

A new isidiate species of *Hemithecium* Trevis. (Ascomycota, Graphidaceae) from India

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Abstract: *Hemithecium isidiatum* from the Eastern Himalayas is described as new to science. It is the first isidiate species in the genus *Hemithecium* and is otherwise characterized by hyaline muriform ascospores and the presence of salazinic acid.

Keywords: Arunachal Pradesh, Eastern Himalayas, lichenized fungi, taxonomy

Introduction

The lichen family *Graphidaceae* has recently been rearranged, with new genera described, some older genera resurrected, and existing genera redefined (Staiger & Kalb 1999; Staiger 2002; Kalb *et al.* 2004; Lücking 2007; Lücking *et al.* 2008). As a result the family is now represented by 24 genera (Lücking 2009). Staiger (2002) reintroduced the genus *Hemithecium* Trevis., which is distinguished by its well-developed, convergent labia, non-carbonized and often distinctly crenate exciple with internal striae, concealed disc and a puffy swollen lateral exciple that reacts reddish brown or brown in iodine.

The lichen genus *Hemithecium* is represented by 44 species worldwide, of which 24 species occur in India (Singh & Sinha 2010). Several new species and combinations of *Hemithecium* have been established based on material from India (Adawadkar & Makhija 2005; Makhija & Adawadkar 2005; Makhija *et al.* 2005; Tewari & Upreti 2007; Chitale *et al.* 2009; Singh & Swarnalatha 2009). While studying the lichens of West Siang district, Arunachal Pradesh in north-east India, an isidiate species of *Hemithecium* was found growing in association with *Graphis scripta* (L.) Ach., *Sarcographa laby-*

rinthica (Ach.) Müll. Arg., *Phaeographis dentritica* (Ach.) Müll. Arg. and pyrenocarpous lichens. It is described here as a new species. So far, the only other graphidacean species reported from India having isidiate thalli are *Graphis patwardhanii* Kulkarni and *Graphis isidiza* Adawadkar & Makhija (Kulkarni 1977; Adawadkar & Makhija 2004).

Materials and Methods

Hand-cut sections of ascomata were mounted in water, 10% KOH solution, Lugol's iodine and lactophenol Cotton Blue (LB) and examined with a binocular Digizoom Stereo microscope and NIKON ECLIPSE E400. All the measurements were made on material mounted in water. The lichen substances were identified by thin-layer chromatography following Orange *et al.* (2001).

The New Species

Hemithecium isidiatum Upreti & U. Dubey sp. nov.

Mycobank No.: 561209

Similis *Hemithecium salacilabiatum* praesentia acidum salazinicum sed differet isidiato thallo et ascosporis majoribus.

Typus: India, Arunachal Pradesh, West Siang district, Kago-kashi forest, near kabu village, Along, on bark, 20 March 2006, *Urvashi Dubey* 06-006525 (LWG—holotypus).

(Fig. 1)

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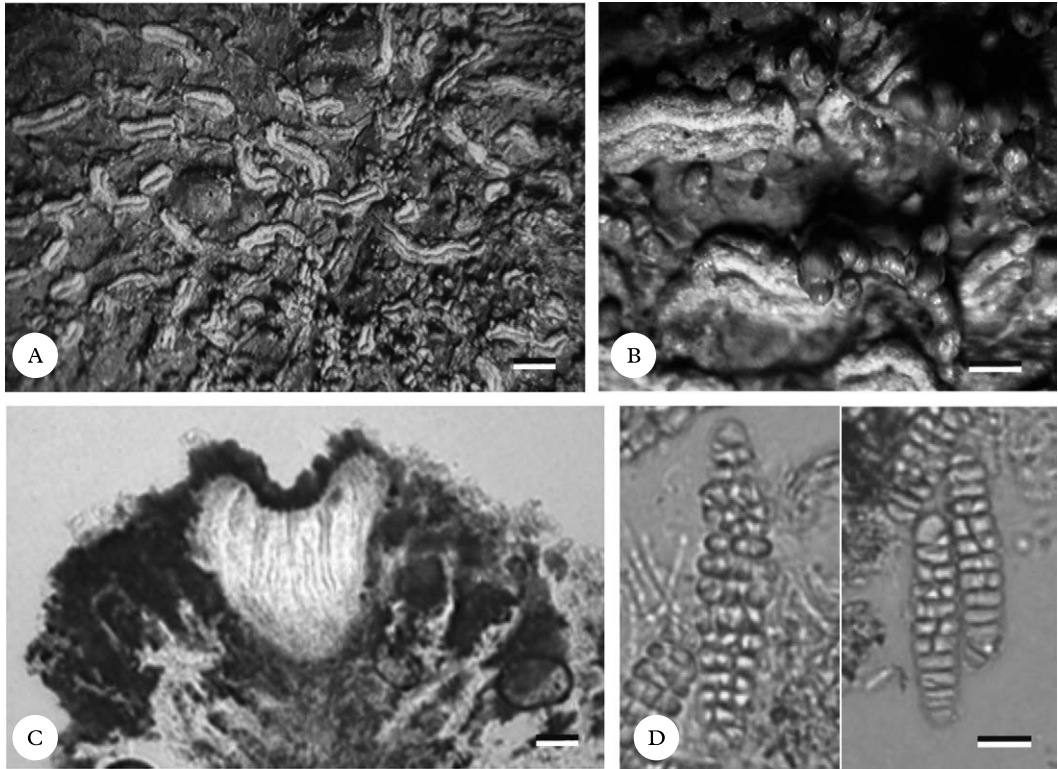


FIG. 1. *Hemithecium isidiatum*. A, habit; B, coralloid isidia; C, vertical section of lirellae; D, ascospores. Scales: A = 1 mm, B = 0.5 mm, C = 20 μ m, D = 5 μ m.

Thallus corticolous, crustose, epidermal, greenish grey to grey, sometimes greyish brown to pale brown, smooth and thick, *isidia* simple to coralloid branched, 0.2–0.4 mm diam. and 0.3–1.0 mm high, spread over the thallus, concolorous, easily detachable.

Apothecia lirellate, lirellae greyish white to grey, prominent, emergent, mostly simple, rarely branched, curved to flexuous, 1–4 mm long and 0.25–0.5 mm broad, ends obtuse, margin thick and covered by a thalline layer. *Disc* \pm closed, slit-like, epruinose. *Exciple* non-carbonized, colourless to pale yellowish brown, basal region narrow and upper region wide with several striae; labia convergent entire, irregular on outer side, covered with thalline veil up to the top, crystals present above the exciple. *Epihymenium* dark brown, 6–9 μ m high. *Hymenium* hyaline, not in-spersed, 80–120 μ m high. *Hypothecium* pale

yellow to yellow, 14–18 μ m high. *Asci* 4–8 spored, 45–77 long and 13–20 μ m broad. *Ascospores* oblong-ellipsoid, hyaline, muriform, with 6–17 transverse septa and 1–5 longitudinal septa, 14–27(–35) \times 6–8 μ m, I+ blue.

Chemistry. Salazinic acid present in the thallus.

Etymology. The epithet is a reference to the presence of isidia, which are not known from other species of *Hemithecium*.

Ecology and distribution. The species is known from semi-evergreen forests, between altitudes of 250–500 m, West Siang District in Arunachal Pradesh, Eastern Himalayas. The new taxon grows mostly on smooth-barked trees in moist and humid places. Other species of lichens associated with the

new species are *Sarcographa labyrinthica* (Ach.) Müll. Arg., *Phaeographis dendritica* (Ach.) Müll. Arg. and other members of the graphideon and pyrenocarpous lichens.

Remarks. In morphology of the lirellae and presence of isidia the new taxon may be confused with *Platythecium dimorphodes* (Nyl.) Staiger. However *P. dimorphodes* has 4-septate to submuriform small ascospores measuring 9–16 × 5–8 µm and the presence of norstictic and connorstictic acid in the thallus. The new taxon is distinguished from other species of the genus by having an isidiate thallus. In ascospore size and shape it is close to *H. microspermum* Chitale, Makhija & B. O. Sharma, but *H. microspermum* differs in having non-striate or weakly striate exciple and a different chemistry, having constictic, hyposalazinic, norstictic and stictic acids. Similar to the new taxon is *H. salacilabiatum* (Patw. & Kulk.) Chitale & Makhija, which also has salazinic acid but differs in having larger spores, measuring 130–200 × 35–60 µm, and in lacking isidia.

Additional specimens examined. **India:** Arunachal Pradesh: West Siang district, Kago-kashi forest, near kabu village, Along, on bark, 2006, *Urvashi Dubey* 06-006508, 06-006538, 06-006534 (LWG); Doji, 16 km from Along towards Basar, on bark, 2006, *Urvashi Dubey* 06-006391, 006361, 006376 (LWG).

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REFERENCES

- Adawadkar, B. & Makhija, U. (2004) A new isidiate species of *Graphis* from India. *Lichenologist* **36**: 361–363.

- Adawadkar, B. & Makhija, U. (2005) Some trans-septate species of the genera *Hemithecium* and *Platythecium* from India. *Mycotaxon* **92**: 387–394.
- Chitale, G., Makhija, U. & Sharma, B. (2009) New combinations and new species in the lichen genera *Hemithecium* and *Pallidogramme*. *Mycotaxon* **108**: 83–92.
- Kalb, K., Staiger, B. & Elix, J. A. (2004) A monograph of the lichen genus *Diorygma* – a first attempt. *Symbolae Botanicae Upsalienses* **34** (1): 133–181.
- Kulkarni, C. R. (1977) A new species of *Graphis* from Western Ghats, South Western India. *Biovigyanam* **3**: 115–116.
- Lücking, R. (2007) *Kalbographa*: monografie einer unerkannten flechtengattung. *Bibliotheca Lichenologica* **96**: 185–192.
- Lücking, R. (2009) The taxonomy of the genus *Graphis sensu* Staiger (Ascomycota: Ostropales: Graphidaceae). *Lichenologist* **41**: 319–362.
- Lücking, R., Chaves, J. L., Sipman, H. J. M., Umaña, L. & Aptroot, A. (2008) A first assessment of the Ticolichen biodiversity inventory in Costa Rica: the genus *Graphis*, with notes on the genus *Hemithecium* (Ascomycota: Ostropales: Graphidaceae). *Fieldiana (Botany), New Series* **46**: 1–131.
- Makhija, U. & Adawadkar, B. (2005) Some additions to the *Graphidaceae* in the Andaman Islands, India. *Mycotaxon* **91**: 347–352.
- Makhija, U., Dube, A., Adawadkar, B. & Chitale, G. (2005) Five trans-septate species of *Hemithecium* from India. *Mycotaxon* **93**: 365–372.
- Orange, A., James, P. W. & White, F. J. (2001) *Microchemical Methods for the Identification of Lichens*. London: British Lichen Society.
- Singh, K. P. Sinha, G. P. (2010) *Indian Lichens: an Annotated Checklist*. Kolkata: Botanical Survey of India.
- Singh, K. P. & Swarnalatha, G. (2009) Some new combinations in the lichen family *Graphidaceae*. *Indian Journal of Forestry* **32**: 179–180.
- Staiger, B. (2002) Die Flechtenfamilie Graphidaceae. Studien in Richtung einer natürlicheren Gliederung. *Bibliotheca Lichenologica* **85**: 1–526
- Staiger, B. & Kalb, K. (1999) *Acanthothecis* and other graphidioid lichens with warty periphysoids and paraphysis-tips. *Mycotaxon* **73**: 69–134.
- Tewari, V. & Upreti, D. K. (2007) A new record of lichen genus *Hemithecium* Trevis. (*Graphidaceae*) from India. *Annals of Forestry* **15**: 145–147.

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