

A NEW SPECIES OF *LEIORREUMA* (ASCOMYCOTA, OSTROPALES) FROM GREAT NICOBAR ISLAND, INDIA

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Abstract

Leiorreuma nicobarense Pushpi Singh, Jagadeesh and Kr. P. Singh, a new species from Great Nicobar Island, India is described and illustrated. It is characterized by its sessile lirellae with widely exposed densely whitish pruinose disc, interspersed hymenium, 8-spored asci with 6-locular ascospores and presence of stictic, constictic and hypostictic acids. Key to species occurring in India is provided.

Introduction

Introduction

Great Nicobar Island, the largest island of the Nicobar group, about 145 km north of Sumatra and about 1,300 km south-east of the Indian mainland covering a geographical area of 1044 sq. km and a part of the Sundaland biodiversity hotspot (Mittermeier *et al.*, 2005) is situated between 6.45°N and 7.15°N, 93.37°E and 93.56°E and forms the southernmost point of India. It offers congenial habitats for the luxuriant and rich growth of crustose lichen biota because of the tropical evergreen coastal and mangrove forests, always in contact with moisture laden sea winds and high annual rain fall (over 3000-3500 mm) and humidity. While studying some collections of lichens made by Botanical Survey of India team from the island under revisionary studies of Indian Graphidiod Graphidaceae, an interesting species of *Leiorreuma* Eschw. as new to science was discovered. The genus is characterized by its immersed to sessile lirellae with opened disc, basally well-developed laterally often thin carbonized exciple, interspersed hymenium with brown, transversely septate or muriform ascospores and presence of stictic, hypostictic or norotatic acids or absence of lichen compounds. The genus is represented by *c.* 18 species (Staiger, 2002; Archer, 2006; Lendemer, 2008; Lendemer *et al.*, 2009; Moon *et al.*, 2008; Dubey *et al.*, 2010; Poengsungnoen *et al.*, 2014; Wang *et al.*, 2015) in the world, of which 3 species (Singh and Sinha, 2010; Dubey *et al.* 2010) occur in India. In the present communication, a new species *Leiorreuma nicobarense* is described together with a key of all species known so far, from Indian territories to facilitate their identification.

Material and Methods

Specimens collected from Nicobar Islands, deposited in PBL herbarium were examined morphologically, anatomically and chemically. Morphological characters of thallus, reproductive structures, colour, size and shapes were examined under stereomicroscope (NIKON SMZ 1500). Thin hand-cut sections of thalli and ascomata were mounted in water and KOH and examined under a compound microscope (Nikon Eclipse 50i). All anatomical measurements were made in water mounts. Ascospores were stained with Lugol's solution to check the amyloid reaction.

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Secondary metabolites were identified by thin-layer chromatography (TLC) following standard procedures (Orange *et al.*, 2001).

Results

Leiorreuma nicobarense Pushpi Singh, Jagadeesh and Kr. P. Singh **sp. nov.** (Fig. 1A-D)

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Diagnosis: The new species *Leiorreuma nicobarense* differs from *L. exaltatum* (Mont. & Bosch) Staiger and *L. taiwanense* M. Nakan., Kashiw. & K.H. Moon in chemistry, from *L. melanostalazans* in sessile lirellae, constantly 6-locular ascospores and presence of constictic and hypostictic acids.

Type: India, Andaman and Nicobar Islands, Great Nicobar Island, North South road, Sastri Nagar, 6°48'39.6" N and 93° 53'27.7" E, alt. 15 m, on the bark of *Artocarpous lakoocha*, 09 February 2014, K. P. Singh and T.A.M. Jagadeesh Ram 2978 (Holotype: PBL).

Thallus crustose, corticolous, irregular, pale fawn to greyish fawn, continuous, glossy, smooth to wrinkled, 6–7 cm across, 75–100 µm thick; *prothallus* indistinct; photobiont green, *Trentepohlia*, algal cells 8–10 µm across.

Ascomata lirelliform, numerous, sessile, elongate, sparsely branched, straight to irregularly curved or flexuous, 2–8 mm long, 0.3–0.7(–1) mm broad, rounded at the ends, covered laterally by thick thalline margin; *disc* widely exposed, concave to flattened, brownish-black, heavily whitish pruinose; *labia* divergent, entire; *exciple* completely carbonized, basally 100–180 µm thick, lateral exciple typically surrounded by large calcium oxalate crystals; *epihymenium* dark brown, granulose, 9–14 µm thick; *hymenium* hyaline, interspersed, 80–130 µm high, I–; *paraphyses* simple, c. 1.5 µm thick; *asci* 8-spored, cylindrical, 64–100 × 10–20 µm; *ascospores* brown, oblong to fusiform, transversely septate with constantly 6-locular (mature ones), 18–25 × 6–7.2 µm (n=25), I+ reddish-brown.

Etymology: The specific epithet refers to its inventory from the Nicobar Island.

Chemistry: Thallus K + yellow, C–, KC–, P– and UV–; TLC: constictic, stictic, (major), hypostictic (trace) acids.

Distribution and habitat: *Leiorreuma nicobarense* is known so far, from habitation area seashore in Great Nicobar Island of the Nicobar Islands, part of the Sundaland biodiversity hotspot. It grows in shady and open place on the trunk of cultivated *Artocarpous lakoocha* and can be spotted easily by its large, sessile and broad lirellae with whitish pruinose disc.

Notes: The new species is characterized by its distinct sessile lirellae, covered laterally by thick thalline margin with widely exposed densely whitish pruinose disc; interspersed hymenium; 8-spored asci; ascospores constantly 6-locular (18–25 µm long) and presence of constictic, stictic and hypostictic acids. In morphology and anatomy, it closely resembles *Leiorreuma taiwanense* M. Nakan., Kashiw. & K.H. Moon which contains hypoprotocetraric and 4'-O-demethyl-notatic acids (Moon *et al.*, 2008). Morphologically, it also closely resembles *Leiorreuma exaltatum* (Mont. & Bosch) Staiger and *L. subpatellulum* Dubey, Upreti & Nayaka but later species differ in having 6–8-locular, 20–34 µm long (Staiger, 2002) and 7–13-locular, 40–46 µm long (Dubey *et al.*, 2010) ascospores respectively and absence of lichen substances. In chemistry, it also closely resembles *Leiorreuma melanostalazans* (Leight.) A.W. Archer, which contains immersed lirellae, epruinose to finely pruinose disc, 8–9-locular, larger (25–37 × 8–10 µm) ascospores and absence of constictic and hypostictic acids (Archer, 2006).

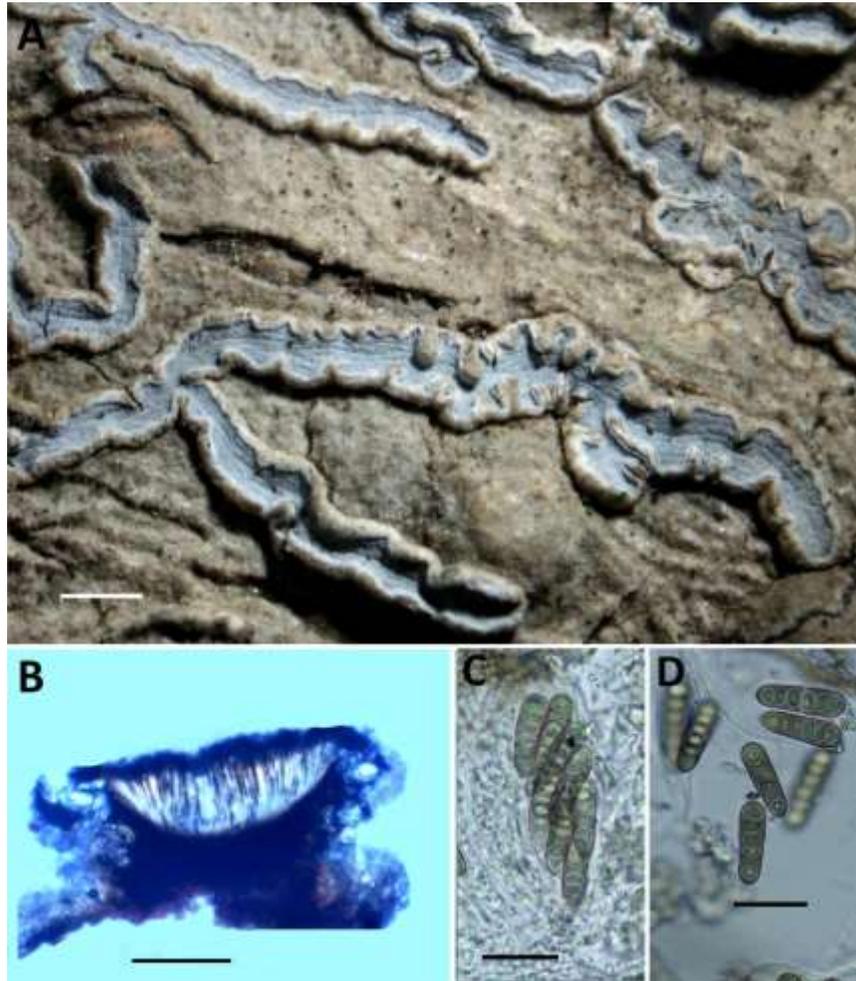


Fig. 1. A-D. *Leiorreuma nicobarense*. A. Habit; B. Cross section of apothecium, C-D. Ascospores. Scale bars: A=1 mm; B=200 μ m; C-D=20 μ m.

Key to the Indian species of *Leiorreuma*

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|---|---------------------------|
| 1. Ascospores 6-locular; lirellae sessile; constictic, stictic and hypostictic acids present; ascospores 18–25 \times 6–7.2 μ m | <i>L. nicobarense</i> |
| - Ascospores more than 6-locular | 2 |
| 2. Stictic acid present; lirellae immersed in the thallus; ascospores 8–9-locular, 25–37 \times 8–10 μ m | <i>L. melanostalazans</i> |
| - Lichen substances absent; lirellae erumpent to prominent | 3 |
| 3. Ascospores 6–8 locular, 20–34 \times 6–9 μ m | <i>L. exaltatum</i> |
| - Ascospores 7–13 locular, 40–46 \times 8–10 μ m | <i>L. subpatellulum</i> |

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