Effects of Crop Rotation and Tillage on C and N dynamics and Aggregate Stability in Eastern Kansas. (S11-doyle102816-Poster)

Authors:

- D.E.Peterson - *Dept. of Agronomy, Kansas State University, Manhattan, KS*
- G.L.Doyle - *USDA-ARS, El Reno, OK*
- C.W.Rice - *Dept. of Agronomy, Kansas State University, Manhattan, KS*

Abstract:

The role of soil aggregation in C sequestration has yet to be fully explained. The objectives of this study were to determine the effects of crop rotation and tillage on aggregate stability, the physical distribution of C and N within aggregates, and the influence of glomalin on aggregate stability. Soil from a long-term (27y) study in Kansas was planted to either sorghum (Sorghum bicolor (L.) Moench) or soybean (Glycine max (L.) Merrill), and grown under no-till (NT) or conventional tillage (CT) and incubated for 250-d. The mass of water stable aggregates (WSA) >250 um in size (macroaggregates) decreased 80% in NT soil after 28 d of incubation at 35C. C and N decreased from 57 to 18 g C kg-1, and 5 to 1.4 g N kg-1, respectively. NT WSA <250 um (microaggregates) were enriched in C and N. Soil from continuous sorghum contained a higher mass of macroaggregates and C while continuous soybean contained more microaggregates and less C. Values of WSA and C for sorghum/soybean rotations fell between the two monoculture crops. No change in total glomalin was measured after incubation, so the role glomalin in aggregate stability remains unclear. Crops that include more fibrous root systems, and reduced tillage favor the formation of WSA and protection of SOM.

Corresponding Author Information:

Geoffrey Doyle
USDA-ARS
7207 West Cheyenne St
El Reno, OK 73036

phone: 405 262 5291
fax: 405 262 0133
e-mail: gdoyle@grl.ars.usda.gov

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