

INFLUENCE OF SYSTEMATIC FERTILIZER ON SOIL FERTILITY FOR CORN GROWING ON GRAIN

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Corn is one of the most strategic crops, which by its economic and biological properties is used in various industries, including livestock, food and processing industries. Corn grain production is a complex and costly process with strict adherence to technological discipline, timely and high-quality execution of all technological operations.

High productivity of any crop, including corn, mainly depends on the technology of its cultivation, the main component of which is a properly selected fertilizer system. This contributes to the cultivation of the arable layer, improves its water-air, heat and nutrient regimes for growing crops. Today, there is no clear position on the rational use of fertilizers for crops, including corn. Therefore, to increase the level of realization of the biological potential of the culture in the conditions of gray forest soil, it is important to introduce into the production of effective cultivation technologies, which should be based on the widespread use of scientifically based fertilizer systems. The answers to these questions can be obtained in the conditions of stationary experiments, which help to identify and investigate the most effective components of fertilizer systems.

The application of fertilizers in a stationary experiment on gray forest soil under the traditional system of their application in direct action has created a tendency to differentiate in terms of potential soil fertility. However, the application of litter manure as a direct action at a dose of 60 t / ha and on the background of moderate fertilizer rates (N40-80P30-60K40-80) contributed to the neutralization of the soil solution to the values of slightly acid reaction (pH salt - 5.2-5.5), while in the absence of manure (mineral fertilizer system) the pH of the salt. continued to

remain within the medium acid reaction. This indicates that the process of systematic application of fertilizers affects the change of physical and chemical parameters of the arable layer of gray forest soil.

Over the years of research there is a tendency to reproduce the content of total humus in the arable layer (0-20 cm) of the soil, so in the organic fertilizer system the content of this indicator exceeded the initial percentage by 13%, at baseline it was in absolute units - 1, 14%. The most effective was both organo-mineral fertilizer system (60 t / ha of manure + N80P60K80) and organic (60 t / ha of manure), respectively, the content of total humus was - 1.35 and 1.37% or in percentage terms by 25-27% higher compared to the control (without fertilizers) - 1.08 t / ha. With the use of purely mineral fertilizers, the humus content in the arable layer was 1.24-1.28% or 14-18% higher than the control variant.

In all variants with the application of fertilizers there was an increase in the content of hydrolyzed nitrogen from 71.0 to 80.0 mg / kg of soil for the content in the control without fertilizers 50.8 mg / kg. The most active processes of accumulation of hydrolyzed nitrogen up to 80.0 mg / kg in the layer of 0-20 cm took place respectively with the application of organic fertilizers 60 t / ha and (N80P60K80) against the background of the aftereffect of 60 t / ha of manure. In terms of mineral content, it was only 71.0-74.0 mg / kg, which is on average 45% higher than the control with a gradation of very low supply of soil with this form of nitrogen.

It is established that taking into account the increased level of mobile phosphorus supply of the soil before laying the experiment, during its systematic management there was an accumulation of this element in accordance with the amount of phosphorus introduced in the composition of organic and mineral fertilizers. By the content in the arable (0-20 cm) layer of mobile phosphorus soil in the control version in the amount

160.0 mg / kg of soil, the largest increase was in the organo-mineral fertilizer system (60 t / ha of manure + N80P60K80) - 265.5 mg / kg of soil, and purely mineral in the application of a similar rate of fertilizers.

The use of organic and mineral fertilizers for crops helped to increase the content of mobile potassium in the soil on average from 120 to 147 mg of K₂O per 1 kg of soil, leaving its content within the high security in the soil. With the content of K₂O in the control without fertilizers of 85.8 mg / kg of soil, its increase (by 51.4 and 61.7 mg / kg of soil) occurred, respectively, with the introduction of increased NPK, both separately and against the background of 60 t / ha of manure.

The creation of appropriate levels of fertility of gray forest soil provides conditions for obtaining stable yields of corn for grain with appropriate quality indicators of basic products. With a yield on control (without fertilizers) of 5.1 t / ha, the highest grain growth was 4.39 t / ha, obtained after the effect of 60 t / ha of manure and direct action of double the rate of mineral fertilizers (N80P60K80), which is 86% exceeds the yield in the control without fertilizers and 1.39 t / ha efficiency of the single rate of NPK on the background of the aftereffect of manure.

It was determined that under the organic fertilizer system the increase in the grain yield of corn (60 t / ha of crop rotation area) was 2.9 t / ha or higher by 56% compared to control without fertilizers. With the use of mineral fertilizers (mineral fertilizer system), in its pure form made it possible to obtain yield gains of corn grain - at a single rate of 1.89 t / ha, at double standards within - 3.01 t / ha, or respectively 37 and 59% relative to control (without fertilizers). This trend of obtaining the main crop products at a sufficient level is consistent with the indicators of soil fertility and the intensity of biological processes in it. The highest content of crude protein was obtained with the use of organo-mineral fertilizer system at the rate of 60 t / ha of manure + N40P30K40 and was 10.64, against the control variant, respectively - 9.36%. In the variant with the application of organic fertilizers, the indicator was at the level of 10.08%, for a purely mineral system at a single rate - 10.29.