International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Diversity of Ingoldian Hyphomycetes From Wadgaon Dam in Umred Tehsil of Nagpur District

R. T. Jadhav

Associate Professor,Department of Botany,S.S.V.P.S Arts,Commerce And Science College Shindkheda Dist. Dhule, Maharashtra ,India.

ABSTRACT:
Present study deals with the diversity of fresh water ingoldian hyphomycetes from the Wadgaon dam in Umred tehsil of Nagpur district. Eight species were found to present in the study area. *Anguillospora crassa* Ingold, *Anguillospora gigantia* Ranzoni *Anguillospora longissima* Sacc. And Syd, *Angulospora aquatica* Sv. Nilsson, *Flaballospora acuminata* Descals and J. Webster, *Flaballospora multiradiata* Nawawi, *Flaballospora verticellata* Alasoadura and *Flabellocladia tetracladia* Nawawi. All these fungal species were repoted for first time from this area.

Keywords: Diversity, Nagpur , Freshwater fungi, Ingoldian hyphomycetes.

Introduction:

Fungi are diverse and ecologically important group of eukaryotes with the majority found in terrestrial habitats. Fewer numbers have been isolated from freshwater habitats, fungi growing on submerged substrates exhibit great diversity, belonging to widely differing lineages. Fungal biodiversity surveys in the tropics have resulted in a marked increase in the numbers of fungi known from aquatic habitats. (Vijaykrishna, D., Jeewon, R. and Hyde, K.D. (2006).

The number of Fungi distributed worldwide has been estimated to be 1.5 million species, based on the 1:6 ratios of vascular plants to fungi on the British Isles (Hawksworth, 1991). Taxonomic studies of micro fungi from little explored areas regularly yield high numbers of new species. For instance, in a monograph of the Coronophorales (Ascomycetes) from India, Subramanian and Sekar (1990) found that ten out of 23 fungi (43%) collected from the Western Ghats were new to science (Hawksworth, 1991).

The importance of Ingoldian hyphomycetes (an ecological group of aquatic anamorphic ascomycetes) in the degradation of leaf litter in lotic habitats is well understood (Suberkropp and Klug, 1976). These fungi produce cellulases and pectinases, enzymes crucial in the breakdown of leaf litter (Chamier, 1985). Ingoldian hyphomycetes have also been isolated from woody substrates in running waters (Shearer, 1992), and while less is known about their role in breaking down wood *in situ*, many produce lignin modifying enzymes (Abdel-Raheem and Ali, 2004).The Ingoldian Hyphomycetes also called as “water borne Hyphomycetes” (Webster and Descals, 1981) or “amphibious Hyphomycetes” (Akridge and Koehn, 1987) as well as “Water-borne Conidial fungi” to include many amphibious or Dematiaceous fungi. They produce conidia that are mostly hyaline and branched or long and narrow. These conidial types are adapted for life in running water and sporulate under water (Ingold, 1975). These fungi most

commonly occur on submerged dead leaves (Barlocher, 1992b), wood (Shearer and Webster, 1991) as well as conidia in foam (Iqbal and Webster, 1973) in streams and rivers surrounded by dense vegetation. A few species have also been reported from well aerated lakes and ponds as well as in tree holes (Gonczol and Revay, 2003).

Topography of study area

Wadgaon dam: The dam is an earthen filled dam on the river Wunna.It is located in Umred tehsil of Nagpur district. It has height of 23.65 meters and length 5370 meters. It has gross storage capacity of 152.60 MCM and live storage capacity of 136 MCM.

Material and method:

Samples of submerged wood, leaves and foam were collected in different seasons from Wadgaon dam in Umred tehsil from Nagpur district. Different kinds of submerged decomposing leaves were collected randomly from various sites of study area. Freshly fallen leaves, which have less chances of being colonized by aquatic hyphomycetes, and leaves in a blackened condition subject to anaerobic conditions, were discarded. The leaves were cut in to small pieces and incubated separately in Petri dishes containing distilled water at laboratory temp. (25^0-30^0 C). To minimize the growth of bacteria and other organisms, water in Petri dishes was replaced once in two days. The leaves were examined under a research microscope (15x eye piece and 40x objective lens) at 24 hours intervals for 60 days to detect the development of fungi on the
petiole, veins and margins of the leaf substratesThe conidia formed on the leaf surface during incubation are gently scrapped off and concentrated in a drop of water on a slide.
Permanent mounting is done by adding Lacto phenol (with or without cotton blue). A drop of mounting fluid is added to one side of the cover glass so that it sleeps under the cover glass. The cover glass was sealed with D.P.X or nail varnish.
Identification of these conidia was done with the help of pertinent literature and competent authorities.

Result and discussion:

During the present study, 08 species of aquatic hyphomycetes were recorded from different submerged leaf litter, wood and foam samples. All the isolated species were studied in detail and illustrated.

Anguillospora crassa Ingold
Trans. Br. Mycol. Soc., **41:** 367 (1958).
***Mycelium*:** Branched, hyaline and septate, yellowish in older stage. ***Conidiophores*:** Simple or rarely branched, blastospore (conidia) terminal in position, micro nematous, hyaline, septate, simple, indistinct. ***Conidia*:** More or less S or L shaped (eel-like), hyaline,130-180 µm long and 16-20 µm wide in the middle region, to 8- 10 µm branched, the main body globose or ovoid at the ends, 5- 10 septate.

Anguillospora gigantia Ranzoni
Farlowia **4:** 363. (1953)
Mycelium: Colourless branched, septate. ***Conidiophores*:** Simple, colourless, up to 65 µm long, 2.5 µm wide, bearing only one conidium. ***Conidia*:** Terminal, colourless, sigmoid or falcate, scolecosporus, 160-680 µm long, 5- 6 µm broad in the middle and tapering gradually to 2.5- 3 µm broad at the tips, 6- 10 celled, shed by a diarticulation and rounding off process of one of the terminal septa of the conidiophore.

Anguillospora longissima (Sacc. and Sydow) Ingold,

Trans. Br. Mycol. Soc., **25:** 389 (1942).
= *Fusarium elongatum* De Wildeman, *Ann. Soc. Belge. Microsc.* **17:** 40 (1893). ***Mycelium*:** Septate ***Conidiophores*:** Simple, hyaline, Cylindrical.***Conidia*:** Hyaline, filiform, unbranched, elongated, 8- 12 septate, curved or sigmoid with curvature in more than one plane, 150- 340 µm long, 2.7- 3.4 µm wide at the middle, tapering at both the ends, usually spiral.

Angulospora aquatica Sv. Nilsson,
Sv. Bot. Tidskr., **56:** 354 (1962).
***Mycelium*:** Septate, branched and hyaline. ***Conidiophores*:** Short, hyaline, septate. ***Conidia*:** Hyaline, unicellular, 78- 96 µm long, 1.5- 2 µm broad, tapering to 1 µm broad at the apex, curved or sigmoid, mostly with right and sharp angles and usually in more than one plane, produced laterally or from the tip of the conidiophores.

Flabellospora acuminata Descals & Webster
Mycelium*:** septate and branched**.** ***Conidiophores*:** Simple or branched, apical or lateral, prostrate, mononematous. Short, up to 30 µm long 2- 3 µm wide, septa indistinct 100- 145 x 3- 4 µm.Conidia*:** Solitary, hyaline, multiradiate, acrogenous, main body clavate, apex capitate 4- 5 µm diameter, base pedunculate, 5- 9 µm long, branches 4- 8 synchronomous, 45-110 x 7-12 µm, one branch apical, the rest of the branches are radiating, slightly straight, fusiform, apex greatly extended, cells 3- 10, dispersed singly or in pairs.

Flabellospora multiradiata Nawawi
Trans. Br. Mycol. Soc., **66:** 543 (1976).
***Mycelium*:** Hyaline, septate and branched. ***Conidiophores*:** Hyaline, lateral, erect, 15- 20 µm long x 2- 2.5 µm wide, 0- 2 septate. ***Conidia*:** Hyaline**,** holoblastic, star-like, developing at apical end of conidiogenous cells. Main axis measures 9- 12 µm long and 2- 3 µm wide at the base, expanding above to form a globose structure 4- 5.8 µm in diameter. Multiradiate appendages 15- 25**,** consist of obpyriform, 10- 18 septate 85- 140 µm long, constricted at the point of origin and thereafter broaden to 1.5- 2 µm at the widest point and finally rappers to 1.7- 2 µm at the apex which is acute to accumulate and lacks septation in the Part 12- 20 µm at the tip.

Flabellospora verticillata Alasoadura
Nova Hedwigia.,**15:** 419 (1968).
***Mycelium*:** Branched and septate. ***Conidiophores*:** Emerging from the edge of the decaying leaves, 20-55 µm long, 1.5- 3 µm wide arise from hyphae. ***Conidia*:** Multi-radiate, hyaline, consisting of a main axis and 5-10 radiating arms. Main axis 15- 28 X 1.5- 2 µm with a spherical 2-3.5 µm wide, terminal spherical or sub-spherical swelling, 2-6 septate, with terminal cell obclavate, each arm 8-14 septate, 62-130 µm long and 4.5-5 µm wide and tapering to about 2 µm at the tip.

Flabellocladia tetracladia (Nawawi) Nawawi
Trans. Br. Mycol. Soc., **85:** 175 (1985d);
= Flabellospora tetracladia Nawawi, Malaysian J. Sci., **2:** 55 (1973a).
***Mycelium*:** Hyaline, septate, branched. ***Conidiophores*:** Erect simple, hyaline. ***Conidia*:** Holoblastic, terminal, hyaline, tetra radiate, arms 3- 5 (mostly 3); main axis cylindrical, thinner than arms, 60- 85 µm long, 3.5- 5.5 µm wide at the base, 9- 11 µm at the apex, 2- 3-septate; arms obclavate to cylindrical, 3- 8 septate (mostly 5- 6), 93- 141 µm long, 8.5- 10 µm at their widest point and taper to 5- 6 µm at the apex, with or without a terminal swelling; they are constricted at their point of attachment and measure 3.5-5.4 µm across the septum isthmus.

PHOTO PLATE


Fig.1

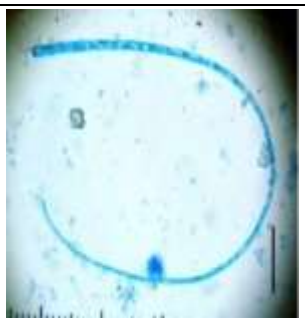
Fig.2


Fig.3

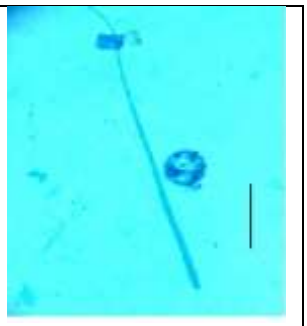
Fig.4


Fig.5


Fig.6


Fig.7


Fig.8

Fig.1 *Anguillospora crassa* Conidium **Fig.2 *Anguillospora gigantia* Conidium**
Fig.3 *Anguillospora longissima* Conidium **Fig.4 *Angulospora aquatica* Conidium**
Fig.5 *Flabellospora acuminata* Conidium **Fig.6 *Flabellospora multiradiata* Conidium**
Fig.7 *Flabellospora verticellata* Conidium **Fig.8 *Flabellocladia tetracladia* Conidium**

Refrence:

1. Vijaykrishna, D., Jeewon, R. & Hyde, K.D. (2006) Molecular taxonomy, origin and evolution of freshwater ascomycetes. Fungal Diversity, 23: 351-390. Subramanian, C. V., and G. Sekar. (1990) Coronophorales from India-a monograph. *Kavaka* 18: 19–90.
2. Hawksworth, D.L. (1991) The fungal dimension of biodiversity: magnitude, significance, and conservation. Mycol. Res., 95: 641–655.
3. Suberkropp, K.and Klug, M J. (1976).Changes in the chemical composition of leaves during processing in a woodland stream. Ecology 57:720-727.
4. Chamier, A.C. (1985) Cell Wall degrading enzymes of aquatic hyphomycetes: a review. Bot. J. Linn. Soc., 91: 67-81
5. Shearer, C.A. (1992) The role of woody debris in the life cycles of aquatic hyphomycetes. In: “The ecology of aquatic hyphomycetes”, (ed. Barlocher, F.), Springer, Berlin & New York, pp. 77–98.
6. Abdel-Raheem, A., Ali, E.Lignocellulolytic Enzyme Production by Aquatic Hyphomycetes Species Isolated from the Nile’s Delta Region. Mycologia 157,277-286(2004).
7. Webster, J. & Descals, E. (1981) Morphology, distribution and ecology of conidial fungi in freshwater habitats. In: “The Biology of Conidial Fungi”, Vol. I (eds. Cole & Kendrick), Academic Press, New York, pp. 295-355.
8. Akridge R.E &Koehn, R.D (1987). Amphibious Hyphomycetes from the san Marcos River in Texas. Mycologia, 79(2), 228-233.

9. Ingold, C.T. (1975) “An illustrated guide to Aquatic and water-Borne Hyphomycetes”, Freshwater Biological Associ. Sci. Publ., 30: PP. 96.
10. Barlocher, F. (1992b) Community organization. In: “The Ecology of Aquatic Hyphomycetes” (ed. Barlocher, F.), Springer, Berlin, pp. 38-76.
11. Shearer, C.A. & Webster, J. (1991) Aquatic hyphomycetes communities in the river Teign on twig colonization. Mycol. Res., 95: 413-420.
12. Iqbal, S.H. & Webster, J. (1973a) Aquatic hyphomycetes spora of the river Exe and it’s tributaries. Trans. Br. Mycol. Soc. Japan, 33: 293-297.
13. Gonczol, J. and Revay, A. (2003) Tree hole fungal communities: aquatic, aero-aquatic and dematiaceous hyphomycetes. Fungal Diversity, 12: 19-24.