

Two novel species of *Neosporidesmium* from India

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Abstract. Two novel species of the asexual ascomycete genus *Neosporidesmium* are described as *N. garoense* and *N. khasianum* from Garo and Khasi Hills of Meghalaya, India, respectively. *Neosporidesmium garoense* growing on bamboo litter is distinguished from closely related species by the larger size of synnema and smaller conidia. *Neosporidesmium khasianum* growing on litter of the tree *Wightia speciosissima* is distinguished by the size of conidia, the presence of multiple proliferations and the size of synnema.

Key words: *Ascomycota*, asexual morphs, Garo-Khasi hills, India, Meghalaya, *Neosporidesmium*, new species, synnemata, taxonomy

Introduction

During routine field explorations in Garo and Khasi hills in Meghalaya, Northeast India, we collected two interesting species of synnematous fungi, one on bamboo litter and another one on dead twigs of the tree *Wightia speciosissima*. Both fungi resembled the genus *Neosporidesmium* introduced by Mercado & Mena in 1988 with *N. maestrense* to accommodate synnematous hyphomycetes characterized by having percurrently proliferating conidiogenous cells forming distinctly swollen subsequent cells and scolecosporous, distoseptate conidia. This genus currently comprises 13 species (Index Fungorum). The two new Indian fungi were found to be distinct upon comparison with all known taxa of *Neosporidesmium*, hence novel species are described in this paper.

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Materials and methods

Freshly gathered aerial litter samples were taken to the laboratory in zip-lock polythene bags and examined under a stereomicroscope. Synnemata were carefully picked up with a sterile needle, mounted in lactophenol and observed under a light microscope. The holotypes were deposited in the herbarium of the Indian Agricultural Research Institute, New Delhi, India (HCIO). Repeated attempts to get these fungi in culture using single spore isolation methods were not successful.

Taxonomy

Neosporidesmium garoense J. Pratibha & Prabhug., sp. nov.

Fig. 1

Mycobank, MB 824922

Colonies on the natural substrate effuse, hairy, dark brown to black. Mycelium partly immersed, partly superficial, composed of dark brown to black, septate, branched, 3–5 µm wide hyphae. Conidiomata macronematous, synnematous. Synnemata solitary, erect, straight, indeterminate, scattered, cylindrical, becoming narrower toward the apex, 700–1620 µm long, 50–65 µm wide at the base, 25–50 µm wide in the middle. Conidiophores straight, 4–8 µm wide, septate, unbranched, smooth, brown to dark brown. Conidiogenous cells monoblastic, integrated, terminal, short subcylindrical, doliiform, determinate, smooth, dark brown, 12–20 × 8–10 µm, splay out laterally over the whole or at least large portion of the synnemata. Conidia solitary, dry, acrogenous, obclavate, 11–13-distoseptate, smooth, pale brown, truncate at the base, 75–100 × 8–11 µm; apical cell hyaline with a globose, hyaline, 10–12 µm diam. mucilaginous sheath.

Type – INDIA, Meghalaya, Garo hills, Baghmara, on dead culms of *Bambusa* sp., 29 September 2017, 25°12'19.06" N, 90°39'06.02" E, J. Pratibha (**holotype**, HCIO 52164; isotype BF-99, ASSAM).

Etymology: the epithet refers to Garo hills, Meghalaya, the type locality.

Distribution: so far only known from the type locality.

Habitat and host plant: on a dead culm of *Bambusa* sp.

Neosporidesmium khasianum Prabhug. & J. Pratibha, sp. nov.

Fig. 2

Mycobank, MB 824923

Colonies on the natural substrate effuse, hairy, dark brown to black. Mycelium partly immersed, partly superficial, composed of dark brown to black, septate, branched, 3–5 µm wide hyphae. Conidiomata macronematous, synnematous. Synnemata solitary, erect, dark brown to black, cylindrical, slightly narrower towards the apex, 855–2750 µm long, 50–60 µm wide at the base, 40–50 µm wide in the middle. Conidiophores, unbranched, 4–7.5 µm wide, septate, smooth, brown to dark brown. Conidiogenous cells monoblastic, integrated, terminal, doliiform, smooth, brown to dark brown, 15–20 × 6–10 µm, with 1–5 percurrent proliferations, with constrictions (monilioid), spread along the two-third of the synnemata. Conidia holoblastic, solitary, dry, acrogenous, obclavate, 10–12-distoseptate, smooth, brown, apex obtuse, paler, base truncate, darkened, 103–135 × 10–18 µm.

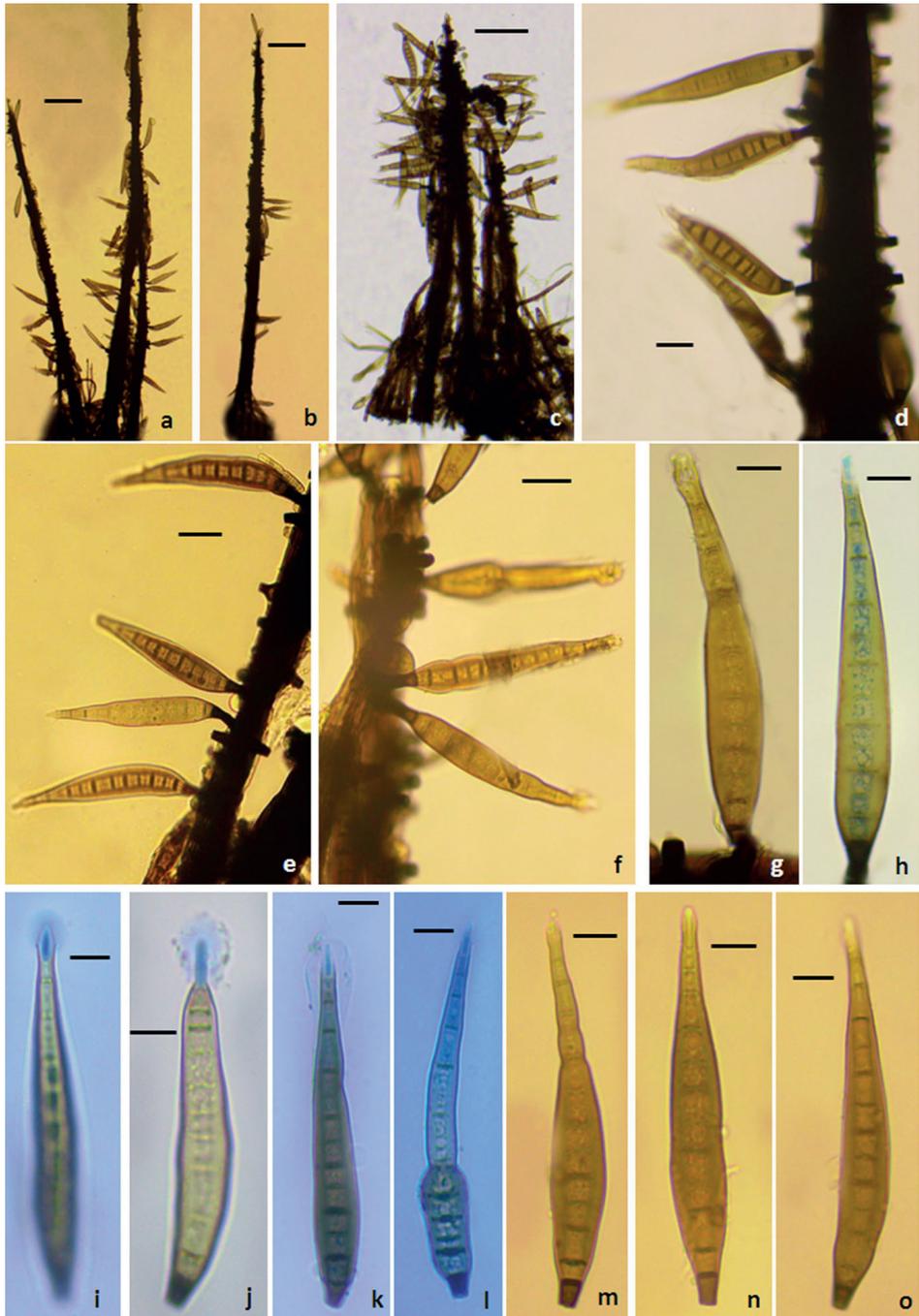


Fig. 1. *Neosporidesmium garoense*: a–c – synnema, d–h – conidiogenous cells and conidia, i–o – conidia. Scale bars: a–c = 100 μm , d–f = 20 μm , g–o = 10 μm

Type – INDIA, Meghalaya, East Khasi Hills, forest patch Near Puriang village, on litter of the tree *Wightia speciosissima*, 13 August 2017, 25°33'07.35" N, 92°04'25.10" E, 1280 m, A. Prabhugaonkar (**holotype**, HCIO 52162; isotype AVP-154, ASSAM).

Etymology: the epithet refers to Khasi hills, Meghalaya, the type locality.

Distribution: so far only known from the type locality.

Habitat and host plant: hanging twig litter of *Wightia speciosissima*.

Discussion

Two recent papers on the genus *Neosporidesmium* (Prasher & Verma 2015; Mel'nik et al. 2016) provide detail reviews of the genus and keys to the species. These taxonomic treatments paved the way for further studies on this comparatively recently discovered genus. The new species *N. garoense* is similar to *N. diaoluoshanense* (Li et al. 2015), the only other species with conidia provided with a spherical apical mucilagenous sheath, but differs in having much longer synnemata and smaller conidia. In *N. diaoluoshanense* the synnemata are up to 605 µm long and the conidia are 105–135 µm long, whereas in *N. garoense* synnemata are 700–1620 µm long and the conidia are 75–100 µm long.

N. khasianum is rather similar to *N. maestrense*, the type species of *Neosporidesmium* (Mercado & Mena 1988), with synnemata more than 2 mm high and with multiple percurrently proliferating conidiogenous cells, however, it differs in the size of the conidia and the size and width of synnemata. In *N. maestrense*, conidia are 55–100 µm long and synnemata are up to 2500 µm long and 60–250 µm wide, whereas in *N. khasianum* the conidia are 103–135 µm long and the synnemata are up to 2750 µm long and only 40–60 µm wide.

Species of the genus *Neosporidesmium* are as far as is known saprobic. However, little is known about substrate preferences of the particular species. Most species are only known from a single or few collections. *N. garoense* is the first species in *Neosporidesmium* inhabiting bamboo litter while *N. khasianum* occurs on litter of a new tree host, *Wightia speciosissima*.

Attempts to cultivate the two new Indian species failed and impeded the generation of molecular phylogenetic data as in most species of *Neosporidesmium*. The only available sequence of a *Neosporidesmium* species (Shenoy et al. 2006) places this genus in *Dothideomycetes*, but this placement is not representative for this genus as its type species, *N. maestrense*, has not yet been sequenced. The generation of cultures of *Neosporidesmium* species, including the type species of this genus, and results of sequence analyses is the most important challenge for the future in order to elucidate the phylogenetic affinity of the genus and its species.

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Fig. 2. *Neosporidesmium khasianum*: a–d – synnema, e–j – conidiogeous cells and conidia, k–s – conidia. Scale bars: a, b = 200 μ m, c, d = 50 μ m, e = 20 μ m, f–s = 10 μ m

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