



A report on some macrolichens new to Karnataka, India

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A large number of taxa collected from the Western Ghats are mentioned in the keys, floristic, monographic and revisionary studies of Indian lichens (Montagne 1842; Awasthi 1988, 1957; Kumar & Stephen 1997, 1999; Patwardhan 1983; Singh 1984; Singh & Sinha 1997). Recently, Nayaka & Upreti (2005) analyzed the status of lichen diversity in the Western Ghats based on published literature which revealed the presence of 949 species with 26.7% endemism. The work on lichens from the Karnataka part of the Western Ghats has been attempted by very few researchers. Nayaka & Upreti (2002) collected 143 species of lichens from Sharavathi Valley along the central Western Ghats. So far, from the available literature only 336 species of

lichens have been reported from Karnataka (Vinayaka et al. 2010). In the present study we found six species of macrolichens from the central Western Ghats region of Karnataka (Shimoga, Chikmagalur, Hassan and Coorg districts). There is no mention of these six macrolichen species in previously published literature (Awasthi & Upreti 1980; Singh 1980; Kumar & Stephen 1997; Nayaka & Upreti 2005; Awasthi 2007; Upreti et al. 2008).

Materials and Methods

The lichen samples were collected from Malnad region comprising Shimoga, Chikmagalur, parts of Hassan and Coorg districts of Karnataka, Western Ghats, from August 2007 to April 2010. They were identified by studying their external and internal morphology following the keys of Awasthi (2007). Colour reaction on the thallus and apothecia were tested by 10% aqueous solution of potassium hydroxide (KOH) (K), Steiner's stable para-phenylenediamine solution - C₆H₈N₂ (PD), and Calcium hypochlorite solution - Ca(ClO)₂ (C). The colour tests were carried out on cortex and medulla of the thallus. Thin layer chromatography (TLC) was done by the concentrated acetone extracts of lichen fragments, separated in solvent system A (Benzene/1-4 dioxane: acetic acid 90:25:4). The colours were noted and spots were marked out, R_f values were noted and calculated. Finally, the lichen substances were identified following the procedures of Orange et al. (2001). Identified lichen specimens are housed at the Herbarium, Department of Botany, Kuvempu University (KU), Shimoga, Karnataka and a set of voucher specimens are deposited at the Herbarium of the National Botanical Research Institute, Lucknow.

Results

Heterodermia albidiflava (Kurok.) D.D. Awasthi (Physciaceae)

Geophytology 3: 113, 1973. = *Anaptychia albidiflava* Kurok., Beih. Nova Hedwigia 6: 42, 1962.

Specimen examined: July 2007, 700m, on bark of tree, Kagemane Giri, Bhadra Wildlife Sanctuary, Chikmagalur District, Karnataka (13°28'00"N & 75°37'30"E), No. KU00054 (Image 1).

H. albidiflava is characterized by foliose thallus, corticated on both sides, upper side grey in colour. It

Date of publication (online): 26 January 2012
Date of publication (print): 26 January 2012
ISSN 0974-7907 (online) | 0974-7893 (print)

Editor: R. Siddappa Setty

Manuscript details:

Ms # o2712
Received 20 February 2011
Final received 22 November 2011
Finally accepted 10 January 2012

Citation: K.S. Vinayaka, S. Nayaka, Y.L. Krishnamurthy & D.K. Upteri (2012). A report on some macrolichens new to Karnataka, India. *Journal of Threatened Taxa* 4(1): 2318–2321.

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Acknowledgements: We are thankful to University Grants Commission, New Delhi for financial support and Chairman, Department of Applied Botany, Kuvempu University for providing laboratory facilities. We also thank the Karnataka Forest Department, Bengaluru for their kind permission to access the forests.

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is close to *H. firmula* but distinguished by saxicolous, lacking isidia and soredia, yellow medulla which turns red with potassium and deep yellow with paraphenyldiamine. It is endemic to India (Awasthi 2007), distributed in tropical to sub-temperate regions in Himachal Pradesh, Madhya Pradesh, Sikkim and West Bengal hills. Its first occurrence in the Western Ghats of Karnataka, was found on the bark of trees in the moist deciduous forests.

Spot tests: Medulla K⁺ red (when potassium hydroxide applied to medulla it gives positive test as red colour), C⁻, P⁺ yellow (When para-phenylenediamine applied to medulla it gives yellow colour as positive test and Calcium hypochlorite as negative test). Zeorin present in TLC.

***Heterodermia microphylla* (Kurok.) Skorepa** (Physciaceae)

Bryologist 75: 490, 1972. = *Anaptychia hypoleuca* var. *microphylla* Kurok., J. Jap. Bot. 34: 123, 1959.

Specimen examined: June 2007, on rocks, Sringeri Taluk, Chikmagalur District, Karnataka (13°24'95"N & 75°15'30"E), No. KU00436 (Image 2).

H. microphylla is characterized by foliose thallus, corticated only on the upper surface, densely lobulate along the margin and containing Salazinic acid in medulla. In India it is earlier reported from temperate regions of Sikkim and Uttarakhand (Singh & Sinha 2010). It is new to the Western Ghats of Karnataka, found growing on rocks.

Spot tests: Medulla K⁺ yellow, C⁻, P⁻. Zeorin present in TLC.

***Ramalina* cfr. *taitensis* Nyl.** (Ramalinaceae)

Bull. Soc. Linn. Normand., ser 2, 4: 119, 1870.

Specimen examined: August 2007, 725m, on bark of *Ziziphus xylopyrus*, Sagar, Sagar Taluk, Shimoga District, Karnataka (13°08'03"N & 75°06'36"E), No. KU00457 (Image 3).

R. taitensis is characterized by fruticose thallus, flattened, greenish-yellow to yellowish-brown in colour, marinal to laminal dense soredia, cracked chondroid tissue, solid medulla with Sekikaic acid aggregate. It is a tropical to lower temperate species, rare in occurrence, reported from Insula Tahiti (French Polynesia) and in India it is known from Sikkim and West Bengal hills (Singh & Sinha 2010). It is new to Karnataka, found growing on the bark of trees in deciduous forests.

Spot tests: Medulla K⁻, C⁻, P⁻. Sekikaic acid

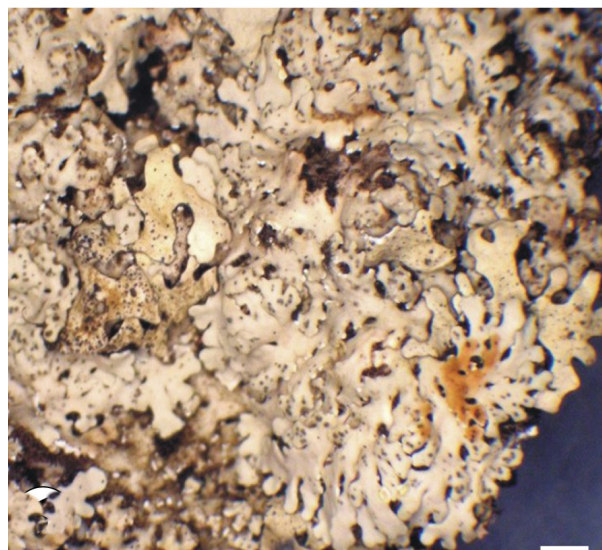


Image 1. *Heterodermia albidiflava* (Kurok.) D.D. Awasthi (Physciaceae). Scale - 0.5cm

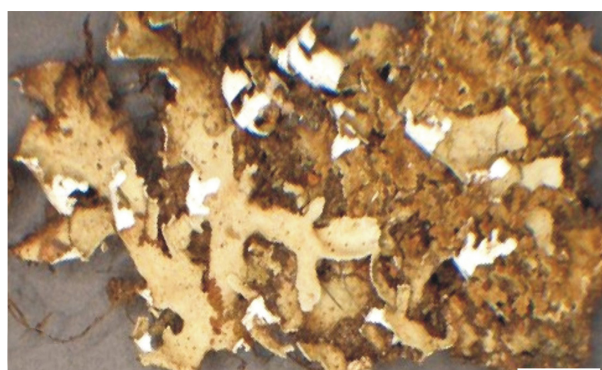


Image 2. *Heterodermia microphylla* (Kurok.) Skorepa (Physciaceae). Scale - 1cm



Image 3. *Ramalina* cfr. *taitensis* Nyl. (Ramalinaceae). Scale - 1cm

present in TLC.

***Usnea aciculifera* Vain. (Parmeliaceae)**

Bot. Mag. Tokyo. 35: 45, 1921.

Specimen examined: November 2008, 698m, deciduous forest, on tree bark, Anadapura, Shimoga Taluk, Shimoga District, Karnataka, (14°05'78"N & 75°17'62"E), No. KU00341 (Image 4).

U. aciculifera is characterized by fruticose thallus, pendulous, yellowish-brown in colour, dichotomous to subsympodial convergent branches, smooth to verrucose-isidiate, annularly cracked, solid central axis, palisade like cortex. It is subtropical to lower temperate in distribution, known from Nepal, China and Japan. In India it is reported from Assam, Nagaland, Sikkim, Uttaranchal and West Bengal hills (Singh & Sinha 2010). It is new to Western Ghats of Karnataka, rare in occurrence and found growing on tree bark.

Spot tests: Medulla K+ yellow, C-, P+ yellow. Stictic acid and Constictic acids present in TLC.

***Usnea eumitrioides* Mot. (Parmeliaceae)**

Pars. Syst.:322.936-38, 1986.

Specimen examined: October 2007, 720m, on tree bark, deciduous forest, near Tupur, Anadapura, Shimoga Taluk, Shimoga District, Karnataka (14°04'52"N & 75°19'91"E), No. KU00322 (Image 5).

U. eumitrioides is characterized by fruticose thallus, erect, yellowish-brown to olivaceous brown in colour, dichotomous to subsympodial branching, branches divergent, curved, non articulate and non inflated, isidiate, isidia whitish in colour, solid central axis with stictic acid complex as secondary metabolite. It is temperate in distribution, known from China and Indonesia. In India it is reported from Indian Himalayas, Uttaranchal, Sikkim and West Bengal hills (Awasthi 1988). It is new to Western Ghats of Karnataka found growing on tree trunks.

Spot tests: Medulla K+ red, C-, P+ yellow. Stictic acid complex present in TLC.

***Usnea sinensis* Mot. (Parmeliaceae)**

Pars. Syst.:248, 1936-38

Specimen examined: June 2007, 785m, on toddy palm tree, Muthodi, Chikmagalur District, Karnataka (13°26'54"N & 75°38'68"E), No. KU00337 (Image 6).

U. sinensis is characterized by fruticose, erect thallus, greenish-yellow to yellowish-brown in



Image 4. *Usnea aciculifera* Vain. (Parmeliaceae). Scale - 0.5cm



Image 5. *Usnea eumitrioides* Mot. (Parmeliaceae). Scale - 1cm



Image 6. *Usnea sinensis* Mot. (Parmeliaceae). Scale - 0.5cm

colour, subdichotomous to sympodial branching with papillate, verrucose-pseudocyphellate surface, double layered cortex, solid, colourless central axis, apical apothecia with ciliate margin. It is a new record for Western Ghats and Karnataka, found growing on toddy palm bark.

Spot tests: Medulla K-, C-, P-. No lichen substance present in TLC.

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