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STUDY OF FUNGI ARE HELPFUL FOR PROTECTION OF LIVING THINGS AND HARMONIZING SURROUNDINGS.

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ABSTRACT:
There are no. of species in freshwater fungi with a greater number know from temperate, as compared to tropical, regions. Three main groups can consider which include Ingoldian fungi, aquatic ascomycetes and non-Ingoldian *Hyphomycetes, chytrids* and oomycetes. The fungi occurring in lentic habits mostly differ from those occurring in lotic habitats. Although there is no comprehensive work dealing with biogeography of all group of freshwater fungi, their distribution probably follows that of Ingoldian fungi, there distribution probably follows that of Ingoldian fungi, which are either cosmopolitan, restricted to pan temperate or pan tropical regions, or in a few cases, have a restricted distribution. Freshwater fungi are thought to have evolved from terrestrial ancestors. Many species are clearly adapted life in freshwater as their propagules have specialized aquatic dispersal abilities. Freshwater fungi are evolved in the decay of wood and leafy material and also cause diseases of plants and animals. These areas are briefly reviewed. Gaps in our knowledge of freshwater fungi are discussed and areas in need of research are suggested.
Key words: - *biodiversity, freshwater fungi.*

INTRODUCTION:

This paper reviews the biology of fungi in freshwater sediments. We use the terms sediments a broad sense to mean freshwater sand, gravel, slit, mud (Anon, 1998), wood, leaves and other organic matter the accumulates on the floor of freshwater habitats. We have not treated lichen-forming fungi on rocks in or by lake or stream margins, which merit a modern separate review.

MATERIALS AND METHODS:

Biodiversity of freshwater fungi:-

There are no of species of freshwater fungi and greater numbers are known from temperate, as compared to tropical. These include ascomycetes, mitosporic fungi and a number of chytrids and oomycetes (Goh and Hyde, 1996). Three main groups can a considered.

1. The Ingoldian fungi which occur on decaying leaves in streams and lakes and which are probably the most well studies. They have been documented in many countries around the world, although the tropics have received less attention.
2. The aquatic ascomycetes and Hyphomycetes occurring in submerged woody material have received less attention. Studies on these fungi in temperate regions are mainly based in North America, around Chesapeake Bay (Sheare, 1993a) and Hong Kong (Hyde et al., unpubl.). Less intensive collections have been made in Australia, Brunei. England, Philippines, Seychelles and South Africa.
3. The chytrids and oomycetes, including those that cause disease, are well-documented (Laidlaw, 1985; Fuller and

Jaworski, 1987, Barr, 1988, Burning, 1991; Powell, 1993) these fungi generally lack the ability to degrade cellulose, and are probably important in degrading no cellulosic entities the freshwater ecosystem (e.g. dead insects, Keratin and pollen grains).

Freshwater habitats that support fungi can be divided can be divided into:

1) lentic (lakes, ponds, swamps, pools): and
2) Lotic (reservoirs. Streams. creels. Brooks) in addition, many freshwater fungi have been reported from artificial habitats, such as water – cooling towers (Jones and Easton, 1969, Eaton and Jones, 1970, 1971 la,b;) Udaiyan and Hosagoudar, 1991).

RESULT & DISCUSSION:

Origin of freshwater fungi:-

Freshwater fungi are a diverse and heterogeneous group comprising species from different orders. The dominant groups are the ascomycetes and Hyphomycetes, depending on geographical location and substrate. Shearer (1993a) stated that "the presence of fungi in aquatic habitats along may not be appropriate to define ascomycetes as freshwater ascomycetes". This is because the occurrence of a species may simply be fortuitous and presence in therefore not conclusive evidence in assigning a particular fungus as "freshwater". The fungus could have its origin in terrestrial habitats and may have entered the freshwater system as spores. There are, however, numerous ascomycetes (and Hyphomycetes) species which commonly occur in freshwater and have not been found in terrestrial habitats. These can confidently be categorized as freshwater fungi.

Certain genera, e.g. Jahnula and Proboscispora, are confined to freshwater habitats, while others have representatives in both terrestrial and marine habitats. Annulatascus has terrestrial (mainly on bamboo and palms) as well as freshwater habitats, while Ascotaiwania which was first reported as a freshwater genus, is now known from terrestrial palms (Hyde, 1995). However, individual species are generally restricted to freshwater, marine or terrestrial habitats. The main differences between species in a genus are found in the Ascospores, with sheaths or appendages often occurring in freshwater and marine or terrestrial habitats. The main difference between species in a genus are found in the Ascospores, with sheaths or appendages often occurring in freshwater and marine representative, while other morphological characters very little.

It has been suggested that some marine fungi have a fungal-algal ancestor, which gave rise to ancestral pyrenomycetes, and which were mainly parasites of algae (Kohlmeyer and Kohlmeyer, 1979). Terrestrial loculoascomycetes and pyrenomycetes are thought to have originated from these parasitic pyrenomycetes. Subsequently these terrestrial ascomycetes moved back into the marine environment and are known as secondary marine fungi. These secondary marine fungi include the terrestrial loculoascomycetes Holotthia, Leptosphaeria, Mycosphacerella, Pontoporeia, and pyrenomycetes such as Chaetosphaeria and Kallichroma.

Kohlmeyer and Kohlmeyer (1979) organized marine fungi in two groups:

(1) Primary marine fungi (e.g. Ceriosporopsis, Corollospora, Halosphaeria) thought to have been derived from marine ancestors, that have not left their original marine environment; and (2) marine fungi which were thought to have evolved from terrestrial ancestors which have migrated back into the sea. An analogy can be made between freshwater and marine fungi. The genus Aniptodera (Shearer and Miller, 1977) may be classified as a primary freshwater fungus as species occur in both freshwater and

marine environment and no terrestrial representatives have been found. Genera such as Annulatascus and Ascotaiwania may be classified as secondary freshwater fungi since they originate most probably from terrestrial habitats, since they have terrestrial representatives.

Recent Phylogenetic studies (Spatafora et al. 1995) have shown that many marine ascomycetes are likely to have evolved from terrestrial ancestors (e.g. Micro scales), which have lost many of their characters. Features such as active ascospore ejection are thought to be unnecessary in the sea. It is probably also true, that most, if not all, freshwater ascomycetes evolved from terrestrial ancestor.

The main role of freshwater ascomycetes, basidomycetes and mitosporic fungi in freshwater ecosystems is in the degradation of dead plant material (e.g. Jencus, leaves and wood) that finds its way into the water (Goh and Hyde, 1996). They may also be involved in the degradation of animal pars such as insect exoskeletons, fish scales, and hair. Other ecological groups present are the plant pathogens and Endophytes that may colonies living plant tissues. The decay of dead plant tissues is a result of the fungi's ability to degrading woody celluloses and lignocelluloses (Zara – maivan and Shearer, 1988a b). Their success in degrading woody tissues lies in an ability to form soft-rot cavities (Shearer, 1993a; Yuen et al. pers Obs.) Basidomycetes are rare and mainly absent in freshwater as they are not soft – rotters, although they can degrade cellulose.

CONCLUSION:

It appears that the ability to degrade the lignocelluloses from within the S_2 layer of the cell wall is important in submerged waterlogged wood. Several species have now been tested for their ability to cause soft-rot decay an although we have information for only a small proportion of know species, it is probably representative.

REFERENCES:

Apinis, A. E., Chesters, C.G.C. and Taligoola, H.K. (1972a) Colonization of Phragmites communis leaves by fungi. Nova Hedwigia 23, 113-24.

Au, D.W.T., Vrijmoed, L.L.P. and Hodgkiss, I.J. (1992a) Fungi and celluloytic activity associated with decomposition of Bauhinia purpurea leaf litter in a polluted and unpolluted Hong Kong waterway. Can. J. Bot. 70, 1071-9.

Bermingham, S. (1996) Effects of pollutants on aquatic Hyphomycetes colonizing leaf material in freshwater. In Fungi and Environmental Change (J. C. Frank land, N. Magan, and G. M. Gadd, eds) pp. 201-16 Cambridge : Cambridge University Press.

Butler, S. and Suberkropp, K. (1986) Aquatic Hyphomycetes on oak leaves: comparison of growth, degradation and palatability. Mycologia 78, 922-8.

Chandrasekhar, K.R. and Kaveriappa, K. M. (1988) production of extracellular enzymes by aquatic Hyphomycetes. Folia Microbiol. 33, 55-8.

Chandrashekar, K.R. and Kaveriappa, K. M. (1989) Effects of pesticides on the growth aquatic Hyphomycetes. Toxicology letter 48, 311-5.

Digby, S. and Goos, R.D. (1987) Morphology, development and taxonomy of Loramyces.

Mycologia 79, 821-31.

Duddridge, J. E. and Wainwright, M. (1980) Heavy metal accumulation by some aquatic fungi and reduction viability of Gammarus pulex fed Cd2+ contaminated mycelium. Water Research 14, 1605-11.

Fabre, E. (1996) Relationships between aquatic Hyphomycetes communities and riparian vegetation in 3 Pyrenean streams. C. R.

Acak. Sci. Paris, Science de la vie Life science 319,107-11.

Fisher, P.J., Davey, R.A. and Webster, J. (1983) degradation of lignin by aquatic and aero aquatic hyphomycetes. Trans. Brit. Mycol. Soc. 80, 166-8

Goh, T.K. and Hyde K.D (1997) Tropical freshwater hyphomycetes. In Biodiversity of Tropical Micro fungi (K. D. Hyde, Ed,), pp. 189-228. Hong: Hong Kong University Press.

Goh, T.K. and Hyde K.D. (1996) Biodiversity of freshwater fungi. Indust. Microbiol. 17, 3287- 45.

Hale, M.D. and Eaton, R.A. (1985) Oscillatory growth of fungal hyphae in wood cell walls. Trans. Brit. Mycol. Soc. 84, 277-88

Hyde, K.D. (1992) Tropical Australian freshwater fungi II. Annulatascus velatispora gen. et.sp. nov., Annulatascus bipolaris sp. Nov. and nais aquatic sp. Aust. Syst. Bot. 5, 117-24

Hyde, K.D. and Goh, T.K. (1997) Fungi on submerged wood in a small stream on Mt Lewis, North Queensland, Australia. Muelleria 10: 145-57

Ingold, C.T. (1966) the tetra radiate aquatic fungal spore. Mycologia 58, 43-56.

Ingold, C.T. (1975) an illustrated guide to aquatic and water-borne Hyphomycetes (Fungi Imperfect) with notes on their biology. Freshwater Biological Association. Scientific Publication. 39, 1-96.

Ingold, C.T. (1984) Aquatic Hyphomycetes with tetra radiate conidia. In Taxonomy of fungi. Proceeding. International Symposium on Taxonomy of Fungi. University of Madras 2, 353-64.

Kjoller, A. (1960) Two finds of aquatic Discomycetes in Scandinavia. Bot. Tidsskr. 56, 242-6.

Kohlmeyer. J. and Kohlmeyer. E. (1979) Marine Mycology. The Higher Fungi, London; Academic Press.

Nawawi, A.(1985) Aquatic Hyphomycetes and other water borne fungi from Malaysia. Malayan Nat. J. 39, 75-134.

Newell. S. Y. (1992) Estimating fungal biomass and productivity in decomposing litter. In the Fungal Community: its organization and role in the ecosystem, 2 edn (G.C. Carroll and D.T. Wieklow eds.) pp-521-61. New York: Mareel Dekker.

Raviraja, N. S., Sridhar, K. R. and Barlocher, F. (1996) Breakdown of introduced and native leaves in two Indian streams. Int. Revue ges hydrobiol. 81, 529-39.

Shearer. C. A. (1984) a new species of Halosarpheia (ascomycetes) from wood submerged in freshwater. Mycotaxon 20, 505-10.

Shearer, C. A. (1993a) the freshwater ascomycetes. Nova Hedwigia 56, 1- 33

Shearer. C. A. (1993b) A new species of Kirshsteiniothelia (Pleosparales) with an unusual fissitunicate Ascus. Mycologia 85, 963-9.

Shearer, C. A. and Crane, J. L. (1978b) the distribution of Nais inornata, a facultative marine ascomycetes. Mycotaxon 7, 443-52.

Shearer, C. A. and Crane, J. L. (1980a) two cleistothecial ascomycetes with papilionaceous ascospores. Trans. Brit. Mycol. Soc. 75, 193-200.

Thornton, D. R. (1965) Amino acid analysis of fresh leaf litter and the nitrogen nutrition of some aquatic Hyphomycetes. Can. J. Microbiol. 11, 657-62.

Tubaki, K. (1996) an undescribed species of Hymenoscyphus, a perfect stage of Varicosporium Trans. Brit. Mycol. Soc. 49, 345-9.