Concentration of Soil Carbon and Glomalin Affected by Tillage in Eastern South Dakota. (S06-pikul154957-Poster)

Authors:

- J.L.Pikul Jr.* - *USDA-ARS, Brookings, SD*
- S.F.Wright - *USDA-ARS, Beltsville, MD*
- L.Jawson - *USDA-ARS, Beltsville, MD*
- M.E.Ellsbury - *USDA-ARS, Brookings, SD*

Abstract:

Loss of soil organic matter (SOM) has been associated with increased tillage. Glomalin, a component of SOM, originates from hyphae of arbuscular mycorrhizal fungi and is thought to be important in maintaining soil structure. Objectives were to determine effect of tillage on soil carbon (C) and glomalin concentration. About 10 kg of soil from the top 50 mm was collected from four locations on no tillage (NT) and conventional tillage (CT) farms. Samples were air-dried and a rotary sieve was used to separate soil into aggregate groups. Group 1 was soil <0.42 mm, group 2 was 0.42-0.84 mm, group 3 was 0.84-2.0 mm, group 4 was 2.0-6.4 mm, and group 5 was 6.4-12.7 mm. Soil C was measured by combustion and total glomalin immunoreactive (TGIR), an indicator of more recently deposited glomalin, was measured with an enzyme-linked immunosorbent assay on all aggregate groups. Results from dry sieving show that soil aggregates from the NT farm resisted breakdown when compared with aggregates from the CT farm. There was a significant difference in total C between NT and CT within aggregate groups 4 and 5. Concentration of glomalin and total C was greater in aggregates that resisted disintegration and these aggregates were from the NT farm. Differences in properties among aggregate classes suggest that C and glomalin are not uniformly distributed across all aggregate groups. This finding is important in respect to identifying soil attributes that are sensitive indicators of soil change resulting from management.

Corresponding Author Information:

Joseph Pikul Jr.
USDA-ARS
2923 Medary Ave.
Brookings, SD 57006
USA

phone: 605-693-5258
fax: 605-693-5240
e-mail: jpikul@ngirl.ars.usda.gov

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