Cultivation Effects on Native Soil Quality in the Delta Region of Eastern Arkansas. (S06-brye124219-Poster)

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Abstract:

Decades of cultivated agriculture have resulted in concern over soil quality and agricultural sustainability in eastern Arkansas. Assessing the impact of agricultural practices on native soil quality is essential for better management of the soil resource for sustainability. The objective of this study was to evaluate soil physical, chemical and biological properties of paired sites with cultivated agriculture adjacent to native prairie. Eleven prairie-agriculture landuse combinations were identified on six alluvial silt loam soils at six locations within the Grand Prairie area of the Mississippi River delta region of eastern Arkansas. Soil samples were collected from the top 10 cm at 15-m intervals along a 60-m transect in each prairie and agricultural field for bulk density, particle-size analysis, pH, electrical conductivity, Melich-3 extractable soil nutrients (i.e., P, K, Ca, Mg, Na, S, Fe, Mn, Zn, and Cu), total N and C, organic matter, and microbial biomass. Overall, S and Mn concentrations, total N and C, organic matter, and fungal biomass were larger for the prairie than agricultural landuse, while bulk density, pH, EC, P, K, Ca, Mg, Na, Fe, Zn, Cu, and bacterial biomass were larger for the agricultural landuse than prairie. The mean difference between the prairie and agricultural landuse for all soil parameters measured, except bacterial and fungal biomass, were significantly different ($P < 0.1$) than zero. Conversion of native prairie to high-intensity cultivated agriculture has significantly altered soil properties related to soil quality in the Grand Prairie area of the Mississippi River delta region of eastern Arkansas.

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