Landscape Influences on Denitrifier Populations and Their Activity Under Wet and Dry Conditions. (S03-mcmahon103715-Oral)

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Abstract:

The purpose of this study was to determine what factors govern denitrifier populations under wet and dry field conditions. Denitrifier populations were characterized based on two main parameters: activity and numbers. A suite of environmental variables was also measured. Redundancy analysis (RDA) was used to evaluate the data. When conditions were wet, the main RDA axis is interpretable as the moisture gradient resulting from changes in topography. The second RDA axis reflects a textural gradient, which has a secondary effect on hydrology. When conditions were dry, different variables were important. The first axis appears to represent a nutrient/energy gradient, as measurements of N and C are most important. This correlates well with CO2 flux, a measurement of aerobic microbial activity. Water is important on the secondary RDA axis. N2O flux is more closely related to water content under dry conditions than wet conditions. It has been suggested that the occurrence of denitrifying bacteria in a habitat is controlled by their ability to compete as heterotrophs rather than their ability to denitrify. Thus under aerobic conditions, denitrifiers are regulated by the same variables that regulate the entire soil microbial community - carbon and nitrogen.

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Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 8:15 am

Keywords:
Denitrifier Populations, Landscape Scale Regulation, Redundancy Analysis, Denitrifier Activity