Geophysical Research Abstracts
Vol. 21, EGU2019-5338, 2019
EGU General Assembly 2019

Anthropogenic nitrogen deposition decreases decomposition by impacting saprotrophic and ectomycorrhizal fungal communities

Michael Gundale, Nadia Maaroufi, Kristin Palmqvist, Niles Hasselquist, Benjamin Forsmark, Nicholas Rosenstock, Håkan Wallander, and Annika Nordin

Swedish University of Agricultural Science, Forest Ecology and Management, Umea, Sweden (michael.gundale@slu.se)

There is evidence that anthropogenic nitrogen (N) deposition enhances carbon (C) sequestration in boreal forest soils. However, it is unclear how free-living saprotrophs (bacteria and fungi, SAP) and ectomycorrhizal (EM) fungi responses to N addition impact soil C dynamics. Our aim was to investigate how SAP and EM communities are impacted by N enrichment and to estimate whether these changes influence decay of litter and humus. We conducted a long-term experiment in northern Sweden, maintained since 2004, consisting of ambient, low N additions (0, 3, 6 and 12 kg N ha-1 yr-1) simulating current N deposition rates in the boreal region, and a high N addition treatment (50 kg N ha-1 yr-1). Our data showed that long-term N enrichment impeded mass loss of litter, but not humus, and only in response to the highest N addition treatment. Further our data showed that EM fungi reduced the mass of N and P in both substrates during the incubation period compared to when only SAP organisms were present. Low N additions had no effect on microbial community structure, while the high N addition decreased fungal and bacterial biomasses and altered EM fungi and SAP community composition. Actinomycetes were the only bacterial SAP to show increased biomass in response to the highest N treatment. These results provide a more mechanistic understanding into how anthropogenic N enrichment can influence soil C accumulation rates and suggest that current N deposition rates in the boreal region ($\leq$ 12 kg N ha-1 yr-1) are likely to have a minor impact on the soil microbial community and the decomposition of humus and litter.