

Proceedings

Effect of biological preparations and different nitrogen fertilization on soil properties and spring wheat crop

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Abstract: Intensifying production of agriculture, rising prices of energy resources and the EU ecological policy goals are forcing farmers to seek solutions to reduce industrial and production costs and energy resources. At the same time, new and efficient measures are sought to increase soil fertility and quality. The investigations were carried out at the Experimental Station of Vytautas Magnus University Agriculture Academy, Lithuania, in 2018–2019, in *Calc(ar)i-Endohypogleyic Luvisol*, a semi-neutral (pH_{KCl} 6.8), highly phosphorous ($226.6 \text{ mg kg}^{-1} \text{ P}_2\text{O}_5$), mid-potassium-level ($105.0 \text{ mg kg}^{-1} \text{ K}_2\text{O}$), mid-humus-level (2.33%) soil, in order to evaluate the effect of biological preparations BactoMix2, BactoMix5 and Rhizobacterin on soil properties and spring wheat crop. Treatments of the experiment: Factor A – biological preparations: 1) without spraying, 2) biological preparation BactoMix2 (*Enterobacter* V-402 D and 409 D), norm 1.0 L ha^{-1} , 3) biological preparation Rhizobacterin (associative nitrogen-fixing bacteria *Klebsiella planticola*), norm 2.0 L ha^{-1} , 4) biological preparation BactoMix5 (*Bacillus subtilis* V-845 D and V-843 D, *Pseudomonas aurantiaca*, *Bacillus megatarium* and *Brevibacillus* sp.), norm 1.0 L ha^{-1} . Factor B - nitrogen rates: 1) fertilized with N_{105} , 2) fertilized with N_{165} . The use of biological preparations had positive influence on the agrochemical soil properties. Biological preparations significantly ($P < 0.05$) increased available phosphorus, potassium, nitrogen and humus content. Fertilization with a lower nitrogen rate (N_{105}) showed a better effect of biological preparations on soil properties. In general, the use of biological preparation had positive effect on soil agrochemical properties, especially the use of BactoMix5. Application of biological preparation significantly ($P \leq 0.05$) increased grain yield of spring wheat when fertilization rate was N_{105} . When fertilization rate N_{165} was used significantly ($P \leq 0.05$) higher yield of spring wheat grain was harvested in plots sprayed with biological preparation BactoMix5 compared with yield of unsprayed plots.