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## Classification Of Fungi Alexopoulos And Mims 1979 Pdf 27 [WORK]

although the possibility that fungi could be the oldest living eukaryotic phylum remains to be established, these observations suggest that the early diversification of modern fungi may have begun aeons before the diversification of plants and animals. since the earliest reports of fungi in bacteriophages ( alexopoulos and mims 1979 ) and in bacteria ( alexopoulos and mims 1979 ; jaffee and erwin 2010 ), a number of studies have demonstrated that these fungi are also obligate parasites of plants (liu and chen 2000 ; martin et al. 2009 ; liu and chen 2010 ; lu et al. 2010 ). we show that fungal endophytes are present in >80% of tropical and temperate tree species; a large number of vascular plants are infected by filamentous fungi (fig. 5 ). we thus conclude that filaments such as those of glomus may have played a major role in the transition from prokaryotic to eukaryotic cells, as fungi may have provided the first eukaryotic cell envelopes (dhiman et al. 2013 ). therefore, the present study shows that the association of fungi with vascular plants was a major development during the evolution of eukaryotes and that fungi are ubiquitous in trees. since the evolutionary origin of modern fungi is dated to the late precambrian-early cambrian ( chiu et al. 2014 ), the association of fungi with plants may have begun before the origin of vascular plants. in conclusion, our study suggests that filamentous fungi were part of the earliest eukaryotic cells. the transition to eukaryotes, together with the diversification of eukaryotic cells, may have occurred during the glomales colonization of the land and its colonization by plants. this study also suggests that glomalean fungi could have played an important role in the colonization of land by plants.

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since recognition of prototaxites as a potential organic fossil species, researchers have reported the presence of similar elements, including fungal hyphae, in subsurface environments (higgins et al. 2011 ; graham et al. 2013 ; graham et al. 2015 ) and in modern tree roots (wright and jumpponen 2011 ). these observations raise the possibility that the silicified remains of prototaxites are widespread and represent the fossils of more than 100 diverse microbial fungi of at least three structural types. these observations also raise questions about whether particular components of this structure are associated with particular lineages of modern-day fungi that may have been present in the paleozoic. we therefore extend the recognition of prototaxites and the concept of prototaxites-type microfossils to encompass not only fungal hyphae but the diverse morphologies of these and other components of the microfossil matrix, which could have preserved distinct morphologies, such as spore-carrying hyphae and hyphae with ligulate, circular, or multiple terminal hyphal ends (wright and jumpponen 2011). our recovery of some of these microfossils from a modern liverwort associate, in particular, contrasts with the virtually nonexistent record of paleozoic-age microfossils of this type from the microbial mat (and bryozoan) model system from which the glomalean fungi of prototaxites have been described. although lignicolous fungi have a broad range of microfossil affinity, many of them are rarely reported. it is also worth noting that we have found no information in the literature describing the kinds of fungal organisms that have actually been observed to occur within the living tissues of liverworts. in our study, we found that the hyphae of diverse modern fungi were entirely resistant to acetolysis, while fungal spores of diverse species tested did not resist. this contrasts with the observations of ochoa et al. ( 2011 ), who reported that some hyphae of ascomycetes were resistant to the action of fungal exogenously added chitinase a ( a class of cellulase) at concentrations 10 to 100 times greater than that required to degrade plant tissue (chang et al. 2015 ). these observations suggest that fungi colonizing bryophyte tissues are not always aided by the activities of their host. there is no obvious reason why such organisms would seek to become associated with a host plant. 5ec8ef588b

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