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TECHNOLOGY FOR OBTAINING EARLY, HIGH-QUALITY AND HIGH-YIELD AGRICULTURAL CROPS IN THE CONDITIONS OF UZBEKISTAN

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Annotation: In the conditions of meadow-serozem soils of the Jizzakh region, pre-sowing treatment of cotton seeds, winter wheat, sugar beet, soybeans and beans and spraying during the growing season with humic-based stimulants and bio-organic fertilizers in optimal timing and rates improves germination, growth and development, physiological processes, as well as increases the yield of raw cotton by 3.4-7.3 c/ha, winter wheat by 2.3-7.7 c/ha, sugar beet by 55.4-112 c/ha, soybean by 3.4-6.5 c/ha and beans by 2.5-5.3 c/ha.

Key words: stimulators, Gumimax, Potassium Humate, bioorganic fertilizer, Rokogumin, seed germination, cotton, winter wheat, sugar beet, soybeans, beans, growth and development, yield.

Introduction: In Uzbekistan, irrigated land areas are limited, due to climate change, water scarcity, increased soil salinity, unfavorable weather conditions, and the negative impact of pests and diseases, there are great difficulties in obtaining high and quality yields of agricultural crops.

As is known, in any soil and climatic conditions, growing early-ripening, high-yielding, and high-quality agricultural products resistant to external factors, diseases, and pests is one of the urgent tasks of today.

Currently, without the scientifically based development of cotton and grain farming, it is very difficult to provide the population with food and industry with sufficient raw materials.

One of the ways to solve the problem of early seed germination, improving the growth and development of plants under unfavorable weather conditions in our republic is to treat seeds with growth regulators before sowing and during the growing season of plants.

In many developed countries of the world, under conditions of global climate change, physiologically active substances, i.e., stimulants, are widely used in agricultural crops.

In this case, plant phytohormones have a positive effect on ensuring healthy germination, intensive growth and development of seedlings, as well as regulating physiological processes, obtaining high and quality yields as a result of improving the activity of enzymes, biosynthesis of amino acids, nucleic acids, proteins, accumulation and distribution of nutrients,

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photosynthesis, respiration, and metabolism.

Scientists of a number of research institutes have conducted numerous scientific studies to determine the positive effects of physiologically active substances on agricultural crops, and scientific research in this direction continues.

Ф.Л. Калинин, Ю.Г. Мережинский (1965) determined the positive influence of physiologically active substances on increasing seed germination and germination energy, accelerating harvest maturation, and increasing plant resistance to drought, salinity, diseases, and pests.

Physiologically active substances, along with organic supplements, also contain natural phytohormones.

Among plant phytohormones, gibberellin regulates cell division and accelerates stem growth, cytokinin accelerates cell division, improves stem and shoot growth and leaf metabolism, abscisic acid stops plant growth during dormancy, and inhibitors slow down physiological and biochemical processes (Никелл, 1984).

В.В. Полевой (1965) established that the phytohormone auxin actively participates in the metabolism of nucleic acids and proteins in plant cells, activates the growth of roots, stems, and leaves.

С.К.Абилев, И.К.Любимова (2002) established that under the influence of phytohormones, the process of photosynthesis intensifies, metabolism improves, the number and weight of fruit elements increase, and plant resistance to stressful situations, water scarcity, adverse weather conditions, as well as pathogenic and harmful insects increases.

In the studies of Е.Р. Виленский (1984) the change in hormone movement caused by external stress factors is regulated by biological phytohormones, improves the mutagenic and protective system of the plant, and ensures the uniform course of physiological and genetic processes under favorable or unfavorable conditions.

О. Ситникова (1966) established that when leguminous crops are treated with growth regulators such as GC, IUC, the root system develops strongly, the roots effectively use water in the soil and increase photosynthesis productivity, and in the leaves, the amount of free water increases and the amount of bound water decreases, transpiration increases in cool morning hours and decreases in hot weather, i.e., the plant's resistance to drought increases.

Sh.Abdualimov (2015) in his research established that treating cotton seeds under unfavorable natural and climatic conditions with physiologically active substances such as T-86, Roslin, Nitrolin, TJ-85, XS-2, Oxygumat, Vitavaks 200 FF accelerates germination, growth and development, increases the number and area of leaves, photosynthetic productivity, and yield.

In studies conducted by И.Г. Ришковым (1955), pre-sowing treatment of winter wheat grain with stimulants accelerated germination, increased seedling resistance to winter cold, which positively influenced plant growth and development and increased yield.

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The influence of stimulants on the germination of grain crops was studied in the works of Н.М.Мильников, В.Н.Мороховец and others. Pre-sowing treatment of barley and wheat seeds with the Agrochit preparation, under the influence of physiologically active substances, increased the activity of auxin in the plant, increased the content of RNA and DNA in the cells (Bryantseva, 1965), as a result, grain germination accelerated by 6.7-9%, growth and development accelerated, the grain was less affected by septoria, various spots, brown rust, and spike fusarium during the growing season, and grain yield increased by 1.7-2.0 c/ha.

Characteristics of preparations

Rockogumin is a growth stimulant that promotes nutrient absorption and increases plants' resistance to fluctuating weather conditions. It is a multicomponent liquid organo-mineral fertilizer made from organic material rich in nutrients. Fertilization has a universal application and is intended for fertilizing all types of plants and crops: agricultural crops, vegetables, fruits, flowers, trees and shrubs, grasses, lawns. Contains nutrients in natural form and has been recommended and approved for use in organic farming. It is applied by spraying on leaves, watering, or drip irrigation. The fertilizer has very good adhesion to the leaves and is resistant to rapid drying and washing.

Fertilizer composition - % in dry matter: contains amino acids-18%, humic acid-13%, nitrogen N-14%, phosphorus P2O5 -9%, K2O -14% and trace elements iron (Fe), zinc (Zn), copper (Cu) and manganese (Mn) are bound in chelate form, physiologically effective amounts of sulfur (S), boron (B) and molybdenum (Mo), physiologically effective content of combustible substances in dry matter min. 50%, dry matter content 20%. The humic acids in the fertilizer affect the development of the root system and enhance germination, and are a natural growth stimulant. The preparation is applied by spraying when the soil is 40-50% covered with plants.

Rocohumin improves the quality of enzymes, accelerates the processes of metabolism, accelerates the physiological processes occurring in plants, as well as their growth and development.

Amino acids: convert mineral fertilizers from the soil into a form easily absorbed by plants, contribute to the improvement of the photosynthesis process, increase the amount of chlorophyll in the plant, improve the development of the plant's root system and the absorption of nutrients from the soil, perform the function of combating stress, ensure plant resistance to drought, increase resistance to diseases and pests, and improve the quality of the harvest.

Huminic acid: increases respiration intensity and plant immunity, positively affects root system development, preserves soil fertility, increases plant salt tolerance.

Potassium humate is an organic universal liquid fertilizer obtained from natural humic substances contained in peat, sapropel, and brown coal. This preparation is used in agriculture due to its high biological activity and ability to improve soil structure. Main components:

Huminic acids are the main active component responsible for improving soil structure and

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stimulating plant growth.

Fulvic acids - accelerate metabolic processes and increase the assimilation of nutrients.

Potassium is a key nutrient element necessary for the proper development of plants.

Microelements (iron, magnesium, zinc, etc.) - improve photosynthesis and protect against diseases.

Research methodology. Research on the effectiveness of the bioorganic fertilizer Rokogumin on winter wheat was conducted in 2018-2020 in the conditions of meadow-serozem soils of the Jizzakh region.

The experiment was conducted in three variants with four repetitions. The layout of the variants is single-tiered. Each plot consists of 8 rows 25 m long. The size of the variant was 7.2 m (width) x 25 m (length) = 180 m2. The total area was 2160 m2. Winter wheat variety "Краснодар-99".

Field research was conducted in accordance with the methodological guidelines "Методика проведения полевых опытов" (Т:2007) and Практикум по физиологии растений (Москва, 1982).

The experiment consisted of the following options: In the 1st variant, the seeds were not treated (control), in the 2nd variant, the wheat seeds were treated with the Gumat potassium stimulant before sowing at a rate of 1.0 l/t and during the tillering and stem elongation phase at a rate of 0.3-0.4 l/ha, in the 3rd variant, the wheat seeds were treated with the bioorganic fertilizer Rokogumin before sowing at a rate of 5.0 l/t and during the tillering and stem elongation phase at a rate of 2.0-3.0 l/ha.

Research results. In the experimental plot, in the plowed (0-30 cm) soil layer, the total nitrogen content was 0.217-0.220-0.236%, phosphorus 0.255-0.228-0.246% and humus 0.812-0.825-0.806%, mobile phosphorus 18.7-19.1-21.1 mg/kg, and exchangeable potassium 235-248-256 mg/kg, respectively, for the three years of research.

The influence of the bioorganic fertilizer Rokogumin on winter wheat germination under field conditions was analyzed in the experiment.

In 2018, the results showed that in the 1st observation, the number of seedlings per 1 m2 in the experimental variants was 315.3-376.4, in the 2nd observation 386.1-468.9 units, the germination rate in the control variant was 70.2%, and in the 2nd variant, where the wheat seeds were treated with the Gumat potassium stimulant at a rate of 1.0 l/t-77.7%, and in the 3rd variant, where the wheat seeds were treated with the bioorganic fertilizer Rokogumin at a rate of 5.0 l/t before sowing, it was 82.9%.

As a result, with the treatment of the bioorganic fertilizer Rokogumin, seedling germination increased by 12.7%, and the number of healthy seedlings that overwintered was 420.6 units, which is 62.4 units more compared to the control (1-table). A similar pattern is observed in the

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2019 and 2020 experiments.

Table 1

Influence of the Gumat potassium stimulant and the bioorganic fertilizer Rokogumin on the germination of winter wheat seeds and the number of overwintered seedlings.

Experience options	Grain treatment before sowing, l/t	Number of seedlings, pcs/m2		Germination rate, %	Difference from control,%	Number of overwintered plants, pcs/m2	Difference from the control, pcs.
		1-bservation	2-observation				
Control	-	315,3	386,1	70,2	-	358,2	-
Potassium humate	1,0	338,5	427,3	77,7	7,5	395,5	37,3
Rokogumin	5,0	376,4	468,9	82,9	12,7	420,6	62,4

The growth and development of wheat in the experimental field were observed at the beginning of each month. In the experiments, growth regulators had a positive effect on the growth and development of wheat.

As of April 1, 2020, in the 1st variant without treatment with the stimulant, the wheat height was 50.3 cm, in the 2nd variant with treatment of wheat seeds with the Gumat potassium stimulant before sowing at a rate of 1.0 l/t and in the tillering phase of wheat at a rate of 0.3-0.4 l/ha, the wheat height increased by 54.8 cm, and in the 3rd variant with treatment with the bioorganic fertilizer Rokogumin before sowing at a rate of 5.0 l/t and in the tillering phase of wheat at a rate of 2.0-3.0 l/ha, the wheat height was 58.2 cm, according to the data of May 1, these indicators were 75.6-79.2-82.3 cm, respectively, and according to the data of June 1, the wheat height in these variants was 92.4-95.5-98.5 cm (Figure 1).

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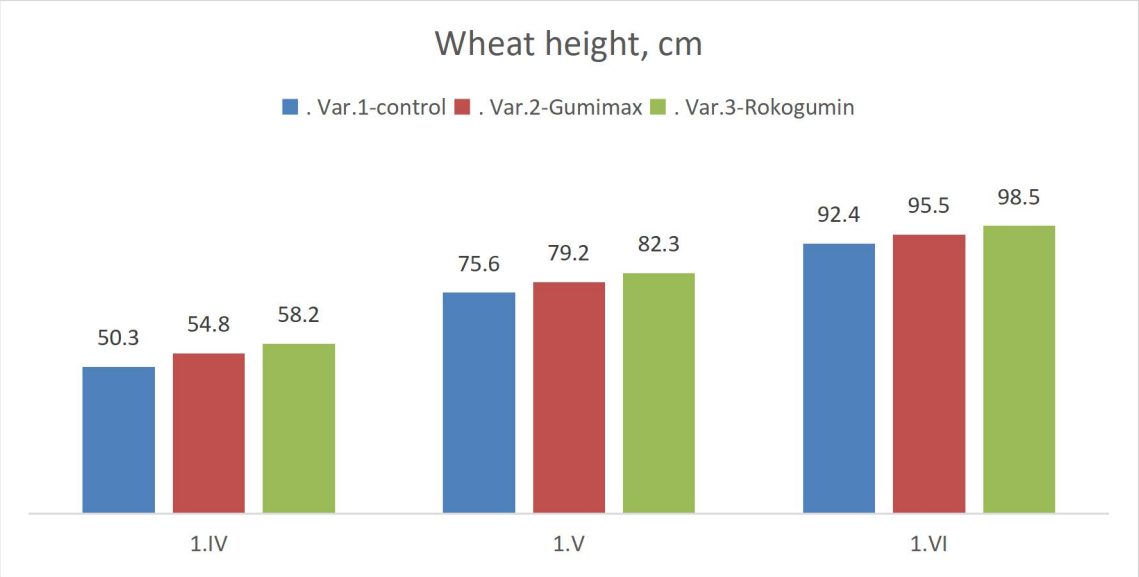

Fig.1. Wheat height.

The number of productive stems was 365 in the 1st variant and 378-398 in the 2nd and 3rd variants (Figure 2).

Overall, favorable conditions for wheat growth and development were observed in the 3rd variant, where Rokogumin bioorganic fertilizer was applied at a rate of 5.0 l/t before sowing seeds and at a rate of 2.0-3.0 l/ha during the tillering and stem elongation phases, where the indicators for height, tillering, and the number of productive wheat stems were high.

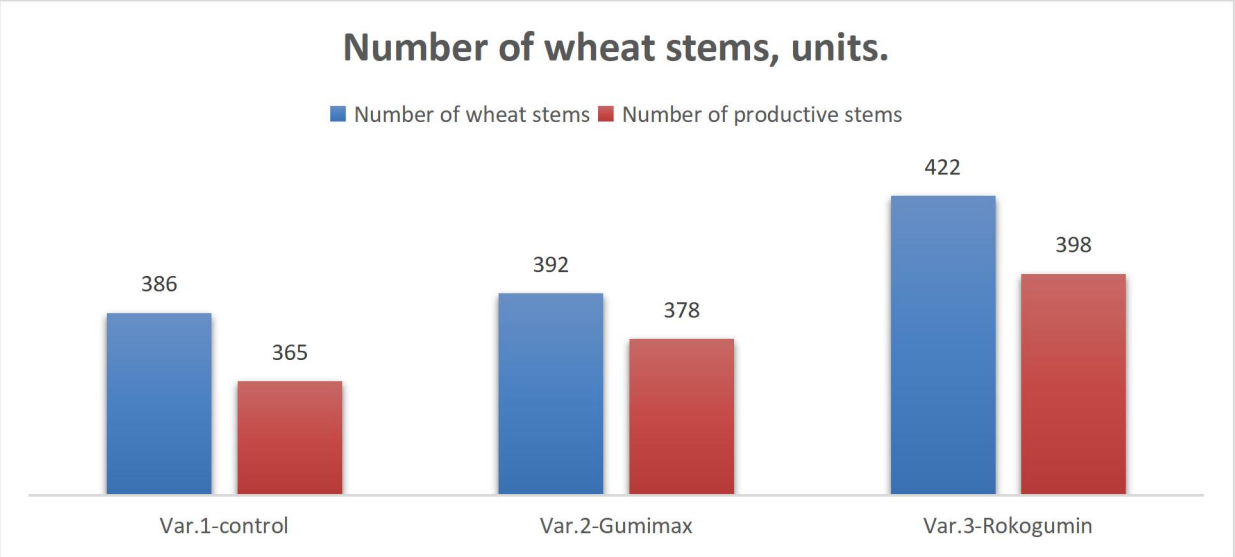

Fig.2. Number of wheat stems

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In the experiment, the highest indicators in terms of the number of grains per head, the weight of 1000 grains, and wheat yield were observed in the 3rd variant, where wheat seeds were treated with the bioorganic fertilizer Rokogumin before sowing at a rate of 5.0 l/t and in the tillering and stem elongation phase at a rate of 2.0-3.0 l/ha, the number of grains per head was 39.2 pieces, the weight of 1000 grains was 33.1 g, and the wheat yield was 49.2 c/ha, which is 7.7 c/ha higher compared to the control (Figure 3).

A similar pattern is observed in the 2018 and 2019 experiments.

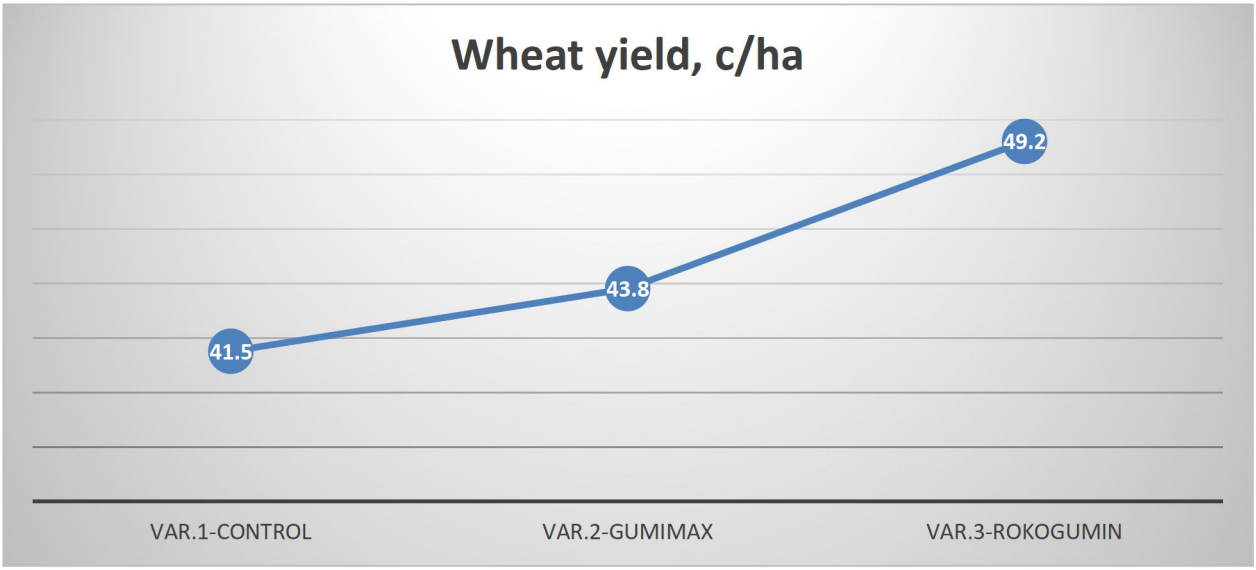

Fig.3. Wheat yield.

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