Soil Responses to Various Farming Systems in Western Kentucky

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Abstract

The interactions among the farming systems and the soil, water, biota, and atmosphere control the effects of cultivation on soil properties. Land conversion from forest or pasture ecosystems into crop fields altered soil properties due to the loss of soil organic matter (SOM) and the increase of soil compaction. However in Kentucky, the magnitude of the changes varied among the soil properties. Therefore, the objective of this research was to investigate the changes of selected soil properties include SOM, soil pH, and compaction under different crop fields such as corn-soybean-tobacco rotation (Field #1), continuous corn field (Field #2), hemp field (Field #3), wheat field (Field #4), pasture with animal grazing (Field #5), and canola field (Field #6). The prominent soil textures in all fields are silt loam and silty clay loam. Disturbed soil samples were taken from the depth of 0-7 cm and 7-23 cm to measure SOM and soil pH. There were three replications from each field. The results indicated that the canola field, which has been under no-till for over fifteen years, had the highest SOM at an average of 4.2% in 0-7 cm. At similar depth, continuous cornfield had the second lowest amounts of SOM which was 2.8%. The canola field and the continuous corn field had soil pH of 6.7 and 5.37, respectively indicating the highest and the lowest level of acidity. The average of soil compaction from all fields were 159 psi in 0-7 cm depth, and 427 psi in 7-23 cm. depth The highest compaction was found in the field under animal grazing at 561 psi the lowest was under tobacco at 243.5 psi. The results provide a solid background regarding to the relationship between farming systems and soil's responses which determine how agricultural production affects the quality of soils.

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