Evaluating the Impact of two Contrasting Tillage Practices on Soil Properties in Central Kentucky

Emily L. Cook¹, Steven Still¹, Iin P. Handayani¹, Jessica Pafford¹, John Grove², Mark Coyne², and Ann Freytag²

¹Murray State University, Hutson School of Agriculture, Kentucky, USA
²University of Kentucky, Department of Plant and Soil Sciences, Kentucky, USA

Abstract

Farming practices such as no tillage and plowing can institute change on soil physical and chemical characteristics. In this research, the effects of long-term conventional and no-tillage systems on the selected soil properties were determined in a continuous corn system on a farm with Maury silt loam soil. These samples were taken from University of Kentucky's Research Farm (Spindletop Farm). The field used was tilled in 1969 from bluegrass sod and the first time research was conducted 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 not used the whole time but the rye is continued to be used. The rye is killed with herbicides in the No-Till plots and plowed every spring in the conventional plots creating different soil conditions. This research has been conducted for over 48 years of continuous no till agriculture under continuous corn. Every time the experiment was conducted, the soil contained four rates of nitrogen applied every spring at 0, 84, 168, and 336 kg/ha. In this research, the soil samples were collected from the conventional tillage no till on June 26, 2017 at 0 and 168 kg/ha of N at the depth of 0 to 7.5 cm and 7.5 to 15 cm. The samples were analyzed for soil organic carbon (SOC), soil aggregates, C in macroaggregates, soil pH, particulate organic matter (POM), and soil porosity. These results will indicate that tillage practice and soil depth are two important factors affecting the soil properties, and conservation tillage practices improve both physical and chemical properties of soil.

Keywords: Aggregates, Kentucky, Macroaggregates, Soil pH, Soil Porosity