World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:11, No:12, 2017

The Influence of Different Technologies on the Infiltration Properties and Soil Surface Crusting Processing in the North Bohemia Region

Authors : Miroslav Dumbrovsky, Lucie Larisova

Abstract : The infiltration characteristic of the soil surface is one of the major factors that determines the potential soil degradation risk. The physical, chemical and biological characteristic of soil is changed by the processing of soil. The infiltration soil ability has an important role in soil and water conservation. The subject of the contribution is the evaluation of the influence of the conventional tillage and reduced tillage technology on soil surface crusting processing and infiltration properties of the soil in the North Bohemia region. Field experimental work at the area was carried out in the years 2013-2016 on Cambisol district medium-heavy clayey soil. The research was conducted on sloping erosion-endangered blocks of compacted arable land. The areas were chosen each year in the way that one of the experimental areas was handled by conventional tillage technologies and the other by reduced tillage technologies. Intact soil samples were taken into Kopecký´s cylinders in the three landscape positions, at a depth of 10 cm (representing topsoil) and 30 cm (representing subsoil). The cumulative infiltration was measured using a mini-disc infiltrometer near the consumption points. The Zhang method (1997), which provides an estimate of the unsaturated hydraulic conductivity K(h), was used for the evaluation of the infiltration tests of the mini-disc infiltrometer. The soil profile processed by conventional tillage showed a higher degree of compaction and soil crusting processing. The bulk density was between 1.10–1.67 g.cm^{-3}, compared to the land processed by the reduced tillage technology, where the values were between 0.80–1.29 g.cm^{-3}. Unsaturated hydraulic conductivity values were about one-third higher within the reduced tillage technology soil processing.

Keywords : soil crusting processing, unsaturated hydraulic conductivity, cumulative infiltration, bulk density, porosity
Conference Title : ICLDSSM 2017 : International Conference on Land Degradation and Sustainable Soil Management
Conference Location : Sydney, Australia
Conference Dates : December 04-05, 2017