N fertilization alters C flow in soils through shifts in microbial community composition and physiology. (S03-waldrop170253-Oral)

Authors:

- M.P.Waldrop - *University of Michigan*
- D.R.Zak - *Univeristy of Michigan*
- R.L.Sinsabaugh - *University of New Mexico*

Abstract:

Atmospheric nitrogen (N) deposition may alter soil biological activity in northern hardwood forests by repressing phenol oxidase enzyme activity and altering community structure, which could slow decomposition of phenolic compounds. We tested this hypothesis by adding 13C-labelled cellobiose, vanillin, and catechol to control and N fertilized soils (20 and 80 kg ha-1) collected from three forests; two dominated by Acer Saccharum and one dominated by Quercus Alba and Quercus Velutina. N fertilization increased total microbial respiration but decreased oxidative soil enzyme activities, resulting in lower degradation rates of all compounds. This negative feedback was greater in the oak forest, where fungi are more abundant, than the sugar maple forest. Microbial community composition, based on phospholipid fatty acid analysis, was not greatly altered by N addition, but analysis of the isotope ratios of PLFAs show that N addition reduced the activity of fungal and bacterial populations in soil.

Corresponding Author Information:

Mark Waldrop
University of Michigan
Dana Building, 430 E. University Ave.
Ann Arbor, MI

phone: 734-763-8003
e-mail: mwaldrop@umich.edu

Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 9:00 am

Keywords:

13C PLFA, enzyme activities, C sequestration, soil organic matter