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A new record of pyrenocarpous lichen to the Indian biota

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India has a rich diversity of lichens, including the pyrenocarpous lichens, which is a group of lichens that have flask-shaped ascocarps (fruiting bodies) called perithecia. Pyrenocarpous taxa commonly grow on the bark of a number of trees or sometimes on rocks, soil, or leaves in moist tropical and temperate regions of the world. The Western Ghats and eastern Himalayan regions hold the highest number of cryptogams together with lichens (Sinha et al. 2018). Both regions are rich in biodiversity so far and lichenologically were investigated by various workers for doing revisionary and floristic studies of the states. Aptroot (2012) revised the genus Anthracothecium and Pyrenula and listed 155 species of Anthracothecium and 745 species of Pyrenula from different parts of the world including India. India is represented by the occurrence of the 350 species of 44 genera and 11 families of pyrenocarpous lichens (Singh & Sinha 2010).

Upreti (1990) described 10 species of Pyrenula, exhibiting Pyrenula subducta (Nyl.) Müll. Arg., spore type of which seven species were new records to the Indian lichen biota. Awasthi (1991) consolidated the information of different lichen genera in a key to the microlichens India, Nepal & Sri Lanka and enumerated 229 species of pyrenocarpous lichens. Upreti (1991a,b, 1992, 1993a,b) studied the Pyrenula genus of pyrenocarpous lichens from India and reported several new records for Indian lichen biota. Jagadeesh et al. (2005) revised the genus Pyrenula and reported Pyrenula subcylindrica jagadeesh & Upreti new to science from India. Recently, Ingle et al. (2018) listed Pyrenula taxa from India and reported 77 species including 10 new records from the country. Based on a revisionary study of Pyrenula, the aim of the present study is to provide a new record for lichen biota.

Materials and Methods

The present study is based on freshly collected specimens from Iravangallaru located at Megamalai Wildlife Sanctuary, Tamil Nadu (Figure 1) and previously collected sample from Arunchal Pradesh’s specimens...
deposited in the herbarium CSIR-National Botanical Research Institute, Lucknow (LWG). Morphological and anatomical characters were examined using stereo zoom Leica S8APO and light DM2500 microscopes attached with camera. Thin sections of perithecia were cut using a razor blade under the stereoscope zoom microscope. All anatomical measurements were recorded in plain water, while 10% KOH was used for detailed study of asci and ascospores. For spot tests the usual reagents of K, C, and P were used and for identification of lichens substance by thin layer chromatography (TLC) was performed in solvent system C following Orange et al. (2001). The specimens were identified up to species level with the help of keys of Awasthi (1991), and Aptroot (2006, 2012). The identified specimens were deposited in the herbarium of CSIR-National Botanical Research Institute, Lucknow.

*Pyrenula subglabrata* (Nyl.) Müll. Arg.

Bot. Jb. 6: 410 (1885).

= *Verrucaria subglabrata* Nyl., in Nylander & Crombie 1883.

Thallus corticolous, corticate, smooth, continuous, thin, up to 10cm across, pale yellow to yellowish-brown, without pseudocyphellae; prothallus indistinct; photobiont trentepohlia. Ascomata perithecioid, simple, dispersed, conical, emergent, 0.3–0.5 mm diam., black, edges without thallus covering; ostioles eccentric to lateral, red-brown, pointing in various directions; hamathecium hyaline, densely inspersed with oil droplets; asci cylindrical to clavate, 4–8 spored, 40–48 × 10–12.5 μm; ascospores brown, 3–septate, 16–22

Figure 1. The distribution of *Pyrenula subglabrata* from Arunachal Pradesh from northeastern India and southern Western Ghats in Tamil Nadu.

A—India (1–2 AP & TN States geographic borders) | B—Arunachal Pradesh (C—West Kameng District) | D—Tamil Nadu | E—Theni District - Megamalai Wildlife Sanctuary.
× 8–11 μm, central lumina not strongly elongated, terminal lumina mostly separated from the exposere wall by endospore layer. Pycnidia not seen (Image 2).

Chemistry: Thallus K−, C−, KC−, PD−, UV−; no lichen substance present in TLC.

Discussion: Pyrenula subglabrata closely resembles Pyrenula oculata A. Singh & Upreti in that they have similar ascomata and not constricted ascospores but the P. subglabrata differs in smaller ascospores 18–20 × 5–10 μm. Pyrenula minarum Vain is another species similar to P. subglabrata in having similar morphology and ascocarps except the size and shape of ascospores of P. subglabrata. Pyrenula occidentalis (R.C. Harris) R.C. Harris also closely resembles P. subglabrata in having similar morphology and dispersed hemispherical but P. subglabrata lacking anthraquinone neither thallus nor ascomata (Aptroot 2012; Cáceres et al. 2013).

Ecology and distribution: The species is found growing on smooth bark of trees at altitudes of between 1,747–2,575 m in the Arunachal Pradesh and Tamil Nadu states of India. Previously, this species is known only from Singapore (Aptroot et al. 2012). This species is a new record for India.

Specimens examined: 08-009440/A (LWG), 12.xi.2008, India, Arunachal Pradesh, West Kameng District, Sela Pass, 27.503’N, 92.104’E, 2,575m, on bark, coll. D.K. Upreti, U. Dubey, R. Khare & G.K. Mishra. 19-36053 (LWG), 02.ix.2019, Tamil Nadu, Megamalai
New record of pyrenocarpous lichen

Rajapr abu et al.

Wildlife Sanctuary, Iravangallaaru, Behind Vinayakar Temple, 9.723’N, 77.456’E, 1,747m, coll. Rajaprabu, N. & G.K. Mishra.

Results and Discussion

The pyrenocarpous lichens communities are a good indicator of young and regenerated forest type. The rich diversity of lichens clearly indicates that most of the forest within the eastern Himalayan region has good health of forest (Singh 1999; Rout et al. 2010). India is represented by the occurrence of 82 species of Pyrenula and maximum diversity was reported from the Western Ghats and the eastern Himalayan region (Mishra et al. 2020). While Tamil Nadu has semi-evergreen forests and smooth bark trees, so far 22 species of Pyrenula have been reported, while Arunachal Pradesh with evergreen dense moist forests have a maximum diversity of Pyrenula with 40 species reported (Awasthi 1991; Nayaka et al. 2001; Hariharan & Balaji 2007; Singh & Sinha 2010). In the present study Pyrenula subglabrata (Nyl.) Müll. Arg. is provided as a new record for Indian lichen biota.

Conclusion

The evergreen forest in both the regions exhibit the maximum diversity of Pyrenula species. The smooth bark trees along the streams in moist shady habitat bear pyrenolichens mostly the species Pyrenula on bark, leaves and rocks. Due to dense virgin forests that cover tracts of land in moist regions of the states are suitable for growth of Pyrenula lichens. Therefore, occurrence of Pyrenula species indicates an evergreen forest with abundance of smooth barked trees. The present investigation is of a preliminary nature, a more intensive and extensive survey will definitely add additional Pyrenula taxa to the country.

References

Aptroot, A. (2006). Three new species of Lithothelium (Pyrenulaceae) from China and Thailand, with a revised world key and annotated list of species. The Lichenologist 38(6): 541–548.

Aptroot, A. (2012). “A world key to the species of Anthracothecium and Pyrenula.” The Lichenologist 44(1): 5–53.

Awasthi, D.D. (1991). A key to the Microlichens of India, Nepal & Sri Lanka. Bibliotheca Lichenologica 40: 1–336.

Cáceres., E.S. E.S. Marcela, A. Aptroot, M.P. Nelsen & R. Lücking (2013). “Pyrenula sanguinea (lichened Ascomycota: Pyrenulaceae), a new species with unique, trypetheloid ascoma and complex pigment chemistry.” The Bryologist 116(4): 350–357.

Hariharan, G.N. & P. Balaji (2007). Checklist of Lichens and Lichenicolous Fungi of Tamil Nadu (India) – Database. Preliminary version http://tnenvis.nic.in/tnenvis_old/Lichens/tamil-nadu.htm

Key to the Taxa

1a Spores oval ......................................................... 2
b Spores ellipsoid .................................................... 3
2a Centrum I+ .......................................................... 4
b Centrum I- ........................................................... 5
3a Perithecia < 1.0mm diam .................................... 6
b Perithecia > 1.0mm diam ................................. P. minarum Vain
4a Centrum I+ blue, with oil globules ....................... P. cayennensis Müll. Arg.
   ……………………………………………………………… P. mastophora (Nyl.) Müll. Arg.
b Centrum I- without oil globules ............................ P. introducta A.Singh & Upreti
5a Centrum I- with oil globules..P. kurzii A.Singh & Upreti
b Centrum I+ red .................................................... 7
6a Ascospores < 21μm long ................................. P. oculata A.Singh & Upreti
b Ascospores >21μm long .... P. oculata A.Singh & Upreti
7a Ascomata with anthraquinone ................................ P. occidentalis (R.C.Harris) R.C.Harris
b Ascomata without anthraquinone .......................... P. subglabrata (Nyl.) Müll. Arg.

Ingle, K.K., V. Uppadhyay, S. Nayaka, S. Trivedi & D. Sahoo (2018). New records and an updated key of Pyrenula from India. Cryptogam Biodiversity and Assessment (Special Volume 2018): 37–46.

Jagadeesh, T.A.M.R., D.K. Upreti & G.P. Sinha (2005). Pyrenula subcylindrica, a new pyrenocarpous lichen from India. Lichenologist 37(2): 109–110.

Mishra, G.K., S. Nayaka & D.K. Upreti (2020). Distribution, biomonitoring and conservation studies of pyrenocarpous lichens in India. G. Journal of Environmental Science and Technology 7(5): 54–59.

Nayaka, S., D.K. Upreti & P.K. Divakar (2001). Distribution and diversity of lichens in Meghamalai Wildlife Sanctuary, Kambam District, Tamil Nadu, India. Biological Memoirs 27(1): 51.

Orange A.P., W. James & F.J. White (2001). Microchemical Methods for the identification of Lichens. British Lichen Society, U.K., 101pp.

Rout, J., P. Das & D.K. Upreti (2010). Epiphytic lichen diversity in a reserve forest in south Assam, north India. Tropical Ecology 51(2): 281–288.

Singh, K.P. (1999). Lichens of Eastern Himalaya region, pp. 153–204. In: Mukerji, K.G., D.K. Upreti & Upadhyay (eds.). Biology of Lichens. Aravali Books International, New Delhi.

Singh, K.P. & G.P. Sinha (2010). Indian Lichens: An Annotated Checklist. Botanical Survey of India, Ministry of Environment and Forests, Kolkata, 571pp.

Singh, K.P., P. Singh & G.P. Sinha (2018). Lichen diversity in the Eastern Himalaya biodiversity hotspot region, India. Cryptogam Biodiversity and Assessment (Special Volume 2018): 71–114.

Upreti, D.K. (1990). Lichen genus Pyrenula in India: Pyrenula subducta spore type. Journal of the Hattori Botanical Laboratory 68: 269–278.

Upreti, D.K. (1991a). Lichen genus Pyrenula from India: The species with spores of Pyrenula brunnnea type. Bulletin De La Societe Botanique De France Lettres Botaniques 138(3): 241–247.

Upreti, D.K. (1991b). Lichen genus Pyrenula from India: IV. Pyrenula cayennensis spore type. Cryptogamie Bryologie Lichenologie 12(1): 41–46.

Upreti, D.K. (1992). Lichen genus Pyrenula from India: VII. Pyrenula mastophora spore type. Feddes Repertorium 103(3–4): 279–296.

Upreti, D.K. (1993a). Lichen genus Pyrenula from India: II. Pyrenula camptospora spore type, III. Pyrenula pinguis. spore type. Acta Botanica Gallica 140(5): 519–523.

Upreti, D.K. (1993b). Notes on Arthopyrenia species from India. Bryologist 96(2): 226–232.
Communications

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Freshwater fishes of Cauvery Wildlife Sanctuary, Western Ghats of Karnataka, India
– Naren Sreenivasan, Neethi Mahesh & Rajeev Raghavan, Pp. 17470–17476

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– Sutanu Satpathy, Kuppusamy Sivakumar & Jeyaraj Antony Johnson, Pp. 17477–17486

An assessment of the population status of the threatened medicinal plant Illicium griffithii Hook.f. & Thomson in West Kameng District of Arunachal Pradesh, India
– Tashi Dorjee Bapu & Gibji Nimasow, Pp. 17504–17512

Short Communications

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On the epidemiology of helminth parasites in Hangul Deer Cervus hanglu hanglu (Mammalia: Artiodactyla: Cervidae) of Dachigam National Park, India
– Naziya Khurshid, Hidayatulla Tak, Ruqeya Nazir, Kulsum Ahmad Bhat & Muniza Manzoor, Pp. 17517–17520

Histopathological findings of infections caused by canine distemper virus, Trypanosoma cruzi, and other parasites in two free-ranging White-nosed Coatis Nasus narica (Carnivora: Procyonidae) from Costa Rica
– Jorge Rojas-Jiménez, Juan A. Morales-Acuna, Milena Argüello-Sáenz, & Friedrich von Maltzahn, Pp. 17521–17528

On a new species of Macrobrachium Spence Bate (Decapoda: Palaemonidae) from Ayeyarwady River, Myanmar
– H.H.S. Myo, K.V. Jayachandran & K.L. Khin, Pp. 17529–17536

Review of the tiger beetle genus Calomera (Coleoptera: Carabidae) of the Philippines
– Milton Norman Medina, Alexander Anichtchenko & Jürgen Wiesner, Pp. 17537–17543

Rediscovery of Martin’s Duskhawker (Odonata: Zygoptera: Platystictidae) from Western Ghats, and its addition to the odonate checklist of Kerala
– Kalesh Sadasivan & Muhamed Jafer Palot, Pp. 17543–17547

A note on the current distribution of reedtail damselfly Protosticta rufostigma Kimmins, 1958 (Odonata: Zygoptera: Platystictidae) from Western Ghats, and its addition to the odonate checklist of Kerala
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Assessment of threat status of the holly fern Cyrtomium micropterum (Kunze) Ching (Polyodiopsida: Dryopteridaceae) in India using IUCN Regional guidelines
– C. Bagath Singh & A. Benniamin, Pp. 17554–17560

Notes

First report of the Asiatic Brush-tailed Porcupine Atherurus macrourus (Linnaeus, 1758) (Mammalia: Rodentia: Hystricidae) from West Bengal, India
– Suraj Kumar Dash, Abhishek Chettri, Dipanjnan Naha & Sambandam Sathyakumar, Pp. 17561–17563

Record of the world’s biggest pangolin? New observations of bodyweight and total body length of the Indian Pangolin Manis crassicaudata Gray, 1827 (Mammalia: Pholidota: Manidae) from Mannarr District, Sri Lanka
– Priyan Perera, Hirusha Randimal Algewatta & Buddhika Vidanage, Pp. 17564–17568

First record of Toit melanonotus (Wied, 1820) (Aves: Psittaciformes: Psittacidae) in Cantareira State Park, Brazil: new colonization or simply unnoticed?
– Marcos Antônio Melo & David de Almeida Braga, Pp. 17569–17573

Is Bombus pomorum (Panzer, 1805) (Hymenoptera: Apidae) a new bumblebee for Siberia or an indigenous species?
– Alexandr Byvaltsev, Svyatoslav Knyazev & Anatoly Afinogenov, Pp. 17574–17579

Some new records of scarab beetles of the genus Onthophagus Latreille, 1802 (Coleoptera: Scarabaeidae) from northern Western Ghats, Maharashtra, with a checklist
– Aparna Sureshchandra Kalawate, Banani Mukhopadhyay, Sonal Vithal Pawar & Vignesh Durgaram Shinde, Pp. 17580–17586

Ecological importance of two large heritage trees in Moyar River valley, southern India
– Vedagiri Thirumurugan, Nehru Prabakaran, Vishnu Sreedharan Nair & Chinnasamy Ramesh, Pp. 17587–17591

Bulbophyllum spathulatum (Orchidaceae), a new record for Bhutan
– Pema Zangpo, Phub Gyeltshen & Pankaj Kumar, Pp. 17592–17596

On the occurrence and distribution of the narrowly endemic Andaman Lantern Flower Ceropogia andamalancica (Apocynaceae: Ceropogieae)
– M. Uma Maheshwari & K. Karthikeyan, Pp. 17597–17600

The oat-like grass Triisetopsis aspera (Munro ex Thwaites) Röser & A.Wölk (Poaceae): a new record for the flora of central Western Ghats of Karnataka, India
– H.U. Abhijit, Y .L. Krishnamurthy & K. Gopalakrishna Bhat, Pp. 17601–17603

Star Grass Lily Iphigenia stellata Blatter (Colchicaceae) – a new addition to the flora of Gujrat, India
– Mitesh B. Patel, Pp. 17604–17606

A new record of pyreneocarpous lichen to the Indian biota
– N. Rajaprabu, P. Ponmurugan & Gaurav K. Mishra, Pp. 17607–17610

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