ANALYZING SOIL POROSITY UNDER DIFFERENT TILLAGE SYSTEMS USING X-RAY MICROTOMOGRAPHY

Anca-Elena CALISTRU[1], Irina Gabriela CARA[1], Denis ȚOPA[1], Gerard JITĂREANU[1]

e-mail: aecalistru@uaiasi.ro

Abstract

X-ray computed tomography is one of the modern techniques used for soil structure visualization and quantification. The aim of this study was to investigate the effects of different tillage systems on soil porosity. Soil samples were collected from the field, on 0-30 cm depth, within the Experimental Farm of the Agricultural University of Iasi, North East of Romania, from a long term experiment with three tillage systems: V1 - chisel, V2 – no-till, V3 - plough at 30 cm. Aggregates were scanned using a SkyScan 1172 microCT and then the reconstructed 3D images were analyzed, in order to investigate pore volume and pore size class distribution. The results of the porosity analysis revealed significant differences between the variants taken into study. Regarding the solid surface area the tillage systems determined very different values of this parameter in soil. Pore size class distribution also showed clear differences between the variants. X-ray CT proved to be a useful tool for soil analysis, in order to have a detailed view of the pore network.

Key words: (soil porosity, X-ray CT, tillage system)