Linking P Forms to the Microbial Community in the Forest Floor Along a Hawaii Chronosequence. (S07-cademenun165733-Poster)

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Abstract:

Using forest floor samples from a Hawaiian chronosequence, we determined P forms and concentrations with 31-P NMR and related them to microbiological parameters determined by PLFA and BiOLOG. Total and organic P followed the same trends as total C and N: lowest in samples from the youngest and oldest sites, and highest at the mid-aged sites. The greatest diversity of P forms from NMR was found in samples from the mid-aged site, which also had the highest microbial biomass. Monoester P was highest at the youngest sites, decreased significantly with age, and correlated positively with pH. Diester P was highest in the mid-aged site, correlated positively with C and N, and negatively with fungi and eukaryotes. Pyrophosphates and phosphonates were seen in all samples, with no differences with age, and did not correlate with any microbial groups. Polyphosphates were seen only in samples from the mid-aged site, and correlated with actinomycetes. These results suggest that monoester P is controlled by the soil chemical environment, while diester P is controlled by soil biota. Phosphonates appear to be controlled by climate and soil chemistry, accumulating in wet, acid soils.

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