

WEED OCCURRENCE IN SOYBEAN UNDER DIFFERENT CONSERVATION TILLAGE AND LIMING

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

¹ Križevci University of Applied Sciences, Ul. Milislava Demerca 1, 48260, Križevci (irojnica@vguk.hr)

² Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Vladimira Preloga 1, 31000 Osijek, Croatia

Abstract

Conservation tillage plays a crucial role in addressing the challenges of climate change. The field experiment was conducted in Čačinci, Croatia (17°86'36" E, 45°61'32"N, 111 m a. s. l.) in 2022, using a split plot design with three replications. The main treatment focused on soil tillage, while liming was the sub-treatment. Plot sizes were 160 m² for tillage and 80 m² for liming. Three tillage treatments were applied: conventional tillage (ST - plowing up to 30 cm depth), deep conservation tillage (CTD - loosening up to 30 cm depth) with 30% minimum crop residue coverage, and shallow conservation tillage (CTS - loosening up to 10 cm depth) with 50% minimum crop residue coverage. Liming material (CaO) was manually applied in recommended amounts after winter wheat in 2020. Weed sampling occurred during critical weed free period in soybean crops (V3) and at maturity stage (R7). Weed density and above-ground biomass were determined by counting and cutting weed species in 0.25 m² squares across four replicates. Visual assessment determined total weed coverage, and weed species were collected, dried (at 60 °C for 48 h) and weighed for biomass evaluation. Soil tillage significantly influenced weed biomass, weed species number and coverage at

the V3 stage. In the R7 stage, significant differences in biomass, total number of weeds, and weed species were observed between CTS and other tillage treatments. CTS exhibited the highest weed biomass in both stages (V3: 8.54 g m⁻²; R7: 88.20 g m⁻²). CTS also had the highest weed density at the V3 stage (36.50 m⁻²), while CTD had the lowest (25.00 m⁻²). However, no significant differences were found in weed density among all tillage treatments at the V3 stage. CTS showed the highest number of weed species at the V3 stage (2.5 m⁻²), while ST had the lowest (1.5 m⁻²), with significant differences among treatments. Significant differences in weed coverage were observed among CTS and ST at the V3 stage, but not at the R7. On average, weed parameters were higher at non-limed treatments compared to limed. Liming significantly decreased weed biomass and weed density on CTS in R7 growth stage. An average decreasing in weed coverage was present in all limed tillage treatments compared to non-limed. On average, CTS with no liming led to increased weed infestation in soybean crops.

Key words: weed infestation, *Glycine max* (L.) Merr., conservation tillage systems, CaO

Acknowledgement

The results presented in the paper are an output from research projects (IP-2020-02-2647). "Assessment of conservation soil tillage as advanced methods for crop production and prevention of soil degradation – ACTIVEsoil.