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Soil Organic Carbon Fractions in Different Land Use Systems under the Haplic Chernozem

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Soil organic carbon (SOC) pool and its fractions in Haplic Chernozem were produced within the complex interaction of soil chemical, physical and microbiological processes. Therefore, to understand the changes in SOC it is necessary to consider dynamic of the different SOC fractions as well as in soil conditions. In order to access the carbon fraction the soil samples were taken (0-30 cm) from the long-term stationary experiment of the Institute of Field and Vegetable Crops Novi Sad, at Rimski Šančevi. The following land use systems were analyzed: monoculture (MO), unfertilized 2-year rotation (MW), fertilized 2-year rotation (MWf), fertilized 3-year rotation (MWSm), adjacent natural meadow land (ME) and natural oak forest (FO). All arable plots were maize-based and received same management practices for >30 years. The decreasing trend of SOC was observed in both arable and non-arable soils compared with earlier findings. Labile fraction of SOC are likely to be controlled by management to a greater extend compared with the SOC. In this study, the average content of labile hot-water extractable carbon (HWOC) ranged from 92.89 μg g-1 to 213.24 μg g-1 in arable land use systems and from 268.44 μg g-1 to 313.01 μg g-1 at the natural soils. The content of mineral-associated organic carbon (MOM-C) ranged from 12.6 to 30.7 g kg-1 whereas particulate organic carbon (POM-C) content was 11.7 to 118.3 g kg-1. In average HWOC had 1.01 to 1.57% of carbon found in SOC. Investigated systems had higher content of carbon in POM-C compared with the MOM-C. Contrary to that the unfertilized 2-year rotation showed opposite POM-C/MOM-c distribution. Correlation reveals that the changes in HWOC and POC-C had higher influence on SOC than those in MOM-C. This result could contribute to the understanding of carbon loss in Chernozem related to the cropping management and could help in preservation of SOC.