

CROP SPECIES AND YEAR SEASONS AS DETERMINANTS OF MICROBIOTA STRUCTURE IN CHERNOZEM SOIL IN THE SOUTHEAST REGION OF MOLDAVIA, ROMANIA

Florin Daniel LIPȘA¹, Andreea Mihaela FLOREA¹, Andrei Mihai GAFENCU¹, Eugen ULEA¹

e-mail: flipsa@uaiasi.ro

Abstract

In this study, we examined the diversity and abundance of microbial communities isolated from chernozem soil type in response to crop species and season from southeast region of Moldavia, Romania. Soil types, plant species, season, human activities and various land management regimes all have great impact on soil biology, but our knowledge of biodiversity of soil microorganisms is still very limited. Therefore, during 2018 we assessed the variation of microbial community in chernozem soil and its response to plant species (rapeseed, sunflower, sugar beet, wheat and maize) and season (spring, autumn). At each site, five replicate bulk samples were taken, consisting of 10 randomly collected sub-samples from the surface soil (10-15 cm horizon). The samples were transported to the laboratory, stored overnight at 4°C, air-dried at room temperature and sieved (2-mm mesh) prior to further use in the experiment. The influence of crop species and season on the total number of microorganisms (CFU g⁻¹), relationships between the main groups (bacteria and fungi) and the spectrum of filamentous fungi from our experiment were established. The abundance of the microbial community from all crop species were ranked as follows: wheat (19.2 x 10⁶ CFU g⁻¹) > sunflower (1.3 x 10⁶ CFU g⁻¹) > maize (1.1 x 10⁶ CFU g⁻¹) > sugar beet (0.6 x 10⁶ CFU g⁻¹) > rapeseed (0.4 x 10⁶ CFU g⁻¹). In case of yearly seasons, the microbial abundance decreased from spring to autumn. Occurrence and distribution of filamentous fungi isolated from soil samples provide new insights into ecology and niche specialization of several soil-borne species. Overall, genera composition of filamentous fungi from chernozem soil cultivated with different crop species was not very heterogeneous and most fungal genera were common to all location. Our results suggest that crop species and yearly seasons have a significant impact on microbial richness and diversity. Extensive use of xenobiotic compounds in agriculture will degrade soil microbial communities, because they affect directly microbial abundance and composition, and indirectly soil texture and fertility.

Key words: microbial community structure, chernozem soil, crop species, seasonal variation