

## Freshwater ascomycetes from north Maharashtra-III

S. Y. Patil

P. G. Department of Botany, S.S.V.P.S.L.K.Dr. P. R. Ghogrey Science College, Dhule-424005 (M.S.), India

### Abstract

The present paper deals with two species of *Zopfiella* Winter the freshwater ascomycetes viz. *Zopfiella latipes* (Lundq.) Malloch and Cain and *Zopfiella submersa* Guarro, Ai-Saadon, Gene and Abdullah were collected from the submerged wood samples from the various water bodies in North Maharashtra region. *Zopfiella submersa* Guarro, Ai-Saadon, Gene and Abdullah is being recorded for the first time from India, while *Zopfiella latipes* (Lundq.) Malloch and Cain is being reported for the first time from North Maharashtra. Brief notes and illustration are given for each taxon. Geographical distribution of each species in India is also provided.

**Keywords:** Freshwater ascomycetes, North Maharashtra, India

### INTRODUCTION

Fungi that are recorded in freshwater habitats can be indwellers or immigrants. "Indwellers" are fully adapted to aquatic environments and can grow and sporulate in water and are often adapted to dispersal in water, while "Immigrants" must continually immigrate from other habitats to maintain their population in water [1]. Wong et al. (1998) [2] points out that there are numerous Ascomycete species that commonly occur in freshwater habitats and have not been found in terrestrial habitats, and only these fungi can be confidently categorized as freshwater Ascomycetes. Vijaykrishna et al. (2005) [3] suggested that due to controversies associated with the definition of this ecologically distinct group, any Ascomycetous fungus that have been isolated from submerged plant substrates be considered as freshwater Ascomycete.

The freshwater Ascomyceta is one of the least studied groups of fungi. Although sporadic reports of Ascomycete species that colonize aquatic macrophytes occur in the early Ascomycete systematic literature. Ingold was the first to recognize that a distinctive freshwater ascomycota might exist and published a series of papers about fungi on submerged substrates in the Lake District, England [4, 5,6 and 7]. Ingold was collecting from the submerged stems of aquatic macrophytes when he discovered *Macrospora scripicola* on *Schoenoplectus laacustris*, the lakeshore bulrush [6]. This fungus is one of the earliest known freshwater Dothideomycetes species. Pringsheim (1858) [8] first reported it from freshwater.

In India freshwater ascomycetes were discovered by Manoharachary and Rama Rao (1972) [9] first discovered new freshwater ascomycetous genus *Subbaromyces* with *Subbaromyces aquaticus* as its type species from South India.

Udaiyan (1989) [10] reported 10 ascomycetous species from water-cooling towers from South India. Out of ten species, 8 species

were first time reported from lotic habitats. Latter on Udaiyan and Hosogaudar (1991) [11] discovered nine taxa from water-cooling tower of Madras. Of these four are new genera namely *Anekabeeja*, *Mukhakesa*, *Neelakesa* and *Phialogangliospora* while *Chaetomium lunasporium*, *Didymosphaeria pittospora*, *Leptosphaeria dimidiata*, *Mycosphaerella aquatica* and *Pleospora subramanianii* are the new species of ascomycetes from freshwater habitats. Recently, Borse and Pawara (2007) [12] reported *Savoryella aquatica* and *S. lignicola* from north Maharashtra region. Recently, Sridhar et al. (2010) [13] recorded some freshwater ascomycetes from Karnataka.

### MATERIALS AND METHODS

The survey was undertaken for two years (2008-2010). Monthly random collections of fifty submerged; partially decomposed woody debris (1-5 cm diam. and 30 cm length) were made from the various sites viz. Tapti river, Panzara river, Latipada Dam, Aner Dam. The samples were returned to the laboratory keeping in plastic bags in the field and immediately examined with a dissecting microscope to locate fungal fruiting bodies. After the first observation, samples were incubated for few months on a moist paper towels in sterile plastic boxes at ambient temp. of 25<sup>o</sup>-30<sup>o</sup> C for three months to stimulate fungal development. Incubated samples were examined on day ten and then over three months under a dissecting microscope for fungal fruiting bodies. The fungal taxa present on the wood samples were recorded, identified and isolated. Voucher slides of the fungi reported were deposited in the mycology herbarium, P. G. Department of Botany, S. S. V. P. Sanstha's L. K. Dr. P. R. Ghogrey Science College, Dhule, M. S.

### Taxonomic Account

**Genus:** *Zopfiella* Winter

*Ascomata:* solitary or gregarious, globose to subglobose, superficial or rarely immersed, nonostiolate, thin-walled, irregularly dehiscing or rarely immersed, nonostiolate, thin-walled, irregularly dehiscing, covered with hairs. *Peridium:* pseudoparenchymatous, membranaceous, cephalothecoid in some species, cells forming a *textura angularis*. *Paraphyses:* early deliquescent, indistinct or absent. *Asci:* 4 to 8-spored, clavate to cylindrical or rarely subglobose, pedunculate, unitunicate, deliquescent, in some species with an apical ring, fasciculate or irregularly arranged. *Ascospores:*

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\*Corresponding Author

S. Y. Patil

P. G. Department of Botany, S.S.V.P.S.L.K.Dr. P. R. Ghogrey Science College, Dhule-424005 (M.S.), India

Tel: +91-9922296057; Fax: +91-2562272562

Email: [sambhajyp@rediffmail.com](mailto:sambhajyp@rediffmail.com)

uni-, bi-, or triseriate, at first 1-celled, hyaline, becoming 1-septate, hyaline in the lower third, forming a large ellipsoidal, dark upper cell and a small, mostly cylindrical, hyaline, often collapsing basal cell; the upper cell may become divided by a horizontal septum in some species; with an apical or subapical germ pore. The genus is represented by 2 species in marine habitats.

**Type species:** *Zopfiella tabulata* Winter

**Habitat:** Saprobic on intertidal and mangrove wood.

**Description:** Based on Kolhm. & Kolhm. (1979) [14].

***Zopfiella latipes*** (Lundqvist) Maloch & Cain

**Ascomata:** 120-700  $\mu\text{m}$  in diam., globose to subglobose, superficial or immersed, nonostiolate, coriaceous, irregularly dehiscing, dark brown, covered with hyaline to grayish- or yellowish-brown, septate, branched hairs, 1.5-4  $\mu\text{m}$  in diam.; solitary. **Peridium:** 40-50  $\mu\text{m}$  thick, semitransparent, composed of 3 or 4 layers of irregular or angular, thin-walled cells of 5-12  $\mu\text{m}$  in diam., forming a *textura angularis*. **Paraphyses:** up to 12  $\mu\text{m}$  in diam., composed of vesicular cells, early deliquescing. **Asci:** 80-120 x 12-18  $\mu\text{m}$ , 8-spored, clavate, broadest in the middle, short pedunculate, apically truncate, unitunicate, deliquescing, with a simple apical ring, 2.1  $\mu\text{m}$  wide; fasciculate. **Ascospores:** biseriate, ellipsoidal, becoming 1-septate in the lower third; slightly constricted at the septum; larger upper cell 16-22(-25) x 10-13(-15)  $\mu\text{m}$ , ellipsoidal, apex conical or abonate, base truncate, olivaceous to brown, thin-walled, smooth, with a apical germ pore, 1  $\mu\text{m}$  in diam.; smaller lower cell 4-8(-9)  $\mu\text{m}$  long, 3.5-7  $\mu\text{m}$  in diam., broadly cylindrical, apex truncate, base broadly rounded, hyaline, at maturity without cytoplasm; the base and one side of the lower cell thin-walled, collapsing, and giving it a cuplike shape; collapsed lower cell appearing triangular in lateral view.

**Habitat:** Saprobic on submerged wood.

**Description:** Based on Kolhm. & Kolhm. (1979) [14].

**Distribution:** West Coast:-Gujarat: On intertidal wood of *Avicennia marina* [15]; Maharashtra: On intertidal wood and submerged wood of *Avicennia alba* and *A. marina* [16 and 17]; Karnataka: On intertidal wood of *Avicennia officinalis*, *Brugueiria gymnorhiza*, and *Sonneratia caseolaris* [18 and 19]; Pondecherry (Mahe): On intertidal wood [20], Kerala: On intertidal wood [14], on intertidal mangrove wood [21 and 22].

East Coast:-Tamil Nadu: On intertidal wood [23], On mangrove wood [21]; Andhara Pradesh: On intertidal wood [14], on intertidal wood of *Avicennia officinalis* [[24, 25, 26, 27, 28 and 29].

***Zopfiella submersa*** Guarro et al.(1997) [30].

**Ascomata:** superficial and immersed, globose or subglobose, 230-470  $\mu\text{m}$  diam., nonostiolate, with hairs uniformly distributed on the surface; ascoma hairs pale brown, unbranched, thin-walled, scarcely septate, 10-20 x 2.5-3.5  $\mu\text{m}$ . **Peridium:** 10-16  $\mu\text{m}$  thick, membranaceous, pseudoparenchymatous, brown, composed of 8-13 layers of cells of *textura angularis*; cells prismatic, 9-12  $\mu\text{m}$  diam. **Asci:** 8-spored, cylindrical to clavate 90-120 x 14-20  $\mu\text{m}$ , apex rounded and with a small, iodine negative subapical ring, evanescent. **Ascospores:** two celled; upper cell 13.0-20.5 x 10-14  $\mu\text{m}$ , limoniform, truncate at the base, smooth, thick-walled, dark brown, with a conspicuous subapical germ pore, umbonate at the apex; lower cell 6-13 x 3-5  $\mu\text{m}$ , cylindrical with a rounded or slightly tapering end, hyaline to pale brown, occasionally dark brown, more or less thin-walled.

**Habitat:-** Saprobic on submerged wood.

**Description:-** Based on Guarro et al. (1997) [30].

**Distribution:-** Maharashtra (present study)

**Remark:** It is being recorded for the first time from India. Both species viz. *Zopfiella latipes* (Lundq.) Malloch and Cain and *Zopfiella submersa* Guarro, Ai-Saadon, Gene and Abdullah were found rarely.

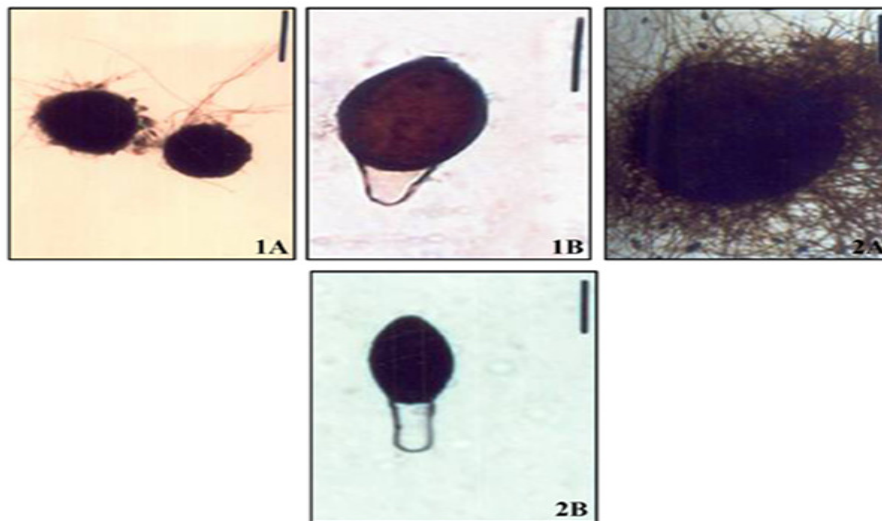


Fig. 1. *Zopfiella latipes*. A) Ascomata (Scale Bar= 75 $\mu\text{m}$ ) B). Ascospores (Scale Bar=10  $\mu\text{m}$ )

Fig 2. *Zopfiella submersa* A). Ascomata (Scale Bar= 50 $\mu\text{m}$ ) B).Ascospores (Scale Bar=10  $\mu\text{m}$ )

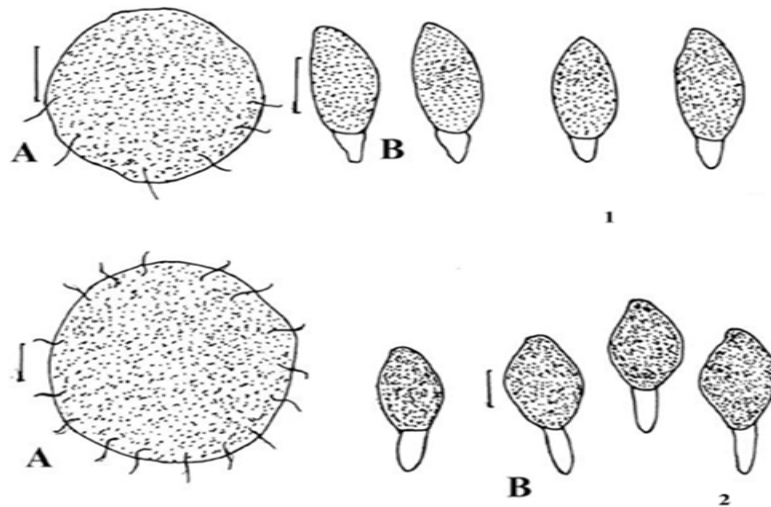


Fig. 1. *Zopfiella latipes*. A) A) Ascogonia (Scale Bar= 175µm) B). Ascospores (Scale Bar=10 µm)  
 Fig 2. *Zopfiella submerse* A). A) Ascogonia Scale Bar=150 µm) B) Ascospores (Scale Bar=10 µm)

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