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New distributional records of lichen genus *Mycobilimbia* from India

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ABSTRACT

Dubey U., Upreti D. K., Ingle K. K. & Nayaka S. 2013. New distributional records of lichen genus *Mycobilimbia* from India. Geophytology 42(2): 115-119.

New distributional records of three species of *Mycobilimbia* collected during the last two decades from different phytogeographical regions of India are provided. All the species exhibit their wide distribution in tropical to temperate regions of both Eastern and Western Himalayas. No records of the species from Western Ghats and other regions of India are available.

Key-words: Lichen, additional distribution, *Mycobilimbia*, India.

INTRODUCTION

The lichen genus *Mycobilimbia* is represented by 44 species in the world, of which 3 species are known from India. The close morphological and anatomical similarities between lichen genera *Biatora* Fr. and *Mycobilimbia* Rehm. resulted into systematic and nomenclatural confusion between the two taxa. Some authors accept the genus *Mycobilimbia* (Vitikainen et al. 1997, Diederich & Serusiaux 2000, Hafellner & Türk 2001, Llimona & Hladun 2010) while other includes it in *Biatora* (Purvis et al. 1992). *Mycobilimbia* was originally circumscribed by Hafellner (1984) as heterogeneous. Awasthi and Mathur (1987) described three species of this genus from India, based on the limited number of species either collected from Darjeeling district of West Bengal in Eastern Himalayas or few localities of Uttarakhand in the Western Himalayas. Räsänan (1950) described *Mycobilimbia calcuttensis* Räsänan, a new species from India (Holotype at Helsinki Herbarium and Isotype at LWG), which is a nonlichenized fungus according to Singh and Sinha (2010).

During the last 2 decades, a large number of field explorations for collection of lichens from various regions of India were conducted and additional distributional records of the species of *Mycobilimbia* are added to the present distribution. The species of *Mycobilimbia* mostly prefer to grow on rock, mosses or on soil over rock mostly in tropical to temperate Himalayan regions between 300m and 2200m both in Eastern and Western Himalayas.

MATERIAL AND METHOD

The study is based on the lichen samples lodged in the Herbarium of National Botanical Research Institute, Lucknow (LWG). Morphological characters were examined on dry material under a stereozoom microscope and anatomical details were examined with a compound microscope. The hand cut sections of apothecia were mounted in water, 10% KOH (K), Paraphenylenediamine (Pd), Lugol's solution (I) and cotton blue. Secondary metabolites of the apothecia were identified by Thin Layer Chromatography (Orange et al. 2001).

TAXONOMIC TREATMENT

Mycobilimbia hunana (Zahlbr.) D. D. Awasthi in D. D. Awasthi & R. Mathur

Proc. Indian Acad. Sci., Pl. Sci. 97(6): 501. 1987. *Bacidia hunana* Zahlbr. In Hand. Mazz. Symb. Sin 3: 113. 1930.

Plate 1, figure 1

Description: Thallus terricolous sometimes saxicolous, cracked; surface grey, granulose; apothecia single or in groups, 0.2-0.8 mm in diameter, plane to convex; disc dark brown to black, epruinose; margin entire, pale yellow; exciple red-brown, 54-77 µm thick at margin, K+ violet-brown, fading below; epithecium red-brown, 12-14 µm thick, K-; hymenium hyaline, 76-92 µm thick, K-, I+ deep blue; hypothecium pale red-brown, 38-50 µm thick, K-; asci cylindrico-clavate, 8-spored; ascospores colourless, oblong-ellipsoid to rarely fusiform, both the ends rounded, sometimes one end slightly tapering than the other, transversely 3-septate, 21-28 x 6-9 µm; paraphyses colourless, simple.

Chemistry: Thallus K-, C-, KC-, P-.

Remarks: The species is characterized by K+ violet brown exciple, 3-septate, 20-28 × 6-9 µm sized ascospore. *M. philippina* is close to the species in morphology but differs in having K- exciple and slightly less wide 5-6 µm ascospores. Earlier, *Mycobilimbia hunana* was reported to occur in Nagaland and West Bengal hills only (Singh & Sinha 2010). Now, the species exhibits its wide extended distribution in Cachar district of Assam, Upper and West Siang districts of Arunachal Pradesh, Gangtok area of Sikkim, Champawat and Chamoli district of Uttarakhand and Kalimpong division of Darjeeling district.

Specimens examined: Assam: Cachar district, Ching Coorie area, on rocks, 17 May 2007, U. Dubey and B. Singha 07-016299 (LWG); Arunachal Pradesh: West Siang district, Kamba, alt. 370 m, on rocks, 26 Jan 2007, U. Dubey 07-009065 (LWG); Upper Siang district, Jengging, near circuit house, alt. 945 m, on rock, 18 Nov 2008, D. K. Upreti, U. Dubey, R. Khare and G. K. Mishra 08-009310/A (LWG); Sikkim: Gangtok, near Burtuk Basti, alt. 1700 m, on rocks, 5 March 1994, G.P. Sinha (BSHC); Uttarakhand: Chamoli district, Gupta Kashi, 2 km from Temple in forest, alt. 1300-1400, on rocks, 23 Sept 1976, Dange 76518, 76519 (LWG-LWU); Champawat district, Dunaghat, alt. 1750 m, on rocks, 28 Nov 2010, G. K. Mishra 10-015249; Gurauli, alt. 1400 m, on rocks, 28 Nov. 2010, G. K. Mishra, 10-015375, 10-015376 (LWG); Uttarkashi district, Silkyara, 1620 m, 15 Sept 1977, A. Singh 95331 (LWG); West Bengal: Darjeeling district, Tiger hill, alt. 2250 m, on ground, 1954, Awasthi 3140 (LWG-AWAS); Darjeeling Pashok road at about 7 miles from Darjeeling, alt. ca. 1900 m, on soil by road side, 6 march 1967, Awasthi & Agarwal 67-175 (LWG-LWU); Kalimpong division way to Musong from Kalimpong alt. ca. 1500 m, on hard soil by road side, 16 May 1967, Awasthi & Agarwal 67-326/B (LWG-LWU); Kalimpong division way to Musong from Kalimpong alt. ca. 1500 m, on hard soil by road side, 16 May 1967, Awasthi & Agarwal 67-326/B (LWG-LWU).

Mycobilimbia philippina (Vain.) D. D. Awasthi in D. D. Awasthi & R. Mathur

Proc. Indian Acad. Sci., Pl. Sci. 97(6): 501. 1987. *Bilimbia philippina* Vain., Ann. Acad. Sci. Fenn., Sér A, 159(6): 76. 1920.

Plate 1, figure 2

Description: Thallus terricolous sometimes saxicolous, cracked; surface grey, furfuraceous; apothecia single or in groups, 0.5-1 mm in diameter, plane to convex; disc black, epruinose; margin entire, brown; exciple red-brown, 70-80 µm thick at margin, K-, fading below; epithecium red-brown, 10-15 µm thick, K-; hymenium hyaline, 70-80 µm thick, K-, I+

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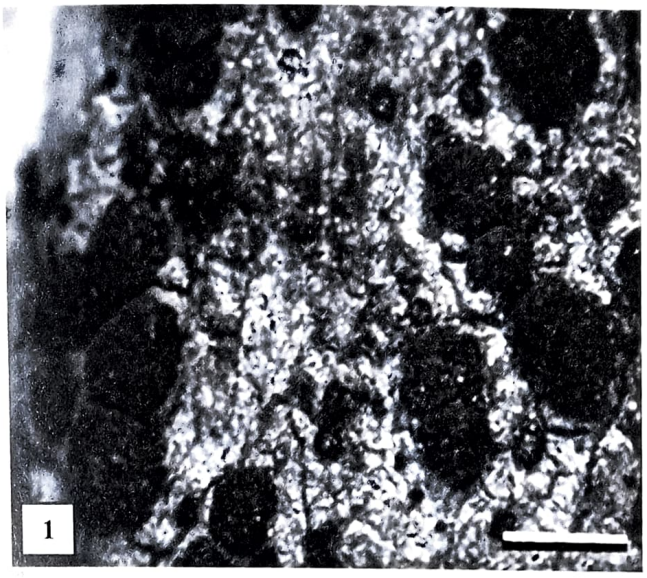
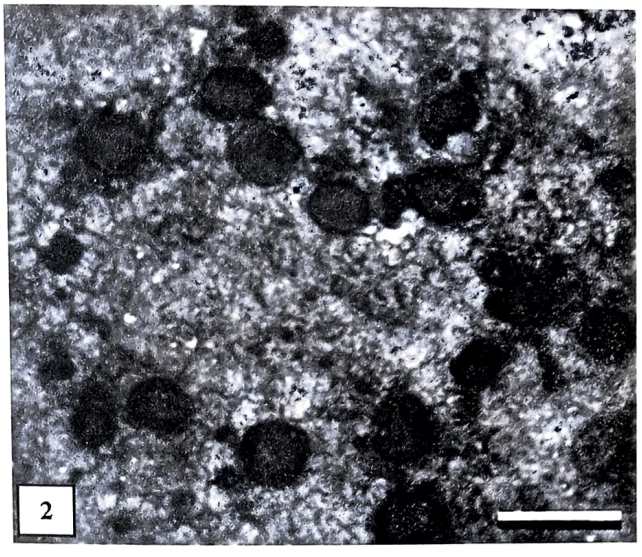
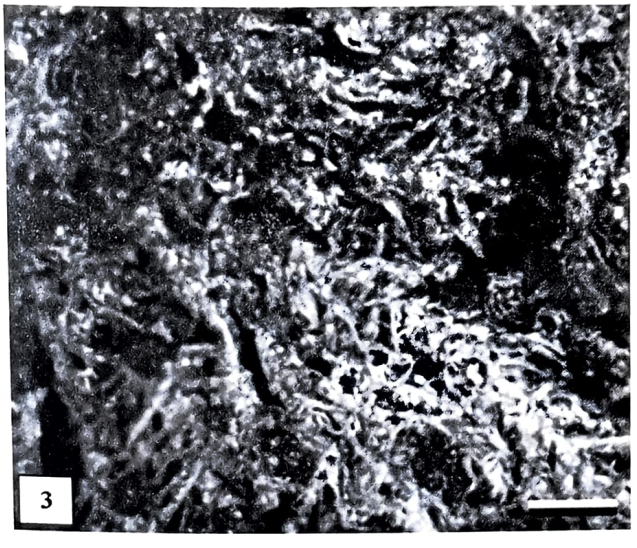
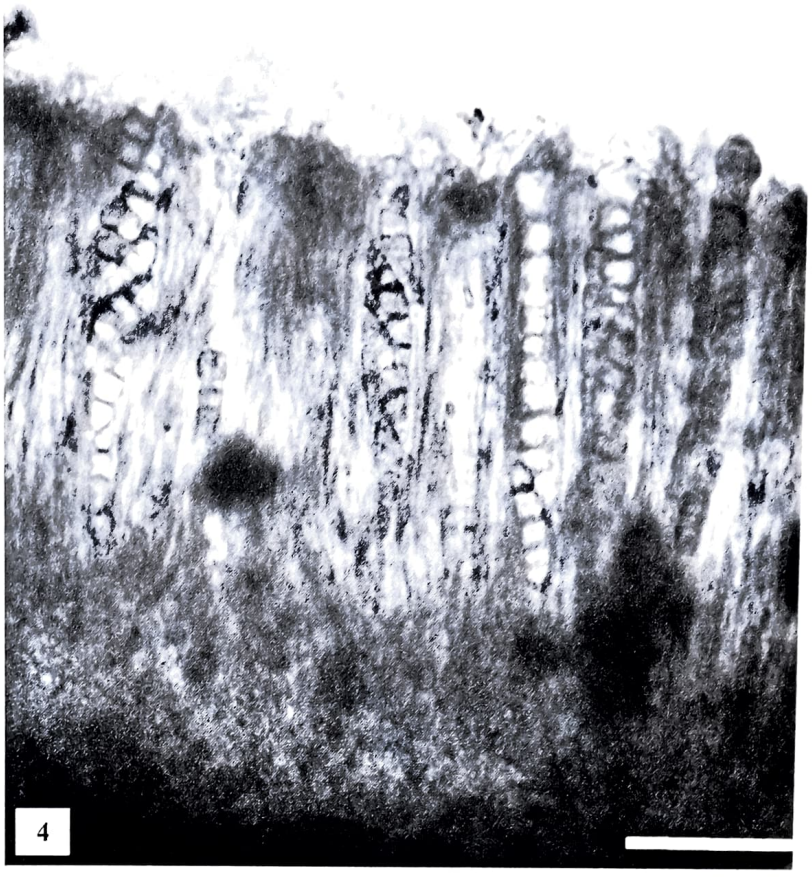
Plate 1

1. *Mycobilimbia hunana*, habitus. 2. *Mycobilimbia philippina*, habitus. 3. *Mycobilimbia sphaeroides*, habitus. 4. Ascus. 5. Ascospores. Scales: A & B = 2 mm; C = 1 mm; D & E = 50 µm.









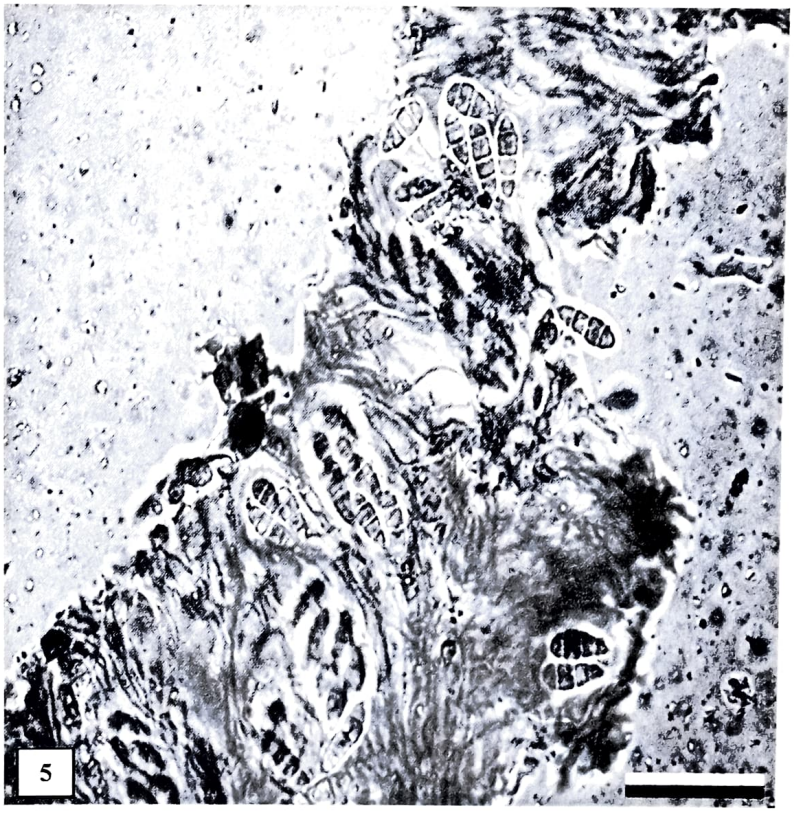


Plate 1

deep blue; hypothecium pale yellow, 40-45 µm thick, K-; asci cylindrico-clavate, 8-spored; ascospores colourless, oblong-ellipsoid to rarely fusiform, both the ends rounded, transversely 3-septate, 20-30 x 4-6 µm; paraphyses colourless, simple to branched.

Chemistry: Thallus K-, C-, KC-, P-.

Remarks: The species is characterized by K- exciple, 20-30 × 4-6 µm sized ascospores. It is close to *M. hunana* but differs in having less wide ascospores and K- exciple. Singh & Sinha (2010) reported the occurrence of this species in Arunachal Pradesh, Manipur, Nagaland, Uttarakhand and West Bengal Hills. The present study further extends the distribution of the species in Cachar district of Assam, Upper Siang district of Arunachal Pradesh, Upper Shillong region in Meghalaya, Chakrata hills, Champawat and Munsiyari and Milam region of Uttarakhand and Kalimpong and Kurseong areas of Darjeeling hills in West Bengal.

Specimens examined: Assam: Cachar district, Ching Coorie area, on rocks, 17 May 2007, U. Dubey & B. Singha 07-016297, 07-016298 (LWG). Arunachal Pradesh: Upper Siang district, Jengging, towards forest road, on vertical rocks, 30 Oct. 2007, U. Dubey 07-012360 (LWG); Dibang Valley district, Roing, Salley lake area, 300 m, on soil, 31 Aug. 1986, D. K. Upreti & M. Ranjan 201565 (LWG); Meghalaya: Upper Shillong peak, by road side, 1950 m, on soil, 6 Oct. 1964, D. D. Awasthi 6479, 6458 (LWG-AWAS); Uttarakhand: Dehradun district, Chakrata hills, on way to Deoban, alt. 1700 m, or rocks, 28 Nov. 2010, G. K. Mishra 10-015029 (LWG); Sukhidak, Shyamla Tal, 1200 m, on rocks, 24 June 1993, D. K. Upreti, 212821 (LWG); Pauri district, Nagdeo, 1950 m, on soil, 15 Oct. 1969, A. Singh 86944 (LWG); Pithoragarh district, Lake Ghati area before Munsiyari, 1200 m, on rocks, D. K. Upreti, 09-012635 (LWG); Lilam to Bogudiyar enroute to Milam Glacier alt. 1800-2450 m, on soil, 17.10.2007, S. Joshi 07-010552 (LWG); West Bengal: Darjeeling district, Kalimpong division, on way to Munsong from Kalimpong, alt. 1500 m, on hard soil by road side, March 10, 1967, D. D. Awasthi & M. R. Agarwal 67-326/A (LWG-LWU); Kurseong, Dow Hill, on soil, 1950 m, 23 Feb. 1966, D. D. Awasthi & M. R. Agarwal 66-2783 (LWG-LWU); Darjeeling, Pashok road, alt. 6-7 miles from Darjeeling, alt. 1950 m, on soil by road side, 6 March 1967, D. D. Awasthi & M. R. Agarwal 67-174 (LWG-LWU); Kurseong, near St. Mary College, 1650-1800 m, 22 Feb. 1966, D. D. Awasthi & M. R. Agarwal 66-178 (LWG-LWU).

Mycobilimbia sphaeroides D. D. Awasthi in D. D. Awasthi & R. Mathur

Proc. Indian Acad. Sci., Pl. Sci. 97 (6): 502. 1987.
Bacidia sphaeroides Vain., Acta Soc. Fauna Fl.Fenn.53(1): 234. 1922.

Plate 1, figure 3

Description: Thallus muscicolous, effuse; surface ash grey, slightly granulose; apothecia few, aggregated in groups, constricted at base, 0.2-0.5 in diameter, plane to convex; disc pale red-brown, epruinose; margin entire, concolorous to disc and later excluded; exciple colourless, 70-80 µm thick at margin, K-; epithecium colourless, K-; hymenium 80-105 µm thick, I+ deep blue then vinose red; hypothecium colourless, 60-70 µm thick, K-; ascospores elongate ellipsoid, transversely 3-4 septate, 20-30 x 4-5 µm; paraphyses simple to branched.

Remarks: The species is characterized by its muscicolous habitat, colourless hypothecium and K- exciple. The species is endemic to India and known from a single locality in temperate region of the Western Himalayas. *M. berengeriana* (A. Massal.) Hafellner & V. Wirth is similar to the species in muscicolous habitat and granular condition of thallus, however it differs in having dark brown hypothecium and simple ascospores.

Specimen examined: Uttarakhand: Dehradun district, Mussoorie, Chakrata hills, on way to Deoban, alt. ca. 8500 ft., on rocks among decaying mosses, 22.06.1976, D. D. Awasthi & M. Joshi 76.71 (LWG-LWU).

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