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The Dynamic of N_{min} in Clay Loam Cambisol in Alternative Farming

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Abstract : The field experiments of different farming systems were conducted at Joniškėlis 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). The research was designed to identify the effects of dry matter and nitrogen accumulated in the above-ground biomass of various catch crops grown after winter wheat on soil mineral nitrogen variation during the autumn and spring period in the presence of intensive leaching complex. Research was done in the soil differing in humus status in the organic and sustainable cropping systems by growing various plant mixtures as catch crops: narrow-leafed lupine (Lupinus angustifolius L.) and oil radish (Raphanus sativus var. Oleifera L.), white mustard (Sinapis alba L.) and buckwheat (Fagopyrum exculentum Moench.) and white mustard as a sole crop. All crop and soil management practices have shown optimal efficiency in late autumn – stubble breaking, catch crops and straw used during the post-harvest period of the main crops, reduced Nmin migration into deeper (40–80 cm) soil layer. The greatest Nmin reduction in the 0–40 cm soil layer during the period from late autumn to early spring was identified in the sustainable cropping system having applied N30 for the promotion of straw mineralization and with no catch crops cultivation. The sustainable cropping system, having applied N30 for straw mineralization and growing white mustard in combination with buckwheat as catch crops, Nmin difference in the spring compared with its status in the autumn in the soil low and moderate in humus was lower by 70.1% and 34.2%, respectively.

Keywords : soil nitrogen, catch crops, ecological and sustainable farming systems, Cambisol
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