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COMMUNITY DYNAMICS OF SOIL-BORNE FUNGAL COMMUNITIES ALONG ELEVATION GRADIENTS IN NEOTROPICAL AND PALEOTROPICAL FORESTS

Neo- és paleotropikus erdők gombaközösségek összetételbeli dinamikája magassági grádiensek mentén

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Because of their steep gradients in abiotic and biotic factors, mountains offer an ideal setting to enhance our understanding of mechanisms that underlie species distributions and community assemblies. Fungal diversity in tropical forests remains little known and opportunities to compare data from similar guilds across diverse tropical forest types at local and pantropical scales are rare. We obtained soil DNA data and compared the structure of taxonomically and functionally diverse soil fungal communities along five elevational gradients in the Neo- and Paleotropics (northern Argentina, southern Brazil, Panama, Borneo, and Papua New Guinea). The deep sequence data presented here show that fungal community composition is strongly structured according to elevational forest types in both the Neo- and Paleotropics. We found that richness and soil fungal community turnover correlated with environmental factors, particularly temperature and soil pH, with some shared patterns among neotropical and paleotropical regions. The observed elevational turnover likely is driven by contrasting environmental preferences among functional and taxonomic groups, resulting in the replacement of species within functional guilds. Composition of fungal communities in lower montane forests may be regarded as intermediate between those in lowland and upper montane forests, although all forest types possess several characteristic taxa. For functional groups dependent on symbioses with plants, most notably ectomycorrhizal fungi, the distribution of host plants drive richness and community composition, resulting in important differences in elevational patterns between neotropical and paleotropical montane communities. The pronounced compositional and functional turnover along elevation gradients implies that tropical montane forest fungi will likely be sensitive to climate change, resulting in altered composition and functionality over time.