

Abstract

Ectomycorrhizal (EcM) fungi form mutualistic relationships with some woody gymnosperms and angiosperms that play an important role in the functioning of most terrestrial ecosystems. Using enzymes capable of sequestering nitrogen and phosphorus from complex organic compounds, EcM fungi make these elements available to their host plants, which in turn provide them with the carbon compounds on which EcM fungi are vitally dependent. However, different species of EcM fungi differ from each other in their ability to sequester nitrogen and phosphorus from organic compounds, as well as in their carbon requirements from plants. The importance of the EcM symbiosis for the ecosystem therefore depends on the species richness of the EcM fungi, which is influenced at large spatial scales by a number of interacting factors, in particular the density and diversity of host plants, climate and soil properties. As EcM fungi generally exhibit low host preference, the density of host vegetation and the associated higher nutrient availability for EcM fungi has a greater influence on their species richness on a global scale than the phylogenetic diversity of host plants. In addition to these environmental factors, however, the distribution of EcM fungi is strongly related to their biogeographic history. In the context of current climate change, research on the species richness of EcM fungi is of considerable importance.