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ENVIRONMENTAL CLIMATE CHANGE AND ROLE OF LIQUID FERTILIZERS IN INCREASING WHEAT YIELDS IN THE ARID ZONE

The potential yield of currently grown wheat varieties meets the needs of farmers, but it is difficult to achieve it without the use of modern technologies and fertilizers. It is necessary to create conditions for increasing the potential of high-yielding varieties, for which it is necessary to use new fertilizers and modern technologies.

In 2016–2021, in order to obtain a high yield of wheat crop on the test fields of the scientific research center, we tested and studied promising liquid organic fertilizers Ecorost, GSN-2004 and CAS 32.

The fertilizer “Escorost” is of natural origin and contains microorganisms, due to which complex biochemical reactions occur in the soil. It includes all the substances necessary for living organisms: amino acids, mono- and polysaccharides, peptides, vitamins, mineral components, etc. Its use increases the drought resistance of the plant, frost resistance, immunity to diseases and pests.

Fertilizer KAS-32 contains 28–32% nitrogen. Nitrogen in it is present in three forms: nitrate NO₃, fast-acting and easily moving in the soil, its content is 8%; Ammonium NH₄, which is effectively used by plants for a long time due to adsorption by soil particles. Its content is also 8%; Amide NH₂, this form is not absorbed by the root system. Well suited for foliar application. When it enters the soil under the influence of microorganisms, it quickly turns into amino, and then into a nitrate form. Its content is 16, thanks to these properties the use of fertilizer KAS-32 increases the drought resistance of the plant and immunity to diseases and pests.

Fertilizer GSN-2004 is a natural biologically active preparation. It contains essential micro elements, saccharides and various easily digestible acids necessary for the formation of new plant cells, acts as a plant growth activator, immunostimulant, antistress and antidote. In GSN-2004, the molecules are in a transient hydrated state. Its effect increases adaptation to climatic conditions (drought, frost, sharp temperature fluctuation); higher quality of the crop (content of protein, starch,

vitamins, sugar); The mass of 1000 grains increases; yield (+15/+50%); Increased efficiency of using mineral fertilizers (+30/+50%); improved agrophysical and agrochemical properties of soil (water permeability, structure, pH); Mobile phosphorus grows in the soil. This leads to the preservation of soil fertility. Fertilizer GSN-2004 contains organic humic acids -53.3%; amino acids 29.9%; Carbonic acids 12.8%; carbohydrates 4.0%; It also contains minerals: nitrogen, phosphorus, potassium, calcium and magnesium.

The studies were mainly conducted at the Dedoplistskaro and Tsilkani Test Base of the Scientific -Research Center. The soil and climatic conditions of the territory meet the biological needs of winter wheat. Dedoplistskaro is characterized by severe droughts and is generally considered an arid zone. The Tsilkani base is characterized by more moderate conditions. For analysis, 4 options were taken: control (nitrogen fertilizers at a dose of 150 kg/ha according to the obtained method;

The test was conducted on the winter wheat variety Tbilisuri 15, authorized for distribution in all regions of Georgia since 2015. The potential yield of 6.5-7.5 t/ha, an intensive variety, actively uses increased doses of fertilizers.

Phenological and biometric signs of the experimental wheat variety were studied according to the method developed by the UPOV. During the growing season, the appearance of seedlings, engraftment, flowering, and maturation of plants were studied. The resistance of wheat to the main diseases: yellow and stem rust, septoriosiis, dust head and ash was evaluated. We studied the economic signs: the height of the plant, the wheat yield, the length of the head, the number of spikelets in the head, the number of grains in the head, the weight of one grain and the weight of 1000 grains. Yields were determined in both replicates per total area and per area of 1 m²; To estimate the reliability of mean values, we calculated standard deviation, mean standard error, least significant difference (LSD), and coefficient of variation (CV). Statistical processing of the obtained data was carried out by analysis of variance (ANOVA) using the Cropstat computer program.

Analysis of the obtained data showed that with their use it is possible to increase wheat yield from 16.2% to 50.0%.

From the studied doses (150 mL, 200 mL, 250 mL), the best results were obtained at the use of 250 mL, which is recommended.

Analysis of the test results showed that the first feeding should be carried out in early spring (at the beginning of germination) at the rate of 250 mL/ha (dissolved in 220 L of water) to increase tillering. The next feeding is done two weeks apart at the same rate to speed up the growing process.

Natural, biologically active GSN-2004 fertilizer, which is a natural growth stimulant and possesses adaptogenic action, is promising for increasing wheat crop yield. The results of three years of research showed that with the action of fertilizer, the yield of wheat increases, the process of photosynthesis is activated. The first feeding should be carried out in early spring (at the beginning of tillering) at the rate of 2.0 l/ha (dissolve in 220 l of water) to strengthen the bark. The next feeding is carried out at an interval of two weeks at the rate of 2.5 l/ha to speed up the germination process.

The introduction of GSN-2004 fertilizer in the dry period has a positive effect on the development of plants. In the wet conditions, the plant is protected from the

spread of fungal diseases.

It is promising to use KAS 32 mineral fertilizer to obtain high yield of wheat crop, which makes it possible to increase yield from 50.0% to 54.0%.

Of the doses studied, the best results were obtained in the second version (KAS-32 - 100 kg/ha + 60 kg/ha), in case of double treating and in the third version (KAS-32 - 100 kg/ha + 60 kg/ha) NPK 20-20-20 + 2 (Mg) - 2 kg/ha), in case of triple treating. Both doses are recommended and practical recommendations for farmers will be prepared.

Analysis of the test results showed that the first feeding should be carried out in early spring (at the beginning of germination) to increase the tillering. The next feeding is done at two-week intervals to speed up the growing and heading processes.

Analysis of three-year data showed that the use of mineral fertilizer KAS 32 is promising for the Kakheti severe drought zone. It is characterized by a long-term effect on the plant, effectively increases drought resistance, immunity to diseases and pests, activates the process of photosynthesis and can be used in all phases of growing.

Application of all studied liquid fertilizers is much more effective than non-liquid fertilizers. The use of a drone is possible in all phases of wheat growing. By this action, we will be able to control the quality indicators of grain.

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