Geophysical Research Abstracts
Vol. 12, EGU2010-9593, 2010
EGU General Assembly 2010

Disentangling the roles of plant diversity and precipitation in structuring microbial community composition and function in a tropical rain forest

Krista McGuire (1), Kathleen Treseder (2), Noah Fierer (3), and Benjamin Turner (4)

(1) Barnard College, Columbia University, (2) University of California, Irvine, (3) University of Colorado, Bouler, (4) Smithsonian Tropical Research Institute

Shifting frequency and intensity of precipitation events is expected to impact soil fungi through a variety of complex feedbacks, although the general patterns and mechanisms are not fully understood. Precipitation and plant diversity often covary, and disentangling the relative contribution of each is important for predicting changes in global C and N fluxes. In order to test the relative contributions of plant diversity and precipitation in shaping fungal community structure and function, soil samples (0-10cm) from six established 1-ha plots across a natural precipitation gradient on the isthmus of Panama were collected. These plots co-vary in mean annual precipitation and plant diversity. Fungal DNA was sequenced using general fungal primers for the 18S region and 454 pyrosequencing. We found that total fungal taxa significantly increased with increasing mean annual precipitation, but not with plant diversity. Activity for some extracellular enzymes increased, whereas as others decreased with mean annual precipitation, indicating that the effect of shifting precipitation on nutrient transformations may be process-specific. To directly test for effects of plant species richness on fungal diversity and function, we experimentally re-created litter diversity gradients in nylon, 2 mm screen litter bags with 1, 25, and 50 species of plant leaf litter. After six months, we found a significant effect of plant litter diversity on decomposition rate, but only after the increase from one to 25 species of leaf litter. Total fungal taxa as determined by 454 sequencing and extracellular enzyme activity did not track plant species richness, suggesting that precipitation may be a more important factor than plant diversity in structuring soil fungi in tropical rain forests.