruvalla, Kaviyoor, on bark of *Swietenia macrophylla*, 9.384°N & 76.615°E, 11m, coll. S.A. Zachariah; RHK L0409, 12.xi.2018, Kerala, Pathanamthitta District, Malayalappuzha-Puthukkulam, on bark of *Artocarpus heterophyllus*, 9.301°N & 76.841°E, 128m, coll. S.A. Zachariah; RHK L0410, 12.xi.2018, Kerala, Pathanamthitta District, Kumblampoika-Thalachira, on bark of *Hevea brasiliensis*, 9.302°N & 76.816°E, 141m, coll. S.A. Zachariah; RHK L0411, LWG 35844, 12.xi.2018, Kerala, Pathanamthitta District, Puthukkulam, Thekkummala, on bark of *Areca catechu*, 9.306°N & 76.848°E, 245m, coll. S.A. Zachariah.

Distribution: In India it was earlier reported from the subtropical areas including Andaman & Nicobar Islands, Tamil Nadu, and Uttarakhand (Singh & Sinha 2010).

5. *Pannaria emodii* P.M. Jørg.

Lichenologist 33: 298. 2001. (Pannariaceae) (Image 5)

Specimens examined: RHK L0501, LWG 35837, 5.i.2019, Kerala, Pathanamthitta District, Ranni, Gurunathanmannu, on bark, 9.288°N & 77.017°E, 579m, coll. S.A. Zachariah.

Distribution: In India, earlier reported from Tamil Nadu and Uttarakhand (Singh & Sinha 2010).

6. *Phyllopsora chlorophaea* (Müll. Arg.) Zahlbr.

Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 83: 133. 1909. (Ramalinaceae) (Image 6)

Specimens examined: RHK L0572, LWG 35846, 30.i.2019, Kerala, Pathanamthitta District, Upper Moozhiyaar, on bark, 9.298°N & 77.125°E, 885m, coll. S.A. Zachariah.

Distribution: In India, the species was earlier recorded from tropical to sub temperate areas of Karnataka and Odisha (Mishra et al. 2011).

7. *Phyllopsora parvifolia* var. *subgranulosa* (Tuck.) Müll. Arg.

Bot. Jharb. Syst. 20: 264. 1894. (Ramalinaceae) (Image 7)

Specimens examined: RHK L0518, 5.i.2019, Kerala, Pathanamthitta District, Ranni, Gurunathanmannu, on bark, 9.293°N & 77.014°E, 545m, coll. S.A. Zachariah; RHK L0546, LWG 35836, 30.i.2019, Kerala, Pathanamthitta District, Upper Moozhiyaar, on bark, 9.301°N & 77.125°E, 896m, coll. S.A. Zachariah; RHK L0593, 20.ii.2019, Kerala,

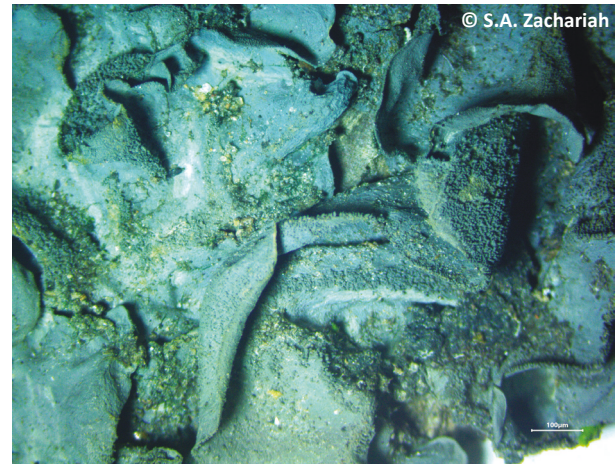


Image 4. *Leptogium coralloideum* (Meyen & Flot.) Vain.

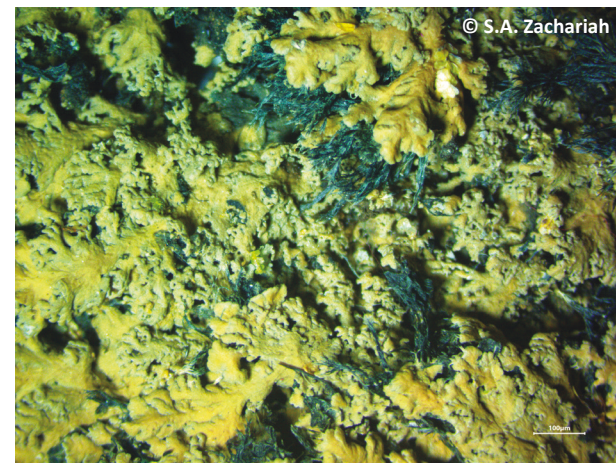


Image 5. *Pannaria emodii* P.M. Jørg.

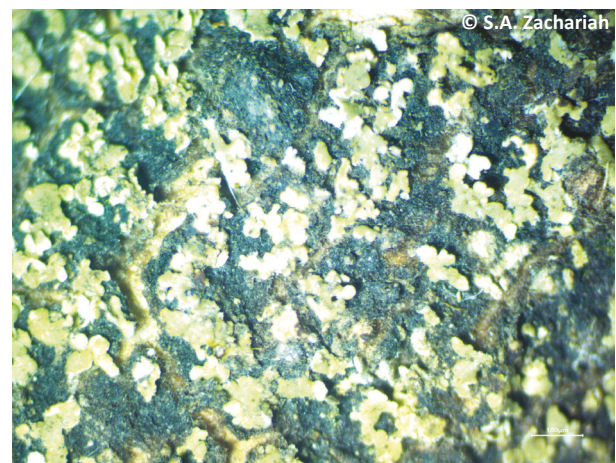


Image 6. *Phyllopsora chlorophaea* (Müll. Arg.) Zahlbr.

Pathanamthitta District, Konni- Mannarappara, on bark, 9.090°N & 77.022°E, 239m, coll. S.A. Zachariah; RHK L0607, Kerala, Pathanamthitta District, Pachakkanam, on bark, 9.459°N & 77.142°E, 936m, coll. S.A. Zachariah.

Distribution: In India, this species was earlier reported from Manipur (Singh & Sinha 2010).

8. *Physcia dilatata* Nyl.

Syn. Lich. 1(2): 423. 1860. (Physciaceae) (Image 8)

Specimens examined: RHK L0223, LWG 35840, 9.x.2018, Kerala, Pathanamthitta District, Tiruvalla, Niranam, on bark of *Areca catechu*, 9.346°N & 76.522°E, 8m, coll. S.A. Zachariah.

Distribution: It was earlier reported from Himachal Pradesh, Madhya Pradesh, Manipur, Sikkim and Uttarakhand states of India (Singh & Sinha 2010).

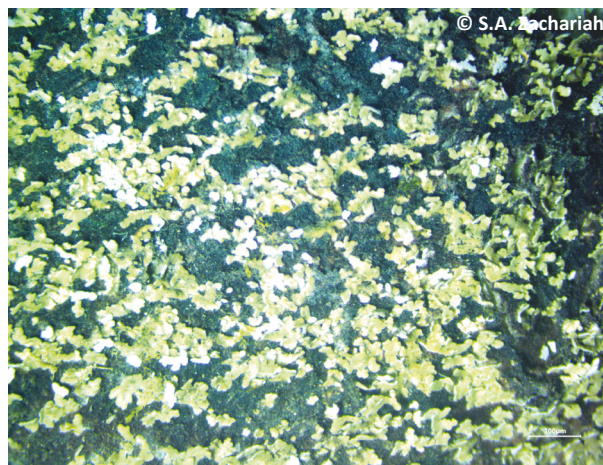


Image 7. *Phyllopsora parvifolia* var. *subgranulosa* (Tuck.) Müll. Arg.

9. *Physcia dubia* (Hoffm.) Lettau

Hedwigia 52: 254. 1912. (Physciaceae) (Image 9)

Specimen examined: RHK L0290, 18.x.2018, Kerala, Pathanamthitta District, Adoor, on bark of *Areca catechu*, 9.160°N & 76.726°E, 62m, coll. S.A. Zachariah.

Distribution: It was earlier reported from Jammu & Kashmir and Uttarakhand states of India (Singh & Sinha 2010).

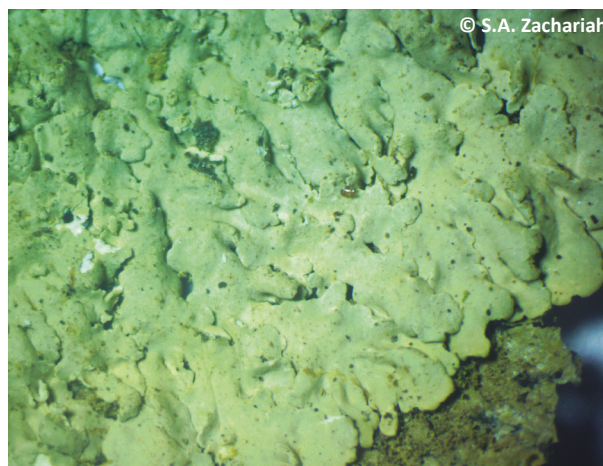


Image 8. *Physcia dilatata* Nyl.

10. *Physcia solediosa* (Vain.) Lynge

Vid. -Slesk. Skrift. I. Mat. -Naturv. Kl. No. 16: 27. 1924. (Physciaceae) (Image 10)

Specimens examined: RHK L0212, 28.vii.2018, Kerala, Pathanamthitta District, Adoor, on bark of *Moringa oleifera*, 9.162°N & 76.726°E, 60m, coll. S.A. Zachariah; RHK L0265, 12.x.2018, Kerala, Pathanamthitta District, Vennikkulam, on bark of *Alstonia scholaris*, 9.408°N & 76.675°E, 63m, coll. S.A. Zachariah; RHK L0266, 12.x.2018, Kerala, Pathanamthitta District, Vennikkulam, on rock, 9.408°N & 76.676°E, 63m, coll. S. A. Zachariah; RHK L0298, 18.x.2018, Kerala, Pathanamthitta District, Adoor, on bark of *Artocarpus heterophyllus*, 9.166°N & 76.720°E, 54m, coll. S.A. Zachariah; RHK L0359, 26.x.2018, Kerala, Pathanamthitta District, Mylapra, on bark of *Hevea brasiliensis*, 9.292°N & 76.807°E, 220m, coll. S.A. Zachariah; RHK L0385, 7.xi.2018, Kerala, Pathanamthitta District, Koodal-Rajagiri, on bark of *Hevea brasiliensis*, 9.151°N & 76.881°E, 98m, coll. S.A. Zachariah; RHK L0417, 12.xi.2018, Kerala, Pathanamthitta District, Malayalappuzha-Puthukkulam, on bark of *Cocos nucifera*, 9.301°N & 76.841°E, 128m, coll. S.A. Zachariah; RHK L0418, L0419, LWG 35841, 12.xi.2018, Kerala, Pathanamthitta District, Puthukkulam-Thekkummala, on bark of *Alstonia scholaris*, 9.303°N & 76.839°E, 133m, coll. S.A. Zachariah.

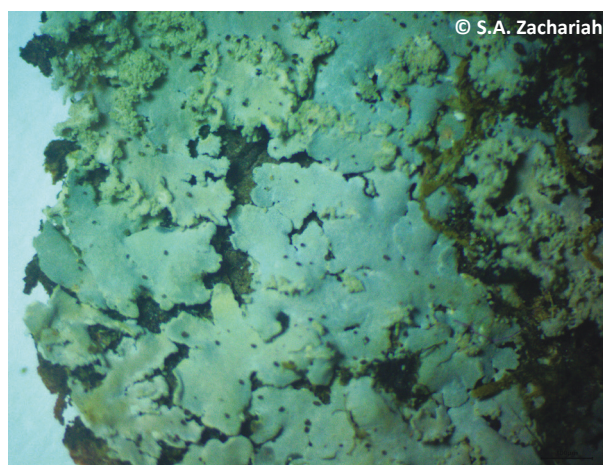


Image 9. *Physcia dubia* (Hoffm.) Lettau

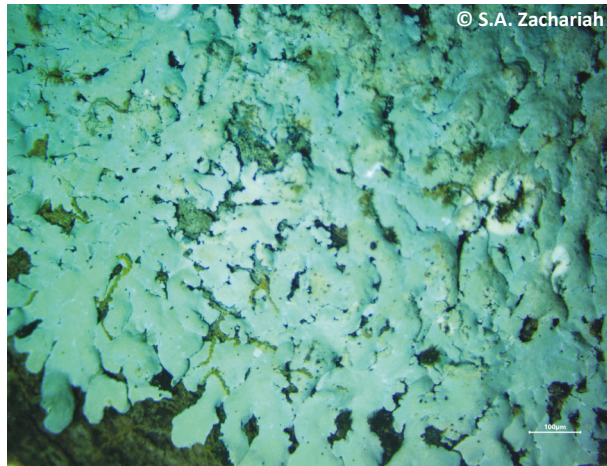


Image 10. *Physcia soresdiosa* (Vain.) Lynge

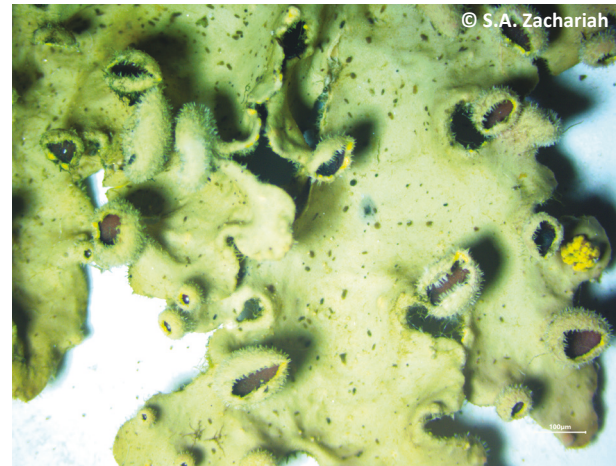


Image 11. *Pseudocyphellaria clathrata* (De Not.) Malme

Distribution: In India, this species was earlier reported from Nagaland and Tamil Nadu (Singh & Sinha 2010).

11. *Pseudocyphellaria clathrata* (De Not.) Malme

Ark. Bot. 26A (14): 9. 1935. (Lobariaceae) (Image 11)

Specimens examined: RHK L0617, LWG 35847, 22.ii.2019, Kerala, Pathanamthitta District, Pachakkanam, on bark, 9.458°N & 77.141°E, 964m, coll. S.A. Zachariah.

Notes: Earlier reports in India are from Sikkim and Nagaland (Singh & Sinha 2010).

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