

Agro-Measures Influence Soil Physical Parameters in Alternative Farming

Authors : Laura Masilionyte, Danute Jablonskyte-Rasce, Kestutis Venslauskas, Zita Kriauciuniene

Abstract : Alternative farming systems are used to cultivate high-quality food products and sustain the viability and fertility of the soil. Plant nutrition in all ecosystems depends not only on fertilization intensity or soil richness in organic matter but also on soil physical parameters –bulk density, structure, pores with the optimum moisture and air ratio available to plants. The field experiments of alternative (sustainable and organic) farming systems were conducted at Joniskelis Experimental Station of the Lithuanian Research Centre for Agriculture and Forestry in 2006–2016. The soil of the experimental site was Endocalcari-Endohypogleyic Cambisol (CMg-n-w-can). In alternative farming systems, farmyard manure, straw and catch crops for green manure were used for fertilization both in the soil with low and moderate humus contents. It had a more significant effect in the 0–20 cm depth layer on soil moisture than on other physical soil properties. In the agricultural systems, where catch crops were grown, soil physical characteristics did not differ significantly before their biomass incorporation, except for the moisture content, which was lower in rainy periods and higher in drier periods than in the soil of farming systems without catch crops. Soil bulk density and porosity in the topsoil layer were more dependent on soil humus content than on agricultural measures used: in the soil with moderate humus content, compared with the soil with low humus content, bulk density was by 1.4% lower, and porosity by 1.8% higher. The research findings allow to make improvements in alternative farming systems by choosing appropriate combinations of organic fertilizers and catch crops that have a sustainable effect on soil and maintain the sustainability of soil productivity parameters. Rational fertilization systems, securing the stability of soil productivity parameters and crop rotation productivity will promote the development of organic agriculture.

Keywords : agro-measures, soil physical parameters, organic farming, sustainable farming

Conference Title : ICABBBE 2019 : International Conference on Agricultural, Biotechnology, Biological and Biosystems Engineering

Conference Location : Athens, Greece

Conference Dates : October 21-22, 2019