Can we use Short-term Microbial Respiration as an Indicator of Soil Quality in Reclaimed Coal Mine Soils of NE Wyoming? (S03-ingram152915-Oral)

Authors:

- L.J.Ingram* - *Dept of Renewable Resorces, Uni. of Wyoming*
- G.E.Schuman - *USDA-ARS, Cheyenne, WY*
- P.D.Stahl - *Dept of Renewable Resources, Uni. of Wyoming*

Abstract:

For coal mines to be successfully reclaimed, it is critical that the soils used in the reclamation process contain a sufficiently amount of organic matter so as to ensure that nutrient cycling will be self-sustaining. Traditionally, methods to measure nutrient cycling in soils are slow, time-consuming and expensive. Rather than measure nutrient cycling in the field, we correlated short-term (3 days) microbial respiration with a number of variables that are generally considered to be good indicators of nutrient cycling and are easily measured in the laboratory. This assessment was made on a range of reclaimed coal mine soils from the semi-arid, Powder River Basin region of NE Wyoming. The indicators of nutrient cycling tested were; long-term (21 days) microbial respiration; microbial biomass (chloroform incubation method); long-term N-mineralization and organic C. We found strong and significant correlations ($r2 > 0.74$, $P < 0.001$) between short-term microbial respiration and the various indicators of nutrient cycling. We believe that this method promises to be a relatively cheap and quick method by which we can assess the ability of reclaimed coal soils to sustain nutrient cycling.

Corresponding Author Information:

Lachlan Ingram
University Of Wyoming
8408 Hildreth Rd
Cheyenne, WY 82009

phone: 307-772-2433 ext 126
fax: 307-637-6124
e-mail: lingram@lamar.colostate.edu

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