

Soil Responses to 48 years of Continuous No Till and Conventional Till Corn in Central Kentucky, USA

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Abstract

Cropping systems, fertilizer applications and tillage practices influence soil physical and chemical characteristics. In this study, the impact of long-term conventional and no-tillage systems on selected soil properties were evaluated in a continuous corn system on a Maury silt loam soil. This field for the study is located on the University of Kentucky's Research Farm (Spindletop Farm). The field was tilled in 1969 from bluegrass sod and the first year's data was in 1970. Each plot is 20 ft. by 40 ft. and for many years each plot was split with winter cover crop planted to rye or hairy vetch. The vetch is no longer sowed but the rye is continued to be used. The rye is plowed under every spring in the conventional plots and killed with herbicides in the No-Till plots. This research field represents 48 years of continuous no till agriculture under continuous corn. Each replication contains four rates of nitrogen applied every spring at 0, 84, 168, and 336 kg/ha. In this experiment, the soil samples were collected from the no till and conventional tillage at 0 and 168 kg/ha of N at the depth of 0 to 7.5 cm and 7.5 to 15 cm on June 26, 2017. The soil samples were analyzed for organic carbon (SOC), aggregates, C in macroaggregates, pH, particulate organic matter (POM), water retention and porosity. The results indicate that the soil surface changed significantly after 48 years of no till and conventional till practices, but the magnitudes of the change varied among the properties.

Keywords: Acidity, Aggregates, Kentucky, No Till, Organic Carbon, Particulate Organic Matter (POM)