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INCREASING ADAPTABILITY AND STRESS RESISTANCE OF LEGUME CROPS USING MICROBIOLOGICAL PREPARATIONS

Preparation of legume seeds for sowing requires special attention, as it is an important factor in shaping productivity. The preparation is based on pre-sowing treatment of seeds with inoculants, micronutrients, growth regulators, and pesticides, which not only protects crop seedlings from pests and diseases, but also stimulates the fixation of nitrogen from the atmosphere in the nodules of the soybean root system, stimulating plant growth and development.

The effectiveness of the pre-sowing application of microfertilizers containing macro-, micro- and mesoelements, growth stimulants, humic compounds, and amino acids for the growth and development of soybean and pea plants in the initial stages accelerates the development of the root system, increases stress resistance and adaptive properties of plants.

Currently, microfertilizers based on chelating substances are widely used, since their effectiveness is 5-10 times higher compared to inorganic salts.

The process of assimilation of chelates occurs due to their faster inclusion in the biochemical processes of the plant and the ability of plants to assimilate them 100%. Taking into account this factor, the rate of chelate application is reduced to 1-2 l/ha.

Many years of research have established the effectiveness of pre-sowing treatment with microfertilizers and foliar feeding of vegetative plants, which helps increase their adaptability and resistance to stress. It was believed that the main source of micronutrient replenishment in organic farming is organic fertilizers, but the current situation in the livestock industry has caused a sharp reduction in the supply of micronutrients. Therefore, the problem of micronutrient deficiency in the soil must be compensated for by their additional application in the form of micronutrient fertilizers, especially of chelate origin.

Chelate-based microfertilizers are applied together with inoculants and growth regulators, which allows reducing the consumption rates of drugs. The yield of soybeans and peas, their adaptability and resistance to stress depend on the technology of their cultivation, the planned protection system and mineral nutrition.

A modern, effective system of fertilizing legumes (soybeans, peas) is aimed at providing a balanced supply of microelements, phosphorus, and potassium, creating optimal conditions for revealing the genetic potential of varieties, increasing plant stress resistance, and enhancing adaptive properties.

The study was conducted according to the following scheme: Control (Rhizoactive) - inoculation; He Stick + Amino Chelate - composition of inoculant + microfertilizer; Rhizostim + Amino Chelate - composition of inoculant + microfertilizer. The soybean variety Mentor and the pea variety Otaman were sown in the experiment.

According to research results, the action of the microfertilizer Amino Chelate in combination with new generation inoculants provided better conditions for seed germination and seedling development due to improved phosphorus nutrition and a wider spectrum of biologically active substances with growth regulators and protective properties. A more powerful stem and leaf apparatus, a more intense green color, and less damage by bacterial pathogens were noted.

In our research, we studied the features of the formation and functioning of the nitrogen-fixing apparatus of legumes (soybeans, peas) and found that the nodulation process occurred actively in all variants, including the control, where nodules were formed thanks to the Rhizoactive inoculant.

The most powerful nodulation apparatus was formed using pre-sowing treatment with Amino Chelate microfertilizer and Rhizostim inoculant, slightly lower indicators were obtained with the He Stick variant. At the same time, a powerful root system with active nitrogen-fixing activity of the symbiotic apparatus was formed. The study noted the process of soil enrichment with biological nitrogen, which affected the rhizobial symbiosis and the level of crop yield.

Seed treatment before sowing crops in a composition with the microfertilizer Amino Chelate had a positive effect on increasing yield. Studies have shown that in variants with seed treatment with microfertilizer, a greater number of beans per plant and their mass were formed, which ensured an increase in yield.

The results of the field experiment showed that the highest increase in the yield of legumes was provided by the drug Rizostim. These results indicate an increase in the resistance of plants to environmental stress factors.

Seed treatment with Amino Chelate + Rizostim compositions provided an increase in pea yield of 0.4 t/ha or 18.7% compared to the control. The increase in soybean yield compared to the control reached 0.3 t/ha or 12.3%.

Pre-sowing seed treatment with a mixture of microfertilizer Amino Chelate in combination with inoculants had a positive effect on plant growth processes, contributed to more efficient operation of the nodulation apparatus, which subsequently affected yield indicators, the disclosure of the genetic potential of soybean and pea varieties, and the accumulation of nitrogen in the soil.

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