Aggregate stability and associated properties of soil under "new management" in eastern South Dakota, Joseph Pikul, Jr., Jane Johnson, Michael Ellsbury, Sara Wright, and TheCan Caesar, USDA-ARS

Soil organic matter (SOM) is an important soil quality attribute. Objectives were to determine effect of management on components of SOM and stability of soil aggregates. Associated soil properties include glomalin, humic acid, carbon (C), and particulate soil organic matter (POM). Measurements were made on soil from four sites, each representing a recent change in management. At Site One, we compared soil properties in a corn-soybean rotation under no tillage (NT) and chisel plow tillage. Measurements at Site Two compare the effect of three levels of corn stover removal on soil properties under NT. At Site Three, we compared soil properties of five crop rotations under NT. Measurements at Site Four compare soil properties in native pasture to that under corn soybean. About 10 kg of soil from the top 5 cm was collected from three to four locations (randomized plots or pseudo-plots within farm fields) at each site. A rotary sieve was used to separate soil into aggregate groups. Group one was soil <0.4 mm, group two was 0.4-0.8 mm, group three was 0.8-2.0 mm, group four was 2.0-6.0 mm, group five was 6.0-19.0 mm, and group six was >19.0 mm. Water stability of aggregates was used to identify effect of management on soil slaking. We found: 1) SOM was not uniformly distributed among aggregate groups; 2) improved soil aggregation under no tillage; 3) greater soil C under NT compared with tillage; and 4) POM to be a sensitive indicator of stable aggregation.

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