

Publication

The distance decay of similarity in communities of ectomycorrhizal fungi in different ecosystems and scales

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1. Despite recent advances in understanding community ecology of ectomycorrhizal fungi, little is known about their spatial patterning and the underlying mechanisms driving these patterns across different ecosystems. 2. This meta-study aimed to elucidate the scale, rate and causes of spatial structure of ectomycorrhizal fungal communities in different ecosystems by analysing 16 and 55 sites at the local and global scales, respectively. We examined the distance decay of similarity relationship in species- and phylogenetic lineage-based communities in relation to sampling and environmental variables. 3. Tropical ectomycorrhizal fungal communities exhibited stronger distance-decay patterns compared to non-tropical communities. Distance from the equator and sampling area were the main determinants of the extent of distance decay in fungal communities. The rate of distance decay was negatively related to host density at the local scale. At the global scale, lineage-level community similarity decayed faster with latitude than with longitude. 4. Synthesis. Spatial processes play a stronger role and over a greater scale in structuring local communities of ectomycorrhizal fungi than previously anticipated, particularly in ecosystems with greater vegetation age and closer to the equator. Greater rate of distance decay occurs in ecosystems with lower host density that may stem from increasing dispersal and establishment limitation. The relatively strong latitude effect on distance decay of lineage-level community similarity suggests that climate affects large-scale spatial processes and may cause phylogenetic clustering of ectomycorrhizal fungi at the global scale.

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