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CORN FERTILIZATION AT CROP CULTIVATION ON TYPICAL CHERNOZEM IN FOREST-STEPPE

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Actuality. The effect of different types and doses of fertilizers in combination with microbial preparation Polymixobakteryn and stand-alone on nitrogen fixation and biological denitrification in rhozosphere soil of corn was studied in long-term stationary field experiments. The conducted research have indicated that the most ecologically expedient doses of fertilizers were the ones that do not exceed $N_{90}P_{90}K_{90}$. It was shown that fertilizer efficiency was higher in the variants with microbial preparation Polymixobakteryn. Economically and environmentally attractive use of manure was also confirmed in corn growing technologies. Due to the high level of N_2O emissions accompanying manure application the receipit and use of compost from manure is required. Application of manure and biocomposts offsets the pre-sowing seeds bacterization efficiency and should be taken into the account when planning crop fertilization systems.

Analysis of recent researches and publications. Corn due to its biological potential, level of productivity and a number of properties significantly dominates other cereals. Culture has different uses (food grains, livestock feed, raw material for technical purposes and biogas production, etc.), and its cultivation area in Ukraine has increased significantly in recent years.

Today, when cultivating corn, high standards of mineral fertilizers, especially nitrogen, are used. This situation is explained by the requirements of culture to the agrofon, since the formation of 1 ton of grain with a corresponding mass of stems and leaves uses about 24-32 kg of nitrogen [1]. However, when planning fertilizer corn in the production, as a rule, the influence of increased standards of fertilizers on the state of the environment, including on the course of biological processes in the soil, is not taken into account.

The purpose of the research was to justify a compromise solution for corn fertilization that would meet environmental requirements and, at the same time, ensured a high level of productivity of the crop.

The materials and methods for investigation. The research was conducted in the conditions of the stationary field experiment of the Educational-scientific and innovative center of agrotechnologies LLC "Agrofirma KOLOS" Skvyra district of the Kyiv region. National University of Life and Environmental Science of Ukraine on typical chernozem (humus content - 4.04%, lightlyhydrogenated nitrogen - 21.7 mg/kg, exchangeable K2O - 22.6 mg / kg, P2O5 - 52.5 mg / kg; 5.37) during 2011-2015. hybrid maize sown Pustovarivskyy 28O JI predecessor corn is winter wheat.

The experiment provides two equivalent blocks of variants - without bacteria and with pre-sowing bacterialisation of the seeds.

Variants of fertilizer culture in both blocks are as follows:

1. Without fertilizers, control;

2. $N_{30}P_{30}K_{30}$;

3. $N_{60}P_{60}K_{60}$;

4. $N_{90}P_{90}K_{90}$;

5. $N_{120}P_{120}K_{120}$;

6. Organic fertilizer (in the third year after 25 t / ha of cattle cattle + direct impact 25 t / ha manure;

7. Organo-mineral fertilizers (in the third year after the 12.5 t / ha cattle cattle + direct action 12.5 t / ha manure + $N_{30}P_{30}K_{30}$);

8. Biocompost (in the third year after the 12,5 t / ha + direct action 12,5 t / ha);

9. The second year after the siderate;

10. Straw of soya, 3 t / ha.

11. In the second year after the siderate and 4 t / ha of rape straw.

The repetition of the experiment is four-fold, the total area of one plot is 200 m2, and the accounting area is 160 m2. Placing sites is renamed.

For pre-sowing bacteria of corn seeds, a microbial preparation Polimikobacterin was used on the basis of a growth-stimulating bacterium *Paenibacillus polymyxa* KV (ТУ У 24.1-00497360-004:2009).

The results and discussion. The accounting of corn yields indicates a significant implementation of the productive potential of the crop even if it is grown on a natural background - without fertilizing. Application of mineral fertilizers is a powerful factor in the intensification of the corn production process, but the effectiveness of different norms is significantly different. Thus, the use of the smallest in the experiment norm ($N_{30}P_{30}K_{30}$) provides a yield increase of 8.2%, the introduction of $N_{60}P_{60}K_{60}$ - by 14,1%, $N_{90}P_{90}K_{90}$ - by 24,7%. In the experiment, the highest rate of fat in the average five years contributed to obtaining 11.1 t / ha of grain, which is only 0.5 t / ha more than the results obtained for the introduction of $N_{90}P_{90}K_{90}$. The difference lies within the statistical error, while the lower rate contributes to an increase in the range of 0.9 t/ ha.

To summarize, the following should be emphasized. It is environmentally advisable to include in the technology of mineral fertilizers in norms that do not exceed the $N_{90}P_{90}K_{90}$ when cultivating maize for grain on chernozem. Excess of this norm is undesirable for reasons of ecological expediency (inhibition of the process of nitrogen fixation during the whole period of vegetation and significant losses of gaseous nitrogen), as well as from the economic (return on yield is relatively low).

Conclusions. The use of manure and biocompost is ecologically feasible and has an impact on the yield of corn, but compost does not cause significant emissions of N_2O, unlike manure, for which nitrogen oxide losses are among the highest in the experiment. The advantages of compost in front of the manure are evident both from the point of view of preservation of the environment and for reasons of economic nature, since it requires a quantity of half that of a manure.

Other organic agrofones should be considered as auxiliary in agricultural systems, primarily due to the need to provide soil with organic matter.

The use of a biological preparation is effective on mineral agrophons, at the same time, it does not provide positive changes in the yield of corn in growing on such backgrounds as manure and biocompost.

Interestingly for further research is the effect of increasing the yield on the use of Polymycobacterium against the background of the aftereffects of green fertilizers.