

***Byssoloma subdiscordans* (Nyl.) P. James: Distributional range and its habitat preference in Indian subcontinent**

Y. Joshi* and M. Tripathi

Lichenology Division, Department of Botany, S.S.J. Campus, Kumaun University, Almora-263601 (Uttarakhand), INDIA

*Corresponding author. E-mail: dryogeshcalo@gmail.com

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Abstract: The present paper deals with the new distributional record of *Byssoloma subdiscordans* for Western Himalayan lichen flora and a new habitat record for Indian subcontinent. A note on its brief taxonomic description, distribution, ecology and occurrence in India is also provided. Previously the species was reported as corticolous and foliicolous from tropical and montane regions of India, viz. Eastern Himalaya and Western Ghats, but this is for the first time that authors have reported it as saxicolous in temperate regions of Western Himalaya, thus extending its habitat preference along with distributional range within Indian subcontinent.

Keywords: *Byssoloma*, Follicolous, Indian subcontinent, Kumaun Himalaya, Lichenized fungi, New record, Saxicolous

INTRODUCTION

The lichens of India have been nicely investigated and compiled by Singh and Sinha (2010) in their checklist “*Indian Lichens: An Annotated Checklist*”, which includes 2303 species belonging to 305 genera and 74 families from tropical, subtropical, temperate and alpine regions colonizing various substrates.

Uttarakhand, one of the culturally rich heritage state of India, is also home to a diverse assemblage of lichens (Upreti *et al.*, 2010), and since last four decades, lichenological studies within this region have yielded a noteworthy increase in lichen taxa which is partly due to local floristic investigations and revisionary studies of certain families or genera (e.g. Awasthi, 1975; 1986; Pant, 2002; Nayaka, 2004; Divakar and Upreti, 2005; Gauniyal, 2005; Joshi, 2008; Joshi, 2010; Mishra, 2012; Upreti and Chatterjee, 1999; 2000; Upreti *et al.*, 2001; 2010). The state is bestowed with 747 species of lichens (Rai 2013).

During a field trip to Jageshwar, a small village amidst the dense grove of the funereal deodar [*Cedrus deodara* (Roxb.) G. Don] trees that even sunrays find hard to penetrate for most part of the year, situated at an altitude of 1870 m, 37 km north east of Almora on main road to Pithoragarh, the authors found luxuriant growth of lichenized fungi, such as, *Buellia* De Not., *Caloplaca flavovirescens* (Wulfen) Dalla Torre and Sarnth., *C. subsoluta* (Nyl.) Zahlbr., *Candelariella* Müll. Arg., *Heterodermia pseudospeciosa* (Kurok.) W.L. Culb., *Hyperphyscia adglutinata* (Flörke), H. Mayrhofer and Poelt, *Lecanora luteomarginata* Nayaka, Upreti and Lumbsch, *Lepraria* sp. Ach., *Mycobilimbia philippina*

(Vain.) D.D. Awasthi, *Pertusaria* DC., *Porpidia albocoerules* (Wulfen) Hertel & Knoph, *Punctelia rudecta* (Ach.) Krog, *Ramalina hossei* Vain. and *Tephromela khatiensis* (Räsänen) Lumbsch, besides a saxicolous *Byssoloma* Trevis. in and around rocks of the monuments.

Byssoloma a cosmopolitan genus of lichenized fungi, belonging to family Pilocarpaceae is represented by ca. 55 species worldwide (Kirk *et al.*, 2008). Generally it is foliicolous lichen but two of its species [*B. leucoblepharum* (Nyl.) Vain. and *B. subdiscordans* (Nyl.) P. James] colonizes various substrates such as rock and bark (Lücking, 2008). Altogether 5 taxa have been recognized and accepted from Indian subcontinent viz. *B. chlorinum* (Vain.) Zahlbr., *B. leucoblepharum*, *B. polychromum* (Müll. Arg.) Zahlbr., *B. subdiscordans* and *B. tricholomum* (Mont.) Zahlbr. (Singh and Sinha, 2010). The aim of present study was to study the distributional range and habitat preference of *Byssoloma subdiscordans* (Nyl.) in Indian subcontinent.

The saxicolous *Byssoloma* species on its examination revealed to be *B. subdiscordans*. Brief taxonomic description of the species is provided herewith.

MATERIALS AND METHODS

The present study is based on lichen specimens of *Byssoloma* species collected from Jageshwar forest, Almora district, Uttarakhand and deposited at herbarium of Kumaun University (ALM), Uttarakhand, India. Morphological characters of thallus, reproductive structures, colour, size and shapes were examined under stereozoom dissecting microscope. Hand-cut sections

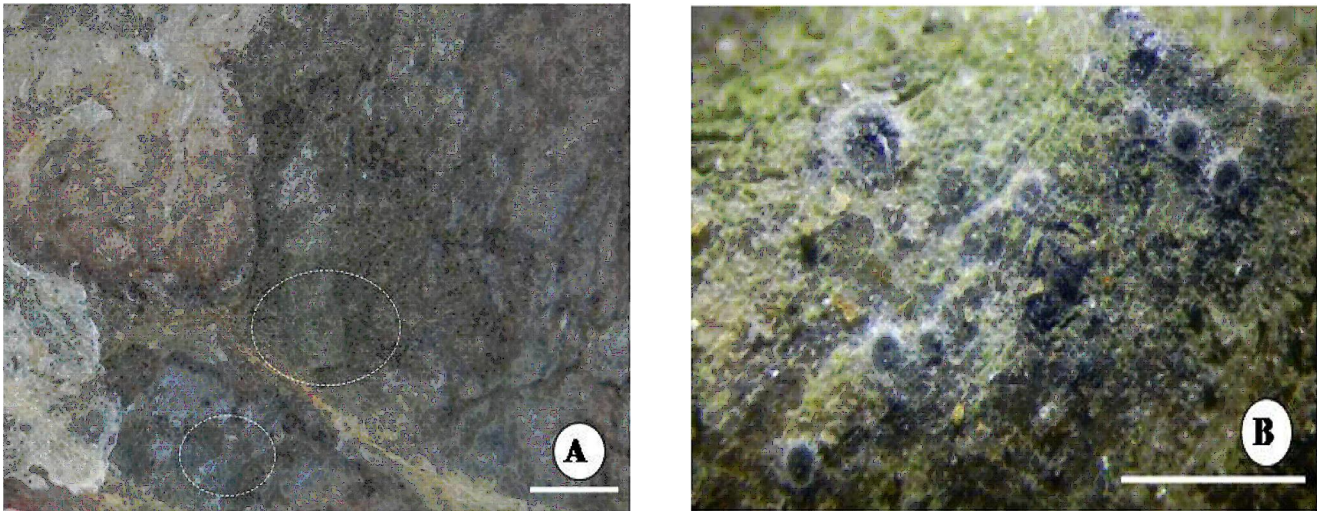


Fig. 1. A. Habitat of *B. subdiscordans* (Encircled area showing the target species) (Scale = 5 mm). B. Magnified view of *B. subdiscordans* (Scale = 1 mm).

were made for studying the anatomy of thalli and fruiting bodies and were examined under compound microscope. Spot test reactions were carried out on hand sections of thalli and apothecia under compound microscope. Thin layer chromatography (TLC) was performed as described by Orange *et al.* (2001).

RESULTS

Taxonomic treatment

Byssoloma subdiscordans (Nyl.) P. James, Lichenologist 5: 126, 1971. (Fig. 1A-B)

Thallus dispersed into rounded to confluent patches, 1 cm across, with corticiform layer, smooth, whitish. Apothecia round, 0.3-0.4 mm diam., disc plane to slightly convex, black; margin well developed and byssoid, spreading laterally over thallus surface, white. Exciple well developed, hyaline, of loosely woven hyphae. Hypothecium 20-35 μm high, dark brown with purple tinge. Epithecium well developed, 6-7 μm high, blackish brown with purple tinge. Hymenium 50-55 μm high, hyaline. Asci 40-45 \times 9-10 μm . Ascospores oblong-ellipsoid, 3-septate, 11-14 \times 3 μm . Pycnidia not seen.

Chemistry: no lichen substances present.

Specimen examined: India, Uttarakhand, Almora district, Jageshwar, 29 $^{\circ}$ 37'44.5" N 0.79 $^{\circ}$ 50'20.3" E, 1828 m, on granite rock, 26 Oct. 2012, H. Joshi & party, 0051 (ALM).

DISCUSSION

B. subdiscordans is reported on leaves, bark and rock in tropical, temperate and arctic regions across the world (Lücking, 2008; Giavarini and Sérusiaux, 2009). It is generally a pantropical species (Santesson, 1952; Lücking, 1992; 2008), but is also reported from temperate regions of Australia, Europe, Japan, New Zealand, North America, Taiwan (Santesson, 1952; Kantvilas and Jarman, 1993; Wirth, 1995; Aptroot, 1996; Thor *et al.*, 2000; Aptroot and Sparrius, 2003; Hermansson and Thor, 2004;

Lücking, 2008; Giavarini and Sérusiaux, 2009) growing on bark, leaves and rocks.

Previous reports of *B. subdiscordans* in India show a restricted distribution of this species in subtropical and montane regions of Eastern Himalaya (Arunachal Pradesh, Manipur, Nagaland, Sikkim) (Pinokiyo and Singh, 2004; Pinokiyo *et al.*, 2006; Sinha and Jagadeesh Ram, 2011) and Western Ghats (Tamil Nadu) (Awasthi and Singh, 1972; Awasthi, 1991; Pinokiyo *et al.*, 2006) growing over bark and leaves. In the present study, the species is recorded for the first time from Western Himalaya growing in deep shady areas on vertical surface of granitiferous biotite granite gneiss (a metamorphic rock) of Almora Crystalline Group of Gumalikhhet Formation in the locality of Jageshwar. A single colony of this lichen was obtained and investigated from the study area. At the collecting site, the species was accompanied by various lichens [e.g. *Buellia* sp., *Caloplaca flavovirescens* (Wulfen) Dalla Torre & Sarnth., *C. subsoluta* (Nyl.) Zahlbr., *Lecanora luteomarginata* Nayaka, Upreti and Lumbsch, *Lepraria* sp., *Mycobilimbia philippina* (Vain.) D.D. Awasthi, *Pertusaria* DC., *Porpidia albocoerulesce* (Wulfen) Hertel and Knoph and *Tephromela khatiensis* (Räsänen) Lumbsch].

It is quite surprising that similar set of conditions, such as damp and shady areas have been mentioned for saxicolous specimens for this species in Europe by Giavarini and Sérusiaux (2009). However, the saxicolous specimens of this species from Taiwan were reported growing on shale (i.e. a sedimentary rock) by Aptroot and Sparrius (2003) in similar set of conditions. In contrast to saxicolous habitat, the foliicolous specimens occur in exposed situations such as the forest canopy and individual trees (Lücking, 2008).

The findings suggests the possibility that *B.*

subdiscordans is expanding its habitat and distributional range in Indian subcontinent and also reflects its wider ecological and distributional amplitude in this subcontinent. It also provides a new source of fascination and interest to explorers and lichenologists for further investigation regarding the new records/species in this subcontinent.

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