

Effects of conservation tillage on maize yield

Irena JUG¹ - Boris ĐURĐEVIĆ¹ - Bojana BROZOVIĆ¹ - Vesna VUKADINOVIĆ¹ - Larisa BERTIĆ¹ - Bojan STIPEŠEVIĆ¹ - Danijel JUG¹

¹Faculty of Agrobiotechnical Sciences Osijek, Josip Juraj Strossmayer University of Osijek, Vladimira Preloga 1, HR-31000, Osijek, Croatia; E-mail: jjug@fazos.hr

Keywords: soil degradation, conservation tillage, grain yield, straw yields, harvest index.

Conservation tillage is prescribed to prevent and protect soil from degradation processes. Conservation tillage ensures more moisture storage, reduces erosion, benefits the crop in arid and semiarid areas by reducing drought risk and increasing grain yield. The aim of the research was to determine the changes in the grain and straw yield as a harvest index with regard to the tillage systems, fertilization treatment and liming. This research was conducted in 2020/2021 on two experimental fields in two different agricultural subregions of Croatia (Krizevci and Cacinci site). Cultivated crop was maize and the treatments were: ST-standard tillage (deep mouldboard ploughing), CTD-Conservation System Deep (chiseling with minimum 30% of surface covered with plant residues), CTS-Conservation System Shallow (tillage up to 10 cm and minimum 50% of surface covered with plant or plant residues). Liming was applied with two different variants: CY-treatment with liming (according to recommendation for neutralization soil pH) and CN-treatment without liming. Fertilization treatments include: FR-according recommendation (NPK), FD-fertilization decreased by 50% compared to recommendation, GFR-fertilization according recommendation + 300 kg/ha Geo2 (biophysiological soil activator), GFD-fertilization decreased by 50% + 300 kg/ha Geo2. After maize harvest the grain and straw yield was measured and the harvest index was calculated. All collected data was statistically processed by the statistical package TIBCO Soft-ware Inc. The means were compared by LSD tests upon significant results of F-test at $P < 0.05$ for observed factors. Grain and straw yields were significantly influenced by the tillage, lime and fertilization treatments in Krizevci site. The highest grain (15.67 t/ha) and straw (15.28 t/ha) yield were achieved on ST /CY/ GFR treatment at Krizevci site. Grain and straw yields, as harvest index were significantly influenced by the tillage, lime and fertilization treatments in Cacinci site. The highest grain yield (9.76 t/ha) and harvest index (0.66) were achieved on CTD/CY/ GFR treatment; the highest straw yield (10.60 t/ha) was recorded on CTS/CY/GFR. The obtained results indicate the importance liming (on acid soils), applying optimal doses of fertilizer with the use of biophysiological soil activators and the possibility of implementation conservation tillage for maize production in different agroecological conditions.

Acknowledgement

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" (IP-2020-02-2647).