The effects of forest understory management on soil carbon dynamics. (S07-horwath200403-Oral)

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Abstract:

Removal of understory vegetation is a common practice in plantation forestry, but little is known about its impact on long-term productivity of forest soils. We conducted a one-year laboratory incubation to quantify the influence of a common understory species on overall patterns of litter decomposition and SOM dynamics in plantation soils. Residues of Ponderosa pine (C/N = 30) and ceanothus (C/N=16), uniformly-labeled with C-13 and N-15, were incubated singly and in mixture in soils collected from a 35-year old ponderosa pine plantation containing plots with and without understory vegetation. Mineralization of soil-derived C was higher in the pine-only litter treatments relative to the mixtures, and was especially pronounced in the soil from the no-understory plots. Soil C and N in the pine-only treatments in both soils were lower than the other treatments by the end of the incubation, but contained a higher fraction of pine-derived C and N. Conversely, soil C and N in the mixtures showed a net accrual, with a high proportion of the new C and N derived from ceanothus. Thus, in the pine-only treatments litter-derived C and N turned over more rapidly through the mineral soil C and N pools and were coupled with no change or a net loss of soil C.

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