Host and soil properties are major drivers of ectomycorrhizal fungi in alpine coniferous forests

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Abstract

Mycorrhizal symbioses are essential for host nutrition and productivity in most forest ecosystems. Although we have gained tremendous insight into their evolution, physiology and partner identity, the knowledge on the deterministic forces in the assembly of ectomycorrhizal (ECM) fungal community is limited over broad geographical ranges, especially for those associated with conifers in alpine forests. We carried out an analysis of ECM fungal community at 65 sites of monodominant stands that covered a large range of contrasting environmental gradients and included 11 conifer species in the alpine regions of Qinghai-Tibetan Plateau. We found that coniferous species from Pinus, Piceae and Abies were differed in their community composition and diversity despite the dominance of Basidiomycota and Ascomycota in coniferous trees of the Qinghai-Tibetan Plateau. Host and soil factors explained most variation in ECM diversity; and of the host-related factors, root stoichiometry (i.e., root C/N, C/P) was suggested to be responsible for the shifts of ECM fungal community composition and diversity, whereas among soil variables, soil inorganic N accounted for the largest variation in ECM fungal composition and the fungal diversity decreased with soil inorganic N. Overall, we provided the first baseline data for ECM fungi in the alpine coniferous forests. Furthermore, we identified host and soil factors as their major drivers that convinced the hypothesis that host and environmental filtering act as large-scale controls of ECM fungi.

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1.Main Document.doc available at https://authorea.com/users/300252/articles/429878-host-and-soil-properties-are-major-drivers-of-ectomycorrhizal-fungi-in-alpine-coniferous-forests