ISSN NO: 2771-8840
December 2024

The Importance Of Organic-Mineral Fertilizer Standards In Preserving The Agrochemical Properties Of Soil

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Abstract: The article presents information about changes in the amount of mobile nutrients in the soil when applying organomineral fertilizers in different types and standards in the care of sunflower crops. At the same time, the most optimal results in terms of the dynamics of improvement of nutrients in the soil were achieved using combinations of the preparations Ecogum bio, Ecosil + Ecogum AF + Polybor and Ecosil + Ecogum complex + Ecogum FC + Polybor.
Key words: Sunflower, Ecogum bio, Ecosil, Ecogum AF, Ecogum FC, Ecogum complex, Polybor.

Introduction.

The role of organomineral, biological fertilizers and physiologically active substances in increasing productivity and ensuring early ripening is of great scientific and practical importance. Studying the effect of biologically active substances on cotton metabolism, that is, on the activity of enzymes during photosynthesis, the biosynthesis of amino acids, nucleic acids and protein, and the metabolism of phytohormones allows us to improve agricultural techniques for producing high-quality crops.

Sunflower cultivation is of great importance in the agriculture of our country, because this plant solves the problems of grain, protein and oil. The Decree of the President of the Republic of Uzbekistan No. PF-4947 dated February 7, 2017 “On the Strategy of Actions for the Further Development of the Republic of Uzbekistan” sets out as one of the important tasks “the development of agriculture and water management based on the introduction of scientific achievements, increasing the efficiency of its export potential, and the application of intensive methods in the agricultural sector, primarily modern agrotechnologies that save water and resources”2. In addition, due to high annual temperatures in our republic, the use of intensive soil cultivation methods in the cultivation of agricultural crops, and irrigation of crops, the natural humus reserves accumulated in the soil have decreased, as a result of which the soil has lost its biological properties, and crop productivity has decreased. It is urgent to create agrotechnology for the use of organomineral fertilizers in the production of high and environmentally friendly sunflower crops as a repeat crop and to study the impact of the use of organomineral preparations on soil fertility.

This dissertation research will to a certain extent serve the implementation of the tasks set out in the Resolution of the President of the Republic of Uzbekistan No. PP-2460 dated December 29, 2015 “On measures for further reform and development of agriculture in 2016-2020” and other regulatory and legal documents related to this activity [1].

The purpose of the study. To determine the effect of the use of organomineral fertilizers such as Ecogum bio, Hydrogumat, Ecosil VE 50 l/ha, Ecogum AF, Ecogum complex, Ecogum FC, Polybor, Immunoact on the yield and soil fertility of sunflower crops replanted after winter wheat in the pasture soil conditions of the Andijan region.

Studies were conducted to study the effect of organomineral preparations Ecosil, Ecogum complex, Ecogum FC, Immunoact, Polybor and Ecogum AF on the growth, development, yield and quality of the crop of sunflower. In particular, organomineral preparations were used in the types, rates and periods specified in the experimental system, and the following phenological observations were carried out on sunflower crops:

-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 grain were determined;

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- the mobile amounts of nitrogen, phosphorus and potassium in the soil and the amount of humus are determined.

Table 1
Experimental system for sunflower cultivation

№	The soil is sprinkled before spring tillage		1st feeding through the leaf, in the phase of 4-5 leaf emergence		2nd feeding through the leaf, in the phase of 7-8 leaves	
	Organomineral fertilizer name	Standard	Organomineral fertilizer name	Standard	Organomineral fertilizer name	Standard
1	not used	-	not used	-	not used	-
2.	Ecogum bio	3 l/ha	Ecosil Group E AF	50 mg/ha 1.0 l/ha	Ecosil Ekogum complex Ekogum FC	100 mg/ha 2.0 l/ha 1.0 l/ha
3.			Ecosil Immunoact	50 mg/ha 2.0 l/ha	Ecosil Ekogum complex Immunoact	100 mg/ha 2 l/ha 2.0 l/ha
4			Ecosil Ekogum AF Polyborus	50 mg/ha 1.0 l/ha 0.5 l/ha	Ecosil Ekogum complex Ekogum FC Polyborus	100 mg/ha 2.0 l/ha 1.0 l/ha 1.0 l/ha
5 kisses	not used	-	not used	-	not used	-
6.	Hydrogut	3 l/ha	Ecosil Ekogum AF	50 mg/ha 1.0 l/ha	Ecosil Ekogum complex Ekogum FC	100 mg/ha 2.0 l/ha 1.0 l/ha
7.			Ecosil Immunoact	50 mg/ha 2.0 l/ha	Ecosil Ekogum complex Immunoact	100 mg/ha 2 l/ha 2.0 l/ha
8.			Ecosil Immunoact Polyborus	50 mg/ha 2.0 l/ha 0.5 l/ha	Ecosil Ekogum complex Immunoact Polyborus	100 mg/ha 2 l/ha 2.0 l/ha 1.0 l/ha

To conduct phenological observations in sunflower, 50 plants were separated by hanging labels in each variant and replication, and the number of true leaves, main stem height at the beginning of the period, main stem height in July, August and September, number of leaves, panicle diameter at the end of September, number of seeds in 1 panicle, seed weight in 1 panicle, and 1000 seed weight were determined. Also, 5 sunflower panicles were separated from each plot before harvesting to determine its quality indicators [2,3].

Also, the sunflower yield in the calculation area of all variants and replications was harvested and the yield was calculated.

As is known, when selecting a site according to the requirements of the experimental methodology,

ISSN NO: 2771-8840
December 2024

it is advisable to select sites that have typical uniformity in terms of their main characteristics and agrochemical supply. In our studies, the site was selected following this principle.

Table 2

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

Soil pit number	Soil layer , cm	humus , %	Amount of mobile nutrients , mg/kg	
			R_2O_5	K_2O
Average of 3 points	0-30	1.65	18.0	210
	30-50	1.54	16.1	180

This table presents the results obtained from the 0-30 and 30-50 cm layers of soil (Table 2). The average humus content in the topsoil was 1.62%, mobile phosphorus was 17.4 mg/kg, and exchangeable potassium was 220 mg/kg.

Data on changes in the amounts of mobile phosphorus and exchangeable potassium in the soil composition are presented in Table 3. The amount of mobile phosphorus in the topsoil changed the least compared to the initial one in control variants 1 and 4, i.e. 0.8 mg/kg and 1.0 mg/kg. In the remaining variants, it was found that it decreased to 3-3.5 mg/kg. From this it can be concluded that both preparations applied to the soil, within the scope of their effect on plant growth and development, have a positive effect on the absorption of mobile phosphorus from the soil. It should also be noted that the rapid absorption of mobile phosphorus in the soil is also affected by the drugs used during the growing season of sunflower, but this indicator does not differ significantly in the variants fed through the leaves, or it would be reasonable to conclude that among the types of drugs used during the growing season (used in all variants by type and application rate), some drug has a clear advantage over others in terms of its effect on plant nutrition.

The results obtained on the change in the amount of mobile potassium in the soil composition in the variants planted with sunflower differed significantly from the pattern obtained for mobile phosphorus. For example, in most variants, it was observed that the amount of potassium in the soil layer decreased from the average supply gradation to the upper limit of the low-supply group before the experiment, with the exception of variants 4, 6 and 8, which also decreased by the same amount, but remained at the lower limit of the average supply group [4,5].

According to the results of the preliminary analysis before sowing, the amount of exchangeable potassium in the arable layer was 230 mg/kg, but in variants 1 and 5, where no fertilizer was applied, it decreased to 198.9 mg/kg and 187.9 mg/kg (-31.1 and -42.1 mg/kg), while in variants 2 and 3, it was absorbed even more (197.7 and 197.4 mg/kg: -32.3 and -32.6 mg/kg). From this it can be concluded that the applied Ecogum bio preparation had a positive effect on the absorption of potassium. This will, of course, be discussed in the relevant section on the amount of crop yield.

When asked why humus in the soil decreases in the fall, it would be appropriate to say that the roots and stalks remaining from sunflowers have not yet decomposed. It was observed that in variants with high yields, the amount of root residues remaining from the crop was relatively higher.

Table 3

The results of the agrochemical analysis of the soil of the experimental field before the start of the experiment and at the end of the sunflower growing season, 2023

Soil depth number	**Soil layer , cm**	**Hummus quantity, %**	**Amount of mobile nutrients , mg / kg**	
			R_2O_5	**K_2O**
before experimenting	0-30	1.65	18.0	210
	30-50	1.54	16.1	180
1st and 3rd returns				
1 c	0-30	1.41	15.3	178.9
	30-50	1.38	8.8	172.2
2 c	0-30	1.37	12.7	178.7

ISSN NO: 2771-8840
December 2024

	30-50	1.38	9.5	169.4
3 с	0-30	1.3 9	13.43	179.4
	30-50	1.23	8.4	166.1
4 с	0-30	1.38	14.2	192.6
	30-50	1.38	10.5	177
5 с	0-30	1.43	15	177.8
	30-50	0.67	7.1	169.7
6 с	0-30	1.42	12.4	182.4
	30-50	1.42	9.1	167.9
7 с	0-30	1.44	13.7	184.9
	30-50	1.4	11.1	174.7
8 с	0-30	1.39	14.4	182.1
	30-50	1.37	11.25	174.5

The results of the changes in soil nutrients compared to the beginning of the sunflower growing season were analyzed over the years. The highest results were observed in options 1 and 5, which revealed that almost all nutrients were removed from the soil more when fed through the leaves. It is worth noting that it is incorrect to conclude that the decrease in soil nutrients has reduced its productivity, because there are also root and shoot residues remaining in the soil, which will decompose in the future, turn into humus and enrich the soil with nutrients. This, in turn, shows that, considering the degree to which crops retain nutrients in the soil, depending on their productivity, options 4 and 8 have better efficiency than other options [6,7].

In conclusion, the highest efficiency is achieved when the composition of the combination of drugs for foliar feeding of crops consists of the organomineral preparations Ecosil, Ecogum AF and Polybor in the 1st feeding, and Ecosil, Ecogum Complex, Ecogum FC and Polybor in the 2nd feeding. Also, when Ecogum Bio is used in soils with a sufficient and high humus content, the microorganisms in it, through their activity in the soil, have a positive effect on plant nutrition compared to the hydrohumate preparation, and the mobile nutrients derived from the applied fertilizers are better absorbed.

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