FRESHWATER HYPHOMYCETES FROM MADHYA PRADESH (INDIA)

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ABSTRACT
The present paper deals with five species of freshwater and freshwater-borne Hyphomycetes encountered in foam samples collected from East Nimar District of Madhya Pradesh viz., Phalangiospora nawawii Kuthubuthen, Speiropsis pedatospora Tubaki, Wiesneriomyces laurinus [Tassi] Kirk, Flabellospora multiradiata Nawawi, and Triscelophorus acuminatus Nawawi. Among which Phalangiospora nawawii Kuthubuthen, Speiropsis pedatospora Tubaki, and Flabellospora multiradiata Nawawi are being reported for the first time from Madhya Pradesh. The data collected provide information on the biodiversity and Geographical distribution of these fungi from freshwater habitats of India, apart from description and illustrations. This data will assist in the compilation of freshwater fungal biodiversity of India.

KEY WORDS: Freshwater fungi, Foam, India, Ingoldian Hyphomycetes, Madhya Pradesh.

INTRODUCTION
Freshwater Hyphomycetes were practically untouched until the pioneering work of Ingold (1942), who recognized them as 'Aquatic Hyphomycetes'. Later these fungi have also been described as "Freshwater Hyphomycetes" (Nilsson, 1964) and "Water-borne Hyphomycetes" (Webster and Descals, 1979). There are more than 500 named species of Hyphomycetes known from freshwater habitats. Most of them were described from temperate regions, while there is little information on tropical species. Previous studies on freshwater higher fungi of Madhya Pradesh were made by Hasija and Shanware (1986), Agarwal et al., (1991, 1992), and Upadhyaya et al., (2012). The East Nimar District of Madhya Pradesh is rich in biodiversity. However, meagre studies have been done on freshwater Hyphomycetes from this area. Therefore, the present investigation was undertaken.

MATERIALS AND METHODS
The foam samples were collected from the different streams and rivers of east Nimar District of Madhya Pradesh. Foam samples were collected at morning and evening time. The foam is formed by the movement of the water against natural barriers like stones, twigs and logs, constitutes a natural trap for the conidia of aquatic Hypomycetes. Samples were made with a ladle and placed in clean wide mouthed plastic bottles and kept for 24 hours to enable the foam to dissolve. It was preserved by adding FAA. The foam samples were returned to the laboratory. They were observed under high and low power of research microscope for the presence of conidia of aquatic Hyphomycetes. The slides were made permanent by using double cover glass method given by Volkmann-Kohlmeyer and Kohlmeyer (1996).

The measurement and microphotographs of fresh water hyphomycetes were taken at P. G. Dept. of Botany, S.S.V.P. Sanstha's, L.K. Dr. P. R. Ghogrey Science College, Dhule. Identification of the freshwater Hyphomycetes was confirmed with the help of Nilsson (1964), Ingold (1975), Marvanova (1997) and other relevant literature. Reports of fungi from India and Madhya Pradesh were confirmed with the help of Bilgrami et al., (1979, 1981, 1991), Sridhar et al., (1992), Sarbhoj et al., (1986, 1996), Jamaluddin et al., (2004) and other relevant literature. Voucher slides of the fungi reported were deposited in the Mycology Herbarium, P. G. Dept. of Botany, S. S. V. P. Sanstha's L. K. Dr. P. R Ghogrey Science College, Dhule (M. S.), India.
RESULTS AND DISCUSSION

Five species of freshwater and freshwater-borne Hyphomycetes showed in figure 1.

1. Phalangiospora nawawi Kuthubutheen
   **Conidia:** Branched, septate, and composed of cylindrical cells, constricted at the septa. Conidial chains in yellowish-brown mass consist of 13-19 cells connected by narrow isthmi with main axis and 2-3 laterals, 6-8 cells in main axis, 2-6 cells in lateral branches, 65-90 µm from base to apex. Basal cell are conical and 8-9 x 2 µm, apical cells conical and 8-12 x 2 µm cells, along conical chain cylindrical and 10-12 x 1.5-2 µm. Light brown in color.
   **Habitat:** Conidia in foam sample, Sukta River, 27 July, 2013, Leg. D.K. Patil
   **Distribution in India:** Karnataka: Conidia in foam samples (Sridhar and Kaveriappa, 1992); Uttarakhand: On submerged leaves (Sati et al., 2003).
   **Remark:** It is being reported for the first time from Madhya Pradesh

2. Speiropsis pedatospora Tubaki
   **Conidia:** Consist of basal cell and three to five divergent arms, each arm consisting of an acropetalous chain of cells. Basal cell is clavate. 2-5 irregular branched chains, 80-90 µm long, 4.5-6.5 µm wide; conidia, cylindrical, hyaline or brown, smooth, 0-septate, 10-14 x 4-7 µm; they remain attached to one another for a long time by narrow isthmi or connections forming branched compound structures and secede only with difficulty.
   **Habitat:** Conidia in foam sample, Sukta River, 27 July, 2013, Leg. D.K. Patil
   **Distribution:** Maharashtra: Conidia in foam samples (Patil and Kapadnis, 1979); Karnataka: Conidia in foam samples (Sridhar and Kaveriappa, 1984); Andhra Pradesh: Conidia in foam samples (Manoharachary, 1989)
   **Remark:** It is an addition to the Fungi of Madhya Pradesh.

   **Conidia:** Conidia are formed in acropetal chains but becoming aggregated in slimi Conidial golden yellow massess, individually Colorless, smooth, 0-septate, the conidium at each end of a chain tapered; intermediate cells are more or less cylindrical. The conidia remain attached to one another for a long time by narrow isthmi or connectives and secede only with difficulty. Conidia are in chains up to 7-11 cells, mostly 9-11, and 50-90 µm long. Individual cells are 10-12 µm long and 3-4.5 µm wide.
   **Habitat:** Conidia in foam sample, Sukta River, 27 July, 2013, Leg. D.K. Patil
   **Distribution:** Maharashtra: On submerged leaves (as W. javanicus Koord., Talde, 1983); Andhra Pradesh: On submerged leaves and conidia in foam samples (Galah and Manoharachary, 1987); Karnataka: On submerged leaves, conidia in foam and water samples (Sridhar and Kaveriappa, 1984); Gujarat: Conidia in foam samples (Ahire et al., 2009); Madhya Pradesh: On submerged leaves, twigs and conidia in foam samples (Agarwal et al., 1992).
   **Remark:** It is being reported for the first time from East Nimar district [M. P.]

4. Flabellospora multiradiata Nawawi
   **Conidia:** Conidia are hyaline and easily recognized, have a multiseptate arms, radiating from central spherical bulb, short obpyriform main axis 9-13µm long, 2-3µm wide at the base, expanding above to form a globose structure 4-6.5 µm dia. From this 15-25 long, cylindrical fusiform arms are arise which are broader at the base and taper towards the apex. The arms are 80-160 µm long; 11-18 septate arms are slightly constricted at basal side. At maturity the cells are vacuolated. The terminal cells are bigger, acute and non-septed.
   **Habitat:** Conidia in foam sample, Sukta River, 27 July, 2013, Leg. D.K. Patil
   **Distribution:** Karnataka: conidia in water samples (Sridhar and Kaveriappa, 1984); Kerala: On submerged leaves, conidia in foam and in water samples (Sridhar and Kaveriappa, 1985); Maharashtra: Conidia in foam sample (Patil and Kapadnis, 1980).
   **Remark:** It is being reported for the first time from Madhya Pradesh.
5. *Triscelophorus acuminatus* Nawawi


**Conidia:** Tetra-radiate, hyaline, each consist of main axis tapering gradually to about 0.5 µm at the apex, up to 8. Septate, not constricted at the septa. Main axis 44 - 66 µm long and 3.5-5µm at the widest point. The arms are connected to the basal cell by a very narrow, thread like isthmus. The arms are slightly shorter than the main axis, 20-58 x 3-4.5 µm.

**Habitat:** Conidia in foam sample, Sukta River, 27 July, 2013, Leg. D.K. Patil

**Distribution:**
- **Uttarakhand:** Conidia in foam samples (Mer and Sati, 1989);
- **Karnataka:** On submerged leaves, conidia in foam and water samples (Sridhar and Kaveriappa, 1982);
- **Kerala:** On submerged leaves, conidia in foam and water samples (Sridhar and Kaveriappa, 1985);
- **Maharashtra:** Conidia in foam samples (Borse and Patil, 2006);
- **Gujarat:** Conidia in foam samples (Ahire et al., 2009);
- **Madhya Pradesh:** On submerged leaves, twigs and conidia in foam samples (Agarwal et al., 1992).

**Remark:** It is being recorded for the first time from East Nimar. [M. P.]

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**Figure 1.** Showed five species of freshwater and freshwater-borne Hyphomycetes

1. *Phalangiospora nawawii* Kuthubuthleen
2. *Speiropsis pedatospora* Tubaki
4. *Flabellospora multiradiata* Nawawii
5. *Triscelophorus acuminata* Nawawii
CONCLUSION

Five species of freshwater and freshwater-borne Hypomycetes encountered in foam samples collected from east Nimar District of Madhya Pradesh viz., *Phalangiospora nawawii* Kuthubutheen, *Speiropsis pedatospora* Tubaki, *Wieseneriomycæs laurinus* [Tassi] Kirk, *Flabellospora multiradiata* Nawawi, and *Triscelophorus acuminatus* Nawawi. Among which *Phalangiospora nawawii* Kuthubutheen, *Speiropsis pedatospora* Tubaki, and *Flabellospora multiradiata* Nawawi are being reported for the first time from Madhya Pradesh. The data collected provide information on the biodiversity and Geographical distribution of these fungi from freshwater habitats of India, apart from description and illustrations. This data will assist in the compilation of freshwater fungal biodiversity of India.

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REFERENCES


