



Heterodermia upretii, a new species from India (Physciaceae, Ascomycota)

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Abstract

Taxonomic studies on the lichen genus *Heterodermia* in India revealed a hitherto unknown species, which is here described as new: *H. upretii* Y. Joshi, S. Upadhyay & K. Chandra. It is characterized by a grayish, ±pruinose thallus, corticated lower surface, yellowish-orange P+ red medulla and *Polyblastidium*-type ascospores with sporoblastidia. The species is reported from temperate regions of Champawat and Pithoragarh districts of Kumaun Himalaya and was found colonizing rocks, barks and twigs of various trees. Description and figures are provided and the new taxon is compared with similar *Heterodermia* species.

Key words: Chemistry, Kumaun Himalaya, Medulla, Sporoblastidia, Uttarakhand

Introduction

The cosmopolitan genus *Heterodermia* (Physciaceae) was described by Trevisan (1868: 613), and at present comprises ca. 100 species (Elix 2011: 1). It is most diverse in warm-temperate to subtropical and tropical regions, with most taxa occurring in the southern Hemisphere (Elix 2011: 1). Previously, the genus was represented by 43 species in India (Singh & Sinha 2010: 8) colonizing rocks, trees, shrubs, and very rarely soil. Recently Joshi *et al.* (2014: 50) reported a new species from India, increasing the total number to 44.

During field studies in the temperate zone of Kumaun Himalayan Mountains in Uttarakhand state, two of the authors (SU & KC) collected a distinctive fertile *Heterodermia* species colonizing rocks, twigs and bark of deciduous trees, which did not match other *Heterodermia* species. Consequently, it is described here as new to science.

Materials and Methods

The study is based on specimens collected from Banasur Fort (Champawat district) and Dhvaj and Deyrani forests (Pithoragarh district). The specimens are deposited in the herbaria LWG and ALM. Macroscopical examination was carried out using a dissecting microscope (OLYMPUS SZ2-ILST) and microscopical studies of handmade sections were made using a CX21iLEDFS1 microscope with tap water. Spot tests were performed with 10% aqueous solution of potassium hydroxide (K), commercial bleach (C), and *para*-phenylenediamine (P). All measurements were done using sections examined in water. Ascospore measurements are given as (min.–)X–SD–X–X+SD(–max.), where X = mean value and SD = standard deviation. Total numbers of measurements (n) are given in parentheses. Thin layer chromatography (TLC) was carried out on all specimens of the new species following Orange *et al.* (2001) using solvent system C.

Results

Heterodermia upretii Y. Joshi, S. Upadhyay & K. Chandra, *sp. nov.* (Fig. 1a)

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corticated lower surface and yellow medulla, include *H. firmula* (Nyl.) Trevis. (1868: 615), *H. himalayana* Y. Joshi, K. Chandra & M. Tripathi (2014: 50), and *H. rugulosa* (Kurok.) Trass (1992: 19), but those differ in chemistry. *Heterodermia firmula* has only atranorin and zeorin, *H. rugulosa* contains leucotylin in addition to atranorin and zeorin, while *H. himalayana* contains 16 β -acetoxyhopane-6 α , 22-diol, 6 α -acetoxyhopane-16 β ,22-diol, dissectic acid and 7-chloroemodin besides atranorin and zeorin.

Other corticated species, such as *H. andina* R. Moberg (2011: 132), *H. coralloidea* Elix (2011: 12), *H. granulifera* (Ach.) W.L. Culb. (1966: 482), *H. isidiophorella* Elix (2011: 13), *H. koyanoides* Elix (2011: 14), *H. lepidota* Swinscow & Krog (1976: 122), *H. pseudospeciosa* (Kurok.) W.L. Culb. (1966: 484), *H. speciosa* (Wulfen) Trevis. (1868: 614) and *H. tremulans* (Müll. Arg.) W.L. Culb. (1967: 485) can easily be distinguished by the presence of vegetative propagules such as phyllidia, isidia or soredia, which are not found in the new species.

Heterodermia flavosquamosa, a species showing a P+ red reaction of the medulla differs in having a yellowish gray thallus with ecorticated lower surface, C+ red medulla, and different chemistry (atranorin, an unidentified anthraquinone, zeorin and several unknown terpenoids).

Specimens examined:—INDIA. Uttarakhand: Champawat distr., Banasur Fort, 29°24'N, 80°05'E, alt. 1817 m, 15 December 2013, *Krishna Chandra 259* (ALM); Pithoragarh distr., Kanalichina Block, Kanalichina, Dhvaj forest, 29°40'N, 80°17'E, alt. 1865 m, 15 March 2014, *Shashi Upadhyay 505* (ALM); 29°39'N, 80°17'E, alt. 1900 m, 12 March 2014, *Shashi Upadhyay 506* (ALM); alt. 1920-2005, 13 March 2014, *Shashi Upadhyay 508* (ALM); Deyrani forest, alt. 1600 m, 14 March 2014, *Shashi Upadhyay 507* (ALM).

Key to corticated *Heterodermia* species lacking vegetative propagules

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|----|---|-----------------------|
| 1. | Medulla yellow to yellowish-orange | 2 |
| - | Medulla white | 4 |
| 2. | Spores of <i>Pachysporaria</i> -type; medulla P– or P+ yellow | 3 |
| - | Spores of <i>Polyblastidia</i> -type; medulla P+ red | <i>H. upretii</i> |
| 3. | Medulla P–; containing leucotylin | <i>H. rugulosa</i> |
| - | Medulla P+ yellow; lacking leucotylin | <i>H. firmula</i> |
| 4. | Dissectic acid present in the medulla | 5 |
| - | Dissectic acid absent in the medulla | 6 |
| 5. | Norstictic acid present in the medulla; widely distributed in Asia, Australia | <i>H. angustiloba</i> |
| - | Norstictic acid absent; endemic to Australia | <i>H. verdonii</i> |
| 6. | Salazinic acid absent in the medulla | <i>H. diademata</i> |
| - | Salazinic acid present in the medulla | 7 |
| 7. | Paleotropical; medulla P+ yellow | <i>H. rubescens</i> |
| - | Neotropical; medulla P+ orange | <i>H. tropica</i> |

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