Geophysical Research Abstracts
Vol. 19, EGU2017-17859, 2017
EGU General Assembly 2017

Drivers of decomposition in forest soils: Insights from a trans-European experiment.

Rebecca Hood-Nowotny (1)

(1) AIT, Tulln, Austria (Rebecca.Hood@AIT.ac.at), (2) For further info of participants see http://www.alter-net.info/about-alter-net/projects/mse/mse-

Meta-data analyses and the model based hypotheses state that global soil C storage is controlled by microbial scale processes of fungal competition for available nitrogen (N). The details of these microbe-dependent feedback mechanisms on N and C dynamics in European soils are largely unknown and contentious. Global trends of increasing atmospheric N deposition and the continuing use of inorganic N fertilizer in both agriculture and forestry mean that the soils vital function as a carbon sink is potentially under threat. We set out to experimentally investigate these hypotheses across a Trans-European gradient of forest soils and provide reliable information on soil microbial responses to nitrogen inputs for predictive climate change models.

Changes in nutrient status could result in a chain reaction of interacting microbial mechanisms which in turn could lead to the shifts in underlying ecosystem biogeochemical process rates. Recent meta-analysis has shown that plant fungal symbiont community structure, exerts a greater fundamental control over soil C storage than temperature, precipitation or net primary production. Based on the hypothesis that plant associated fungi effectively scavenge all available organic and inorganic N leaving little N for the growth of the free-living decomposer microbial community and preventing further breakdown of SOM.

To investigate these possible effects we have sampled forest soils across a trans European gradient (ALTER-net-MSII network) which have received additional inputs of inorganic nitrogen fertilizer or carbon in the form of sugar, over a three year period. We have studied both nitrogen and carbon dynamics in these systems using a tool box of stable isotopes, high through-put sequencing for microbial community analysis and be-spoke litter bags to tease out the dominant drivers of decomposition.

The results and conclusions from these analyses will be presented.