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Assessing Soil Health Among Conventional Annual, Cover Crop Annual, and Perennial Forage Systems in Tennessee

Abstract

Climate variability is increasing and is imperiling the profitability and sustainability of annual crop and perennial forage production. Soil health indicators including soil microbial indicators can be improved through the use of cover crops and perennial forages owing to reduced fluctuations in soil moisture. We conducted on-farm research to evaluate various soil health indicators and soil nutrients in conventional annual systems, annual systems with cover crops, and perennial forage systems in Franklin County Tennessee. We found that the perennial forage system had the highest soil organic carbon followed by annual systems with cover crops. Conventional annual systems had the lowest soil organic carbon. Interestingly, nitrate nitrogen was lower in the fields with cover crops compared to conventional annual crop fields and perennial pastures. The lower nitrate nitrogen in cover crop fields may be associated with the utilization of nitrate nitrogen cover crops compared to conventional fields when the fields were fallow during the sampling time, but it is still not clear about the higher nitrate nitrogen in the perennial pastures. Next sampling in 2025 from the same fields will give more power to detect slow-changing soil health.