International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 3, Issue 12 - 2016

Review Article

DOI: http://dx.doi.org/10.22192/ijarbs.2016.03.12.026

Distribution and Ecology of Myxomycetes

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Abstract

The bright colors and delicate architecture of the spore-bearing structures of Myxomycetes have attracted mycologists as well as layman sufficiently to make collections of these minute organisms for over a century. Our research reports revealed that the spore walls of these small group of fungi which is not touched by many mycologists in India, contains considerable amount of melanin in addition to some other pigments. These pigments protecting fungi in adverse environmental conditions. The 600 – odd species of this little group are widely distributed over tropical and temperate regions, in deciduous and coniferous forests, and even in regions of extreme environments. From evidence collected from recent reports of the widespread occurrence of common species, it is suggested that the universal presence of melanin in the spore walls is one of the contributory factors for the successful distribution of this group.

Keywords: Distribution – ecology - extreme environment - Myxomycetes

Introduction

Habitats of Myxomycetes

Myxomycetes are primitive, holotrophic, eukaryotic, which commonly in association with decaying logs and litter in terrestrial ecosystems. Although their exact evolutionary affinities are still debated, the Myxomycetes constitutes a well–defined and homogenous group of approximately 600 – odd species. Judging from their distribution as indicated by taxonomic monographs and systematic accounts in individual publications, most of the species are cosmopolitan in distribution. However, while several species have been described as being predominantly tropical, temperate or alpine; or as occurring predominantly on bark, wood or litter very few species are listed as being restricted to such habitats or substrata (Gray and Alexopoulos, 1968). The above aspects were brought out very clearly during a conference on systematics and ecology of myxomycetes held in Madrid, Spain, in 1996. The papers presented in this conference supports the cosmopolitan distribution of myxomycetes.

As more and more people show an interest in looking for the minutely beautiful fructifications of myxomycetes in unusual habitats or in intensifying their search within a restricted area, their search does not generally yield many new species but only reveals more and more known species to be widely distributed. Broadly, however, one can list some species as being common to one habitat or the other. A few which are reported to be restricted to specific habitats are new species.

Besides availability of an abundance of moisture throughout the assimilative phase, temperature is a major factor in the growth of myxomycetes, so it is

broadly separate them as myxomycetes of warm or tropical habitats and those of cold habitats.

Myxomycetes in the tropics

The statement of Alexopoulos (1970) that myxomycetes are rare in the tropics, is refuted by some authors, who state that because of the seasonality of monsoon in the tropics, one has to look for these moisture-loving organisms at the right time (Kalyanasundaram,1997).

Within the tropical countries, one may find diverse climates because of topographical differences. According to Torres (1996), of some 234 species reported from Mexico only 107 were collected from regions with truly tropical climate, and of these 107 species 79 were also found in regions of cold or temperate climate in that country. Palma and Torres (1996) classify the Liceales of myxomycetes into five categories based on the distribution as i)cosmopolitan, ii)widespread but not cosmopolitan iii). Common to tropical and temperate ecosystems, iv). Species of cold and temperate ecosystems and v). species exclusive to coniferous forests. The myxomycetes were most common in the montane forest belt rather than the savannas, where natural or man-made fires generally destroyed the wood and litter.

Myxomycetes in the cold climates

Myxomycetes of high altitudes

Special mention may be made of the "nivicolous" myxomycetes growing in the snow-line region of mountains, because of the discovery of myxomycetes in these regions of melting snow dates back to the first few decades of this century(Grey and Alexopoulos, 1968). Takahashi and Yamamoto (1996), who found 12 species in the snow-line region at low elevations in Japan, state that these were associated with certain types of substrata and not restricted to alpine areas. Chopra (1996) on the other hand reports finding of 20 new species by incubating bark, from the foot hills of the Himalayas.

Myxomycetes of high latitudes

Myxomycetes have been reported from subarctic or sub antarctic latitudes. Stephenson *et al.*, (1996) reported 24 species in 424 field collections from Mcquarie islands, 54^0 South. Incubation of substrata yielded only common forms such as *Echinostelium minutum* and *Trichia contorta* which have been reported even from tropical countries.

Longevity of Myxomycete spores

What emerges from all these accounts is that while the total number of known myxomycetous species is limited these species have distributed themselves far and wide. Only a few have perhaps found for themselves a special ecological niche, such as the melting snow-line. The rest, no matter where their spores land as long as the substratum is suitable lie in wait for the right combination of environmental conditions, which is sure to occur at some time of the year even in areas of otherwise hostile environment. What is more essential to the spores is their survival on the substratum until the suitable microclimate is obtained. In this regard, the structure of their spores is of great advantage in their survival. Such a view is also expressed by Schnittler (1996) with regard to the myxomycete flora of the cold desert.

The melanised spores of myxomycetes are highly advantageous in addition to other components of the thick heavily ornamented walls built of a galactosamine polymer. Melanin is known to provide protection from ultraviolet radiation, desiccation and extreme temperature (Bell and Wheeler, 1986). It also helps to retain water and ions to maintain the long viability even up to 75 years as reported for myxomycete spores reported by Gray and Alexopoulos,1968). It is strongly envisaged that the myxomycetes to continue to invade new habitats and establish themselves until they achieve the status of "living fossils" in the future.

Acknowledgments

The author is highly thankful to UGC for funding through Minor Research Project (MRP 4960/14 (SERO/UGC) to carry out the present work and to the college management for facilities provided.

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	Subject: Fungal Diversity
Quick Response Code	
DOI:10.22192/ijarbs.2016.03.12.026	

How to cite this article:
Loganathan, P. (2016). Distribution and Ecology of Myxomycetes. Int. J. Adv. Res. Biol. Sci. 3(12):188-190.
DOI: http://dx.doi.org/10.22192/ijarbs.2016.03.12.026