

The influence of conservation tillage systems on soybean weediness

Iva Rojnica¹, Bojana Brozović², Irena Jug², Boris Đurđević², Marija Ravlić², Danijel Jug²

¹Križevci College of Agriculture, Milislava Demerca 1, Križevci, Croatia (irojnica@vguk.hr)

²Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, Osijek, Croatia

Summary

Conservation tillage systems, compared to conventional ones, have proven to be more effective from a biological, ecological and economic point of view, while at the same time preserving the ecosystem. Research with conservation tillage systems was conducted in 2022 on the experimental area of Križevci College of Agriculture (46° 01' 38" N, 46° 33' 32" E). The field experiment was set up according to a split plot experimental design with three main tillage treatments: ST (conventional, plowing), CTD (conservation, loosening with a minimum of 30% crop residues on the surface) and CTS (conservation, tillage up to 10 cm with a minimum of 50 % crop residues on the surface). Weed sampling was carried out during the critical period for weediness in soybean crops. The number and above-ground biomass of weeds was determined by counting individual weed species using a square of 0.25 m² in four replicates per experimental plot. Weeds from each square were cut at ground level, counted, sorted according to species, dried at 65 °C and weighed. The applied herbicide treatments were uniform on all tillage treatments. Tillage had a statistically significant effect on the total number of weeds, the above-ground biomass and the number of weed species. The highest number of weeds was found in the CTD treatment (44.67 m⁻²), and the lowest in the ST treatment (7.33 m⁻²), with a statistically significant difference between ST and conservation treatment treatments. The CTS treatment resulted in the highest weed biomass (48.77 g m⁻²) but without a statistically significant difference compared to CTD (39.98 g m⁻²). The highest number of weed species was found in the CTS treatment (3.66 m⁻²), and the lowest in the ST (1.33 m⁻²), with statistically significant differences between all tillage treatments. All investigated weed parameters were, on average, the lowest in the conventional tillage system compared to the conservation systems. The CTD treatment resulted in a smaller number of weed species and a lower biomass compared to the CTS treatment, which indicates the need for further research into the impact of conservation tillage on the occurrence of weeds in soybeans.

Keywords: conservation tillage, weeds, soybeans

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