

Cover crop practices in Missouri claypan soils and their influences on selected soil health indicators

James Shannon VeVerka

Advisors: Dr. Robert Kremer and Dr. Ranjith Udawatta

Abstract

Growing world human populations and diversified global markets have increased demand for agricultural food products, as well as non-food agricultural industry products. To meet these expected future demands, increasing and maintaining soil productivity will be vital. The concept of soil health assessment focuses on specific soil properties and determining its ability to maintain a range of ecological functions in its appropriate ecosystem, supporting long term sustainability. Farmers today implement diverse management practices to maintain and increase the soil health. Cover crop and crop rotation management practices have been used for centuries in agricultural production systems with known benefits. With increasing interest in soil health issues, interest in use of cover crop practices has grown. Methods to determine the effectiveness of cover crop practices on soil health are diverse. Soil enzymatic activity and soil microbial functions can reflect the health of a soil ecosystem and are linked to soil carbon, nutrient cycling and soil structure properties among many other soil characteristics.

The objective of the investigation was to determine the influence of cover crop, no-till and rotational crop practices on soil health parameters, specifically biological indicators. Variations between sampling events using selected soil health indicators helped evaluate changes in soil ecosystems over time and treatments. Analyses performed include soil enzymatic activity, soil microbial diversity, soil nutrient and physical properties.