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Article

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Paoayensis aquatica sp. nov. (Ascomycetes) on submerged wood from the River Tapti, Maharashtra, India

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Abstract

A new fungus was collected on submerged wood from a freshwater stream in Maharashtra at Western Ghats is described here as *P. aquatica*. The new ascomycete fungus differs from the type and only species in the genus, *P. lignicola,* by size and characteristics of ascomata, asci and ascospores. This is the first record of the genus *Paoayensis* from India.

Key words – biodiversity – freshwater – systematic – taxonomy

Introduction

Freshwater ascomycetes are defined as ascomycetous fungi which have been recorded in freshwater lentic and lotic habitats and which complete part, or the whole of their lifecycle within freshwater environment, playing an important role in recycling organic matter (Shearer 1993, Wong et al. 1998), and include ascomycetes and their anamorphs that grow on submerged wood, leaves and asexual spores found in foam samples (Cai et al. 2006, Vijaykrishna et al. 2006). Shearer (1993) listed 288 species of ascomycetes that had been recorded from freshwater habitats; this number has grown to 622 (Cai et al. 2014, Shearer et al. 2014). Many new taxa of freshwater ascomycetes have since been described including new genera and species (Baschien & Hyde 2018, Bao et al. 2018, Li et al. 2017, Lin et al. 2018, Luo et al. 2018, Zhang et al. 2017). In India, studies on freshwater ascomycetes (69 sp.) were compiled by Borse et al. (2014, 2016, 2017).

The genus *Paoayensis* typified by *Paoayensis lignicola* Cabanela et al. (2007) is monotypic genus in Pezizomycotina, Sordariomycetes, Sordariomycetidae, and Annulatascaceae. The type species was reported from submerged wood in freshwater lentic habitat (Paoay Lake), in the Philippines. In this paper, we describe and illustrate a new species of *Paoayensis* which was found on submerged wood from a freshwater stream in India.

Materials & Methods

Ascomata were observed on the submerged decaying wood under a stereo-zoom microscope. Asci and ascospores were mounted in lactic acid with cotton blue and measured using an ocular micrometer with 25 observations per structure. The holotype specimen (slides) is deposited in the Herbarium Cryptogamie Indiae Orientalis (H.C.I.O.), Division of mycology and plant Pathology, I.A.R.I. Pusa Campus, New Delhi, India (Holotype, HCIO no 52061).

Results

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Paoayensis aquatica Borse and N.S. Pawar, sp. nov. Figs 1–2

MycoBank MB829044

Etymology – from the Latin *aquatica* meaning 'growing in water'

Ascomata: 700-1000 µm high, 800-1000 µm diam, immersed, slightly erumpent through the host surface, papilla only visible, globose to obpyriform, in small valsoid groups with common ostiole, developing beneath a dark brown to black extensive pseudostroma. *Ostiole*: central, short, brownish-black and periphysate. *Peridium*: comprising several layers of light brown to brown cells which are darker externally and lighter to hyaline and compressed internally. *Paraphyses*: tapering distally, septate, rarely branching and early deliquescing. *Asci*: 85-170 × 40-65 µm, 8-spored, unitunicate, clavate, short pedicellate, apical apparatus of the asci was not observed as they are deliquescing and rarely seen. *Ascospores*: 50-80 × 20-38 µm, overlapping, lemon form, 1-3-septate, asymmetrical, base conical, apex rounded, first septum formed at the center and second and third septa formed simultaneously near the conical base and rounded apex, brown, dark-brown at maturity, germ slit 10-12 µm long, not full length, arising from the base, perpendicular to the ascospore, smooth-walled, and no sheath or appendages observed in aqueous India ink.

Anamorph – not observed.

Known distribution – tropical regions of India.

Material examined – India, Maharashtra, Sonewadi (Sindkheda, Dhule), on submerged decorticated Wood from Tapti River, 15 Aug 2015, B.D. Borse (Holotype, HCIO no 52061).

Kye to Paoayensis species

1. Asci 2-6-spored ……..……..... *P. lignícola*
2. Asci 8-spored ……..……..... *P. aquatica*

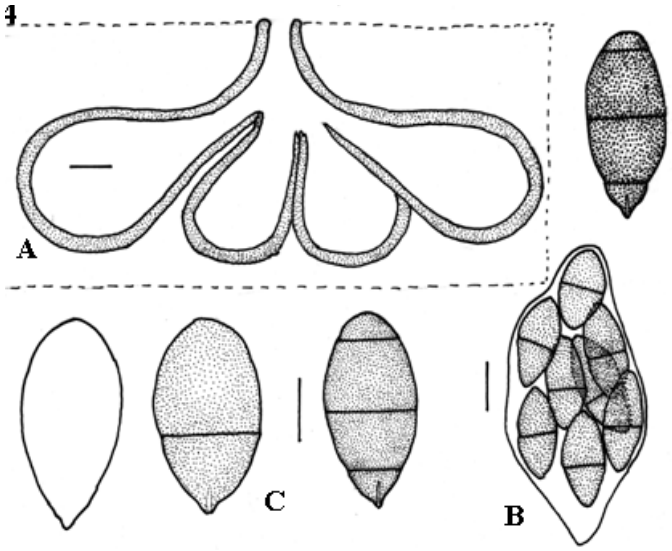

Fig. 1 – Line Drawings: A Ascomata. B Asci. C Ascospores.

Discussion

The general characteristics of the present collection fit within the concept of the monotypic genus *Paoayensis* (Cabanela et al. 2007). *Paoayensis aquatica* is differs markedly from the type species *P. lignicola* as data provided in the Table1. The ascomata and asci of the *P. aquatica* are larger than those of *P. lignicola*. Asci of the *P. lignicola* are 2-6-spored and are always 8-spored in *P. aquatica* Ascospores of *P. lignicola* are wider than *P. aquatica*. In *P. aquatica* first septum formed at the center and second and third septa formed simultaneously near the conical base and rounded apex which is similar to *P. lignicola* (noted from microphotographs). This is the first record of the genus *Paoayensis* from India.

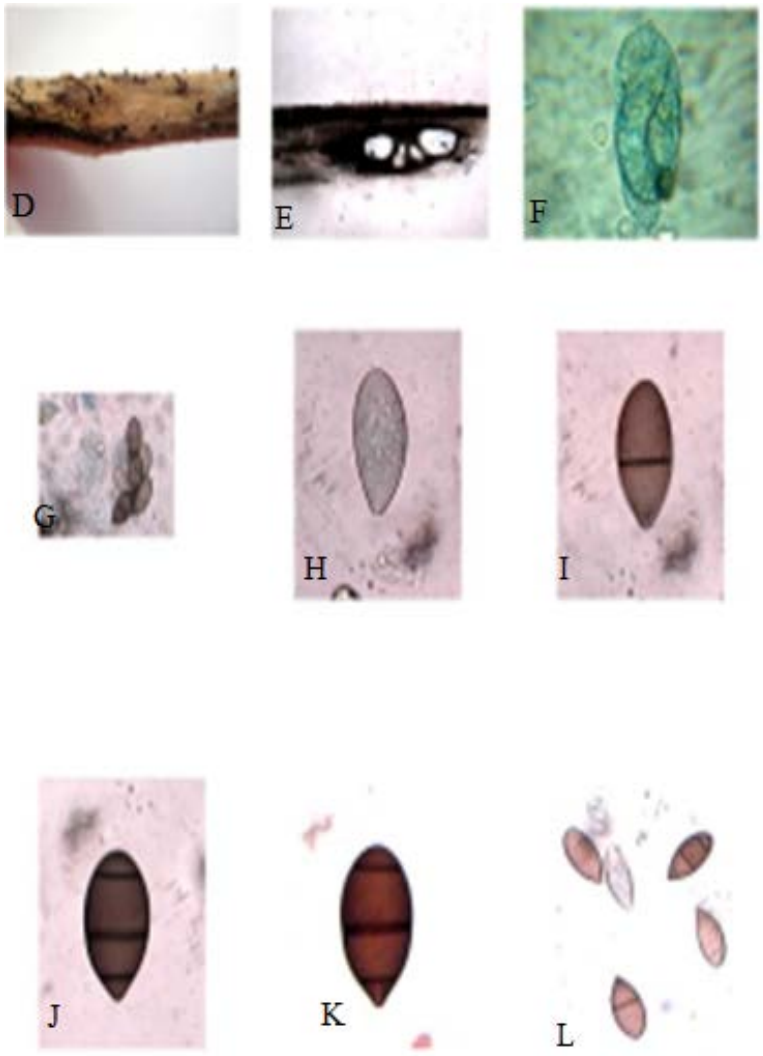

Fig. 2 – *Paoayensis aquatic* (HCIO 52061, holotype). D Habitat on submerged wood showing release of ascospores in cirrhus (arrowed). E V.S. of Ascomata showing ascoma in valsoid group. F Immature ascus. G Immature and mature asci. H Immature one-celled ascospore. I Immature 1-septate ascospore showing basal germ slit (arrowed). J Mature 3-septate ascospore. K Mature 3-septate ascospore showing basal germ slit (arrowed). L Immature and mature ascospores.

Table 1 Comparison of morphological characters of *Paoayensis* species.

	Paoayensis lignicola	***Paoayensis aquatica***
Ascomata	*Ascomata*: 546-626 µm high, 520-586 µm diam.	700-1000 µm high, 800-1000 µm diam.
Asci	45-130 × 13-35 µm, 2-6-spored	85-170 × 40-65 µm, 8- spored
Ascospores	41.9- 79.9 × 67- 74.4 µm	50-80 × 20-38 µm
Reference	Cabanela et al. (2007).	Present study

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