

SUMMARY

Title: Weed diversity in spring cereals and weed seed bank in conventional and organic farms in the province of Lublin.

Key words: biodiversity, segetal flora, weeds, soil seed bank, farms, organic farming, conventional farming, lubelskie region

The aim of the study was to compare species diversity and soil seed bank of segetal flora in organic and conventional farms as well as the assessment of the impact of specific agronomic practices on diversity of weed flora and weed seed bank. The study was carried out between 2012 and 2014. Weed flora and weed seed bank were investigated each year between 10th of June and 5th of July in spring cereals fields located in Lublin province. Chemical analysis of soil was done to get full information about the fields and farms. Also surveys with farm owners were conducted. Weed species and their abundance on one square meter in spring cereals were counted. Soil seed bank was evaluated with greenhouse method (emerging seedlings of weeds were counted in 12 month time period). Shannon diversity index as well as Simpson dominance index were counted. Statistical analysis, including Mood's median test, correlation analysis and cluster analysis were done.

Diversity and abundance of weeds in spring cereals and in soil seed bank was generally higher in organic farming system than in conventional. No significant differences between systems were found in 2013, in which weather conditions made impossible the execution of agricultural weed management treatments for some farmers, due to local inundation of fields. Weed species composition depended on farming system as well as on soil and local habitat conditions. It has been shown that qualitative changes in the population of weeds and soil seed bank are slower than quantitative changes. Moreover, weed composition in the organic management system was characterized by a greater mutual similarity in years compared to the conventional system. Also a greater similarity of species composition in soil seed bank than in fields sown with spring cereals was found.

Both organic and conventional agricultural production systems were dominated by the same above-ground flora species: yellow foxtail (*Setaria pumila*), barnyardgrass (*Echinochloa crus-galli*) and couch grass (*Elymus repens*); in the soil seed bank: barnyardgrass (*Echinochloa crus-galli*) and common windgrass (*Apera spica-venti*). Both organic and conventional farms of Lublin province are the mainstay of valuable weed species, which is confirmed by the presence of the species threatened with extinction, for example: summer pheasant's-eye (*Adonis aestivalis*), poorman's blue weatherglass (*Anagallis foemina*), rye brome (*Bromus secalinus*) tiny mousetail (*Myosurus minimus*), or some rare species like: common corn-cockle (*Agrostema githago*), *Veronica dillenii*, lamb's succory (*Arnoseris minima*), *Euphorbia exigua*, bloody geranium (*Geranium sanguineum*), tuberous pea (*Lathyrus tuberosus*), creeping bellflower (*Campanula rapunculoides*). Dwarf everlast (*Helichrysum arenarium*) is the only found species that is subject to partial protection by Polish law.

The studies provided knowledge about the natural value of organic and conventional farms in Lublin province and the effect of different agricultural practices on the diversity of weed flora and weed seed bank. It has been shown, that mechanical weed control (harrowing) and the use of intercrops are the two agricultural practices that can keep the weed populations at low level, while maintaining their high biodiversity.