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Cover: Pseudo-flying animals and wind-dependent seed & spore dispersers – made with digital painting in Krita. © Melito Prinson Pinto



NOTE

New record of an usneoied lichen *Usnea hirta* (L.) Weber ex F.H.Wigg. from India

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Lichens are the first members of the barren rocky regions to colonize and are good forest health indicators in the tropical forest regions of the world. Western Himalaya and Western Ghats are lichen hotspots in the country (Upreti et al. 2005). *Usnea* is one the largest fruticose genera of lichen forming fungi around the world within the family Parmeliaceae (Lucking et al. 2016). The genus *Usnea* is widely distributed in tropical and subtropical regions of the world (Stevens 2004; Clerc 2006; Galloway 2007; Hinds & Hinds 2007; Herrera 2016; Ohmura et al. 2017). Among the usneoied lichens, the genus *Usnea* was segregated into five subgenera (Motyka 1938). About 300 *Usnea* species were reported from all over the world Ohmura (2012) and 57 species are known from India (Shukla et al. 2014). *Usnea* species which are primarily saxicolous have restricted distribution patterns compared to corticolous species (Clerc & Herrera-Campos 1997). The genus *Usnea* can be described by fruticose thallus with cartilaginous central axis. The species of *Usnea* are differentiated on the basis of pigmentation on cortex and medulla, branching types, density of branches, and different morphological parts.

The present study is based on the lichens collected from different parts of Karnataka during 2008–2020.

The lichens were collected from different altitudes and all types of substrata such as barks, twigs, and rocks. The collected samples were taken to the laboratory, air dried, and stored in the lichen herbarium of Kumadvathi First Grade College and Sri Venkataramana Swamy College, Karnataka. The voucher specimen was submitted to NBRI, Lucknow (LWG). Ecological parameters such as temperature, humidity, altitude, latitude were noted at the place of collection. The morphological characters were noted down. The anatomical characters studied with the help of binocular microscope. The chemical tests (K, C, KC, P, I test, and TLC in solvent system A) were carried out to identify the secondary metabolites present in it (White & James 1985; Orange 2001). The pH of the bark was estimated by the procedure of Kricke (2002) using digital pH meter (Multi-Parameter PTTesr™ 35 Oakton, USA). The identification of *Usnea* was done on the basis of morphological, anatomical, and chemical characters (Awasthi 2007; Ohmura 2012).

Usnea hirta (L.) F.H.Wigg.

Collection: Karnataka, Chikkamagaluru, Mullayanagiri (13.6433°N & 73.9840°E) on the twigs of *Hypericum mysurense* at an altitude of 1,780m. Average temperature

Editor: Anonymity requested.

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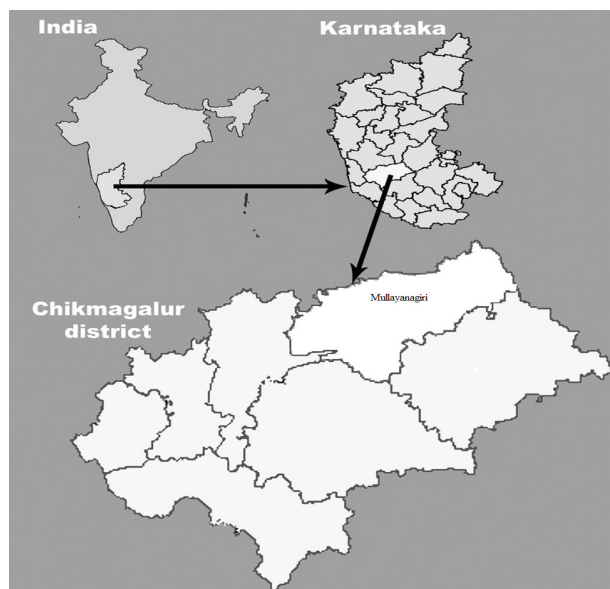


Figure 1. Study locality of *Usnea hirta* in India.

is 24°C and humidity 90–92%.

Voucher No: LHKFGC0015

Description: Thallus fruticose, corticolous, branching sympodial, main branches stiff, segments terete to strongly ridged, thallus erect and shrubby, 5–7cm long, light to dark brown in color, absence of papillae, cortex single layered, central axis solid, pseudocyphellae and soredia absent, isidia present, apothecia not found.

Ecology: Ramicolous, collected from the shola forests of Mullayanagiri on the twigs of *Hypericum mysurense* with smooth bark with pH 6.36±0.3

Chemistry (Colour Test): Medulla K-, P-, I-, C-, KC-

Chemicals: Norstictic acid, usnic acid, and murolic acid

Distribution: Europe, North America (South California, Arizona), Philippines, Australia, eastern Africa, India (Western Ghats).

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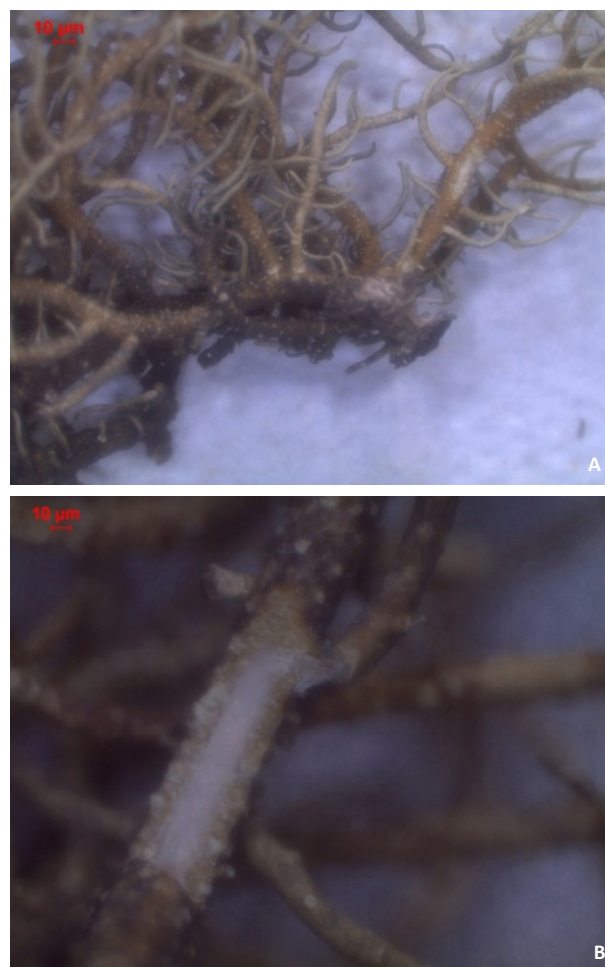


Image 1. A—*Usnea hirta* (L.) Weber ex F.H.Wigg. | B—thallus section (scale =10 µm). © Vinayaka KS.

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Differences with other *Usnea* species

	Papillae	Isidia	Apothecia	Medulla	Secondary metabolites
<i>U. hirta</i>	-	+	Not found	Dense	Usnic acid and norstictic acid
<i>U. ghattensis</i>	+	-	Terminal	Loose	Only usnic acid

Key to *Usnea* species of Karnataka

1. Central axis solid 2
2. a. Thallus dichotomously branched up to the apices.....3
- b. Thallus sympodially branched 4
3. Thallus surface with annular, irregular cracks and dot like to linear pseudocyphellae ***U. rigidula***
4. Branching sympodial or subsympodial, with secondary branches, thallus erect bushy 5
5. a. Thallus with pseudocyphellae 6
- b. Thallus lacking pseudocyphellae and red pigment absent 10
6. a. Thallus pseudocyphellate, isidiate but lacking soredia ... 7
- b. Thallus pseudocyphellate lacking both soredia and isidia. 9
7. Cortex single layered and much branched 8
8. a. Thallus surface tuberculate, lacking papillae, five different chemical strains present ***U. undulata***
- b. Central axis thick, medulla compact and thin ***U. hirta***
9. Cortex single layered, lacking tubercles, medulla K-, thallus stiff, lateral branches dense, apically blackish ***U. ghattensis***
10. a. Thallus with apothecia 11
- b. Thallus lacking apothecia 16
11. Lacking soredia and isidia, cortex single layered 12
12. a. Thallus surface papillate and tuberculate 13
- b. Thallus surface lacking papilla and tubercule 14
13. Thallus yellow to yellowish brown, branches somewhat inflated, medulla K+ red ***U. orientalis***
14. Thallus large, not sub subcoralloid, central axis circular in cross section 15
15. Lateral spinules and fibrils rigid, dense, ± uniform in length ***U. luridorufa***
16. Medulla K+ red (norstictic/salazinic acid) 17
17. Thallus both isidiate and sorediate, inflated in apical region, smooth to maculate, stictic acid complex in medulla ***U. leucospilodea***



Image 2. TLC of *Usnea hirta*. 1—*Parmelinella wallichiana* | 2—*Usnea ghattensis* | 3—*U.hirta*)

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