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CREATION OF EFFECTIVE COMBINATIONS OF BIOFERTILIZERS USED IN SUNFLOWER GROWING

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Annotation. The article presents information on the effect of applying organomineral fertilizers on the formation of their crop structure to the sunflower crop planted as a secondary crop in Uzbekistan. In this combination, the weight of 1000 grains and the yield rate of 1000 grains in the 4th variant were the highest among the variants, which were 76.4 grams and 37.23%, respectively. The yield was 32.1 c/ha in option 4 and 30.6 c/ha in option 8, which was 8.2 and 7.7 c/ha higher than the corresponding control options.

Key words: Bio-fertilizer product, Ekosil, Ekogum bio, Hydrogumat, Ekogum complex, Ekogum FK, Polibor, Immunoact, sunflower, basket.

Аннотация. Мақолада Ўзбекистонда иккинчи маҳсулот сифатида экилган кунгабоқар экинига органоминерал ўғитларни қўллаш таъсири ҳақида маълумотлар берилган. Бу комбинацияда, 4-чи вариантда 1000 доннинг вазни ва 1000 доннинг ўртача ўсиш фоизи энг юқори бўлиб, улар 76.4 грамм ва 37.23% ни ташкил этди. 4-чи вариантда ўртача ўсимлик ҳосили 32.1 ц/га, 8-чи вариантда эса 30.6 ц/га бўлиб, бу уларнинг тегишли назорат вариантларидан 8.2 ва 7.7 ц/га кўпдир.

Калит сўзлар: Био-ўғит маҳсулоти, Экосил, Экогум био, Гидрогумат, Экогум комплекс, Экогум ФК, Полибор, Иммуномат, сават.

Аннотация. В статье представлены данные о влиянии применения органоминеральных удобрений на подсолнечник, выращиваемые как повторная культура в Узбекистане. В комбинации с удобрениями 4-й вар ант показал наивысшие результаты: вес 1000 семян составил 76.4 грамма, а средний процент роста 37.23%. Средний урожай в 4-м варианте составил 32.1 ц/га, в 8-м варианте — 30.6 ц/га, что превышает от контрольных вариантов на 8.2 и 7.7 ц/га соответственно.

Ключевые слова: Биоудобрение, Экосил, Экогум био, Гидрогумат, Экогум комплекс, Экогум ФК, Полибор, Иммуномат, корзина.

Introduction. In the global agricultural network, the use of effective organo-mineral fertilizers in the nutrition of crops is aimed at achieving the production of agricultural products, increasing the yield and soil fertility, the efficient use of land, organomineral fertilizer for high-yielding varieties. The leading scientific centers of the world are conducting research on the norms, periods and methods of using dogs and biostimulants, and the use of effective crop rotation systems.

To correctly select the types of organomineral fertilizers suitable for the soil-climatic conditions of a certain region in the effective use of land, to create the scientific basis for the use of organomineral fertilizers in feeding crops for the production of agricultural products, and establishment is one of the urgent issues of today.

Planting of sunflower as a secondary crop in our country is quite remarkable. Because this plant solves the problems of feed, protein and oil for livestock and poultry. It is known that in our republic, due to the high annual temperature and the use of accelerated tillage methods in the cultivation of agricultural

crops, as well as the irrigation of crops, the accumulated natural humus reserve in the soil has decreased, as a result, the soil has lost its biological properties. caused to die, the yield of crops decreased.

Methodology. Based on these and other issues, it is urgent to create an agrotechnology of using organomineral fertilizers and to study the effect of their application on soil fertility in the cultivation of high and ecologically clean sunflower as a secondary crop.

The purpose of our research is to evaluate the effect of Ekogum bio, Gidrogumat, Ekosil, Ekogum AF, Ekogum complex, Ekogum FK, Polibor and Immunoact on the yield and soil fertility of sunflower crops planted secondary after winter wheat in Andijan region grassland soil conditions. was to determine the effects of using dogs. To achieve this goal, the following tasks were assigned to the research work:

- to determine the effect of organomineral fertilizers on soil fertility, the mobile amounts of nitrogen, phosphorus and potassium in the soil, and the amount of humus;
- determining the effect of organomineral fertilizers on the growth, development and formation of crop structure of secondary planted sunflower;
- determining the effect of organomineral fertilizers on the yield of secondary planted sunflower;
- to determine the effect of organomineral fertilizers on the quality indicators of the yield of secondary planted sunflower;
- determining the economic efficiency of using organomineral fertilizers.

In the study, it was the object of the study, which was irrigated meadow soils from ancient times, sunflower plant, Ekogum bio and Hydrogumat, Ekosil VE 50 l/ha, Ekogum AF, Ekogum complex, Ekogum FK, Polybor and Immunoakt organomineral grass. are considered to be gites. The subject of the study is sunflower growth, development, productivity, ripening periods, product quality indicators, changes in agrochemical properties of soil when organomineral fertilizers are used, soil fertility.

Literature review. One of the promising directions of crop physiology and biochemistry is to determine the effect of physiologically active substances, i.e., growth regulators and microelements on plant growth, development and productivity.

B. Eshkuwatov, A. Turdiyev [12; p.16] biostimulants are biologically active substances that are formed in plant tissues under certain conditions and enhance the plant's vital functions. Therefore, developing and improving the technology of using biologically active substances in agriculture will bring out the internal capabilities of the plant and increase the possibility of growing high-quality crops.

Sh. Nurmatov, R. Nazarov and others [11; p.11] In the conditions of Kashkadarya region, biologically active growing substances such as Oxygumate, Sodium humate, Silk, Print, Bionitrogen, etc., before sowing and during the operation period, increase the cotton yield by 2-3 hours per hectare in order to obtain an abundant harvest from cotton. emphasized.

V.N. Tarusina, T.V. Sokolova, G.G. Rusin [10; p.21-23] In Ukraine, they studied the effect of pollination of cereal seeds with silicic organic compound powder on sprout germination, plant growth and development, yield and its quality. The organosilicon compound is polymethylsiloxane, that is, a polycondensed cubic residue (CO) preparation of methylchlorosilane, which was used in the form of a 33% powder. When the seeds of autumn and spring wheat were pollinated with KO, the oxygen demand of the 2-3-day-old sprouts increased compared to the control,

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and healthy seedlings were obtained. Also, the surface of the leaf increased, the weight of the root and leaf increased, and the amount of pigments in the leaves increased.

Also, during the vegetation period, the activity of the enzymes involved in oxidation-reduction is increased, the respiration of the plant is accelerated, that is, the exchange of substances is coordinated. It was found that this drug improves the absorption of phosphorus by the plant. This was achieved due to the increase in phosphate desorption under the influence of silicates in organic silicon compounds. Also, the vegetation period of corn was accelerated by 2-3 weeks and the grain yield was 51.2 t/ha, 21.7 t/ha more than the control (29.5 t/ha) and the protein content was 1.2%. observed to increase.

According to Sh. Abdualimov, D. Abayeva, Sh. Turdialiyeva [13;30-35-b], the highest indicators of seedling germination in corn experiments were 0.6 with UzGumi 71.0-94.4% when l/t is treated, 69-91.8% when Bioenergiya-M 2.5-3 l/t is used, and 20.3-16.1% in UzGumi compared to the control, 18.3-13.5% increase was observed in Bioenergy-M.

Results. The field experiments conducted by us within the framework of this direction are conducted in the grassland soil conditions of the experimental fields of the Andijan Institute of Agriculture and Agro-technologies. The soil of the experimental field is grassy soil that has been irrigated since ancient times, heavy sand according to its mechanical composition, and the seepage water level is located at a depth of 2.0-2.5 meters.

During the agrochemical analysis of the soil of the field allocated for the experiment, it was found that humus in the tillage layer was 1.59%, and it was provided at a high level (see Table 1).

Table 1.

Results of agrochemical analysis of the soil of the experimental field before the start of the experiment

Soil pit number	Soil layer, cm	Amount of humus, %	Amount of mobile nutrients, mg/kg	
			P_2O_5	K_2O
Average of 3 points	0-30	1,59	16,8	230
	30-50	1,51	17,6	200

In the same layer, it can be seen that the amount of mobile phosphorus is 16.8 mg/kg, and it is poorly supplied, and exchangeable potassium is provided at an average level (230 mg/kg). In the subsoil layer, the supply of soil with humus, mobile phosphorus and exchangeable potassium is sufficient (humus 1.51%), low (mobile phosphorus 17.6 mg/kg) and low (potassium 200 mg/kg). it was found that it was mounted.

The experiment consists of 8 options and is repeated in 3 iterations. The options are placed on two levels, the area of one part is 144 m^2, the total area of the experiment is 3456 m^2. "Methods of conducting field experiments" in conducting field experiments [6; p.2-28], "Metody agrokhimicheskih analizov pochvi rasteniy Sredney Azii" in the analysis of agrochemical properties [4; p.187], in the analysis of agrophysical properties of the soil "Rukovodstvo k proveteniyu khimicheskikh i agrofizicheskikh analizov pochv pri monitoringe zemel [5; p.227-230], research works were carried out based on them.

Studies were conducted to study the effect of Ekogum bio, Hydrogumat, Ekosil, Ekogum complex, Ekogum FK, Immunoact, Polibor and Ekogum AF organomineral fertilizers on the growth, development, productivity and quality of the sunflower. In particular, organomineral

fertilizers were used in the types, rates and periods specified in the experimental system, and the following phenological observations were made in the sunflower crop:

- germination of sunflower seeds is determined;
- during the growth periods, the number of leaves, the height of the main stem, the diameter of the baskets, the number of grains in 1 basket and the weight of grains, the weight of 1000 grains, the percentage of pods in the grain were determined;
- the mobile amounts of nitrogen, phosphorus and potassium in the soil and the amount of humus are determined.

Depending on the growth and development of the crops, the formation of their crop structure was also different in the experimental options.

Discussion. In the sunflower crop structure, the weight of grain in 1 basket, the weight of 1000 grains and grain yield are the main indicators. The results of the analysis to determine the weight of grain in 1 basket except for the roots. In the 1st feeding, ecosil, ecogum AF and polyboron organomineral fertilizers were used, in the 2nd feeding, ecosil, ecogum complex, ecogum FK and polyboron organomineral fertilizers were used, the highest in the 4th option. showed that it was. In it, the average weight of grain in 1 basket was 76.69 grams, and it was almost 21.2 grams more than in the control option where organomineral fertilizers were not used. In options 2 and 3, the weight of grain in 1 basket was 59.92 and 61.34 grams, which was 4.43 and 5.85 grams higher than in the control option.

The 1000-grain weight and grain yield in option 4 were also the highest among the options, which were 76.40 grams and 37.23%, respectively. Hydrohumate preparation was applied to the soil before planting, and in the 8th option, in the 1st feeding, Ecosil, Ecogum AF and polyboron organo-mineral fertilizers were used, in the 2nd feeding, Ecosil, Ecogum Complex, Ecogum FK and polyboron organomineral fertilizers were used. Correspondingly, the weight of sunflower seeds in 1 basket, the weight of 1000 sunflower seeds and the yield percentages are 75.29 g; 14.28 g and 36.9%, it was determined that the weight of grain in one basket is 21.40 g, the weight of 1000 grains is 12.72 g, and the yield of grain is 4% higher than control variant 5.

Table 2.

Effect of organomineral fertilizers on sunflower yield structure

Options	In 1-case			
	Weight of 1 basket with grain, g	Grain weight in 1 basket, g	Weight of 1000 grains, g	Grain yield, %
1(control)	192,1	55,49	63,68	28,9
2	209,4	59,92	67,91	28,6
3	203,7	61,34	71,01	30,1
4	205,9	76,69	76,40	37,2
5 (control)	187	53,89	61,56	32,9
6	204,3	58,32	65,79	32,2
7	198,9	59,94	68,89	34,6
8	201,1	75,29	74,28	36,9

It is known that the evaluation of the results obtained from any scientific-research work is necessarily expressed by the amount of crops obtained from the tested factors. In our ongoing research work, we determined the effect of the drugs used on sunflower productivity in the section of options. The yield results of the crop according to the options are presented in Table 3.

Depending on the organomineral fertilizers used in the experiment, the growth and development of the crop, and the formation of the crop structure,

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its seed yield was also different. In the control option, where organomineral fertilizers were not used in the extra-root feeding of the crop, the grain yield from sunflower was 23.9 c/ha, while the bio-preparation Ecogum was applied to the soil in the amount of 3 l/ha, and Ecosil and Ecogum were applied to the soil in the 1st feeding AF organomineral fertilizers, ecosil, ecogum complex and ecogum FK organomineral fertilizers were used together in the 2nd feeding, in the 2nd option, a yield of 26.0 c/ha was obtained. Among the options, the highest productivity was recorded in option 4, which used ecosil and immunoact organomineral fertilizers in the 1st feeding, ecosil, ecogum complex and immunoact organomineral fertilizers in the 2nd feeding, and was 32.1 c/ha, and compared to the control, it was 8.2 centner additional sunflower seed yield was achieved.

The same pattern was observed in the 8 variants, where the hydrohumate preparation was applied to the soil before planting crops, and during the growing season, ecosil and immunoact organomineral fertilizers were used in the 1st feeding, and ecosil, ecogum complex and immunoact organomineral fertilizers were used in the 2nd feeding, and in the control option, 22.9 c/ha, and in the 8th option, the yield of sunflower seeds was 30.6 c/ha. This, in turn, shows that the seed yield is 7.7 c/ha higher than the control option.

On the basis of the results obtained above, it can be concluded that in order to meet the demand for nutrients of crops along with mineral fertilizers added to the soil to obtain a high yield from sunflower crops, ecosil, ecogum AF and polyboron organomineral fertilizers in the 1st feeding, ecosil in the 2nd feeding, The combined use of ekogum complex, ekogum FK and polybor organomineral fertilizers gives a good effect.

Table 3.

Sunflower grain yield in the experiment (29.09.2022)

Options	productivity, c/ha				Additional yield, c/ha
	1st iteration	2st iteration	3st iteration	Average	
1 (control)	23,75	22,91	25	23,9	0,0
2	26,66	26,25	25	26,0	2,1
3	28	28,83	31,75	29,5	5,6
4	30,83	32,5	32,91	32,1	8,2
5 (control)	22,84	22,13	23,8	22,9	0,0
6	24,76	24,95	22,9	24,2	1,3
7	27,04	27,69	29,85	28,2	5,3
8	29,65	31,08	31,21	30,6	7,7

Conclusions and recommendations

It was found that the application of 3 l/ha of the ecogum bio preparation to the soil before planting sunflower seeds or together with planting is more effective than the application of the same amount of hydrohumect. Based on the results of field experiments, the following preliminary conclusions can be made.

1. 50 mg/ha of ecosil, 1.0 l/ha of ecogum AF and 0.5 l/ha of polyboron organomineral fertilizers are applied to the sunflower crop at the stage of 4-5 leaf emergence, 7-8 leaves in the release phase, Ekosil at the rate of 100 mg/ha, Ekogum complex at the rate of 2.0 l/ha, Ekogum FK at the rate of 1.0 l/ha, and Polibor at the rate of 1.0 l/ha the height of the main stem was 9.9 cm, and the diameter of the basket was 3.8 cm higher than the control in the phase of formation of sunflower elements.

2. At the phase of 4-5 leaves to the sunflower crop are applied organomineral fertilizers such as Ecosil at the rate of 50 mg/ha, Ecogum AF at the rate of 1.0 l/ha and polyboron at the rate of 0.5 l/ha, and also at the phase of 7-8 leaves at

the rate 100 mg/ha of Ecosil, 2.0 l/ha of Ekogum complex, 1.0 l/ha of Ekogum FK and 1.0 l/ha of polybor fertilizers, the weight of sunflower grains in 1 basket was 21.2 grams higher than the control, and the weight of 1000 grains was 12.72 grams higher.

Based on these conclusions, taking into account that the highest efficiency was achieved when the composition of the combination of fertilizers in foliar feeding of sunflower consisted of ecosil, ecogum AF and polyboron organomineral fertilizers in the 1st feeding, and ecosil, ecogum complex, ecogum FK and polyboron organomineral fertilizers in the 2nd feeding, and also, When using Ekogum bio on soils with sufficient and high humus content, taking into account that the microorganisms in it have a positive effect on the nutrition of plants through their activity in the soil, compared to the hydrohumate preparation, in the combinations mentioned above, and before planting, the soil should be treated with Ekogum bio preparation we recommend giving.

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