Conservation tillage effects on soil health in maize production

Irena Jug, Boris Đurđević, Bojana Brozović, Vesna Vukadinović, Ante Bubalo, Domagoj Veseli, Danijel Jug

Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, University of, Vladimira Preloga 1, Osijek, Croatia (ijug@fazos.hr)

Summary

Conservation tillage is a type of land management that aims to minimize the frequency or intensity of tillage operations in an effort to protecting the soil by managing crop residue and limiting soil disturbance with minimum or no-tillage. Conservation tillage methods improve soil health and productivity, reduce runoff, increase soil carbon sequestration and limit the extent of erosion and also promote certain economic and environmental benefits as decrease in carbon dioxide and greenhouse gas emissions, less reliance on farm machinery and equipment, and an overall reduction in fuel and labor costs. Changes in the soil health status resulting in a diminished capacity of the ecosystem to provide goods and services for its beneficiaries, are define as soil degradation. The field experiment with different conservation tillage systems in maize production was conducted in 2021 in Čačinci and Križevci. Tillage treatments were: ST (plowing), CTD (conservation deep, loosening up to 30 cm with a minimum of 30% of crop residues) and CTS (conservation shallow, tillage up to 10 cm with a minimum 50% of crop residues). The following parameters were investigated: bulk density (ρv), packing density (PD), soil compaction (by penetrometer), soil organic matter (SOM), soil organic carbon (SOC), soil respiration, estimation of N-mineralization and C/N ratio. After the first year of research, a large heterogeneity of the researched parameters between the tillage treatments was recorded.

Keywords: conservation tillage, soil degradation, soil health.

This work has been fully supported by Croatian Science Foundation under the project "Assessment of conservation soil tillage as advanced methods for crop production and prevention of soil degradation – ACTIVEsoil" (IP-2020-02-2647)