Book of Abstracts

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Weed Seed Bank Model

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Poster

Weed seed banks are an inexhaustible and permanent source of weeds, but they also have a stabilizing effect on the ecosystem and biodiversity in plant production systems. Scarce research on this topic has shown great variability in results, in part, due to different methodology of the seedbank estimation. The aim of this research was to compare two methods of estimating weed seed bank: 1) physical extraction of seeds, and 2) seedling emergence method. The plots of the stationary experiment "Plodoredi", Institute of Field and Vegetable Crops, Novi Sad, Serbia (N 45° 19', E 19° 50') were used for these research. Soil samples were taken from two experiments, a 50-year winter wheat monoculture, and from a three-year crop rotation (winter wheat-maize-soybean), over the course of three years (2014-2017). The method of physical extraction, although longer and physically more exhaustive, showed better results. In winter wheat monoculture 12 weed species were recorded, with a total of 21575 seeds m^{-2}, while in the three-year crop rotation 25 weed species were detected, with a total of 16300 seeds m^{-2}. Using the seedling emergence method only five weed species and 8500 seeds m^{-2} were estimated in monoculture, while in crop rotation five weed species and 4500 seed m^{-2} were estimated. This indicates that the entire weed seed bank is not active: some seeds are not able to germinate, while others are dormant, but present a potential danger. The estimated number of seeds per m^{-2} by the more efficient method of physical extraction was used to create the "*Artificial Neural Network*" model which had been previously tested using the Random-Holback method. The model answered the key question: how monoculture and crop rotations can change the soil weed-seed bank and diversity in a long-term cropping system.

Keywords: *weed seed bank, physical extraction of seed, seedling emergence method, ANN model*