Public Abstract

First Name:Kristen

Middle Name:Sloan

Last Name:Veum

Adviser's First Name:Keith

Adviser's Last Name:Goyne

Co-Adviser's First Name:Peter

Co-Adviser's Last Name:Motavalli

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Department:Soil, Environmental & Atmospheric Sciences

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Title:Characterization of Soil Organic Matter Under Varying Conservation Management Practices

The primary objective of this study was to use chemical, biological and physical indicators to characterize changes in soil organic matter quantity and quality as a result of agronomic conservation management practices currently practiced in Missouri and other Midwestern states. This research study utilized surface water runoff and soil samples collected from three small subcatchments that were no-till planted to a corn-soybean rotation with contour vegetative filter strips installed in two of the subcatchments. The study site was located in the Central Claypan region in northeast Missouri. This study measured dissolved organic carbon losses in runoff and examined multiple soil properties that are indicators of soil organic matter quality. The variables measured included soil organic carbon, aggregate stability, aggregate-associated carbon, water-extractable organic matter, microbial enzyme activities, labile organic carbon, and spectroscopic analysis of organic matter. This study found that perennial vegetation enhances stocks of labile, partially decomposed organic matter by slowing the decomposition rate through physical protection in soil aggregates. In contrast, the reduced aggregate stability under no-till leads to increased rates of organic matter turnover. Therefore, although no differences in soil organic carbon stocks were found among conservation management practices after 10 years, the vegetative filter strips may have increased C sequestration potential over no-till in the long-term. Overall, this study contributes to a greater understanding of conservation management practices on a field scale, and has implications for the role of management practices in the global soil carbon cycle.