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FEATURES OF APPLICATION OF FERTILIZERS AND RICE NUTRITION

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Abstract: *This article is a review work where the role of microelements in life of plants is observed and theoretical and practical issues concerning application of complex micro fertilizers enhancing productivity, quality of seeds and grain on rice crops are highlighted. The complexions of the metals used as micronutrients, are an effective form of trace elements and means of regulation of the production process of agricultural crops as seed treatment before sowing, and when conducting foliar vegetating plants.*

Their inclusion in the system of fertilizer rice to balance mineral nutrients necessary for plant life, providing increased productivity, quality seeds and grains.

Key Words: *Cultivation of rice, soil processes, soil food regime, humus, plant growth.*

1. INTRODUCTION:

The chronic shortage of food and agricultural raw materials strictly confronts the agriculture of the Republic of Uzbekistan with the problem of accelerated, steady growth in the yields of all agricultural crops, including rice.

The Republic of Karakalpakstan is the largest rice-growing region in Uzbekistan, almost entirely located in the environmental disaster zone of the Aral Sea region. The soil and climatic conditions of the region are quite favorable for rice-growing, but already in most areas there is a limitation of natural resources, as well as the disturbance of many natural ecological processes caused by thoughtless anthropogenic activities.

The most important reserve for increasing the yield of rice in the Aral Sea region is the development and implementation of zonal progressive farming systems that will improve the soil-ecological conditions for growing crops. Accelerated development of rice growing in Uzbekistan should be based on the transition to intensive resource-saving technologies. For this, it is necessary to have scientifically grounded recommendations that allow a set of basic natural factors to be maintained and the anthropogenic impact on the agroecosystem.

The effectiveness of the implementation of soil fertility in crops, as well as the impact of intensification factors, especially irrigation and fertilizer, depends on improving soil-ecological conditions, understanding the mechanisms of creating and regulating soil fertility by improving irrigation regimes, rational use of crop rotation, tillage, fertilizer and bioclimatic potential. At the same time, the modeling of parameters of ecologically safe systems, technologies and processes ensuring the maximum bioproductivity of agrolandscapes during land reclamation, chemicalization, mechanization, the use of intensive rice-growing technologies and others comes to the fore. This has caused the need for research on the effective use of water and land resources. On the rice irrigation systems of the Aral Sea region, the development of scientific foundations of rice sowing aimed at water conservation, increase of soil fertility, technologies ensuring high productivity of soils and at the same time high profitability of intensification factors of agriculture.

Agrotechnical methods of soil fertility regulation are reduced to various methods of plowing, applying nitrogen and phosphate fertilizers. The fertility of periodically flooded soils that are present in the course of a year, in different redox conditions, is greatly influenced by the activity of microorganisms, and many aspects of this process are not well understood.

The final crop yield is largely dependent on the germination of seeds, which are greatly influenced by soil microorganisms, including those that can infect seeds. Of great importance is the study of the species composition of microorganisms that reduce the germination of rice seeds.

2. MATERIAL AND METHOD:

With a lack of nitrogen in the soil, the growth of plants slows down, the leaves turn yellow, the rice weakly bushes, the panicle turns out to be slightly grained. However, the effectiveness of various forms of nitrogen is not the same. Fertilizers containing nitrogen in ammonia forms, under rice are more effective than fertilizers with a nitrate form of nitrogen, which is leached from the soil by filtration water. Therefore, from the forms of nitrogen fertilizers, ammonium sulfate works best (Table 1). The weak effect of ammonium nitrate on rice yield is due to the fact that in it 50% of nitrogen is represented by nitrate forms. According to the experimental field of the Karakalpak branch of UzNIIRis, the yield of rice from the introduction of ammonium nitrate was 80.5, and from cyanimide, 72.8% compared to ammonium sulfate. Being physiologically acidic fertilizer, ammonium sulfate, besides directly supplying plants with

nitrogen, reduces the alkalinity of the soil used, facilitating the mobilization of phosphorus by converting it into more soluble forms. Therefore, ammonium nitrate is not the main fertilizer for rice in the region [16].

Along with the great need for nitrogen, rice also needs phosphorus. With a deficiency of P, the Belk plant metabolism is disturbed, the root system develops poorly, the leaves become narrow, the tillering passes slowly, the panicle is poorly formed, the weevil is insufficiently fulfilled. In addition, the lack of phosphorus in the early period of growth adversely affects all subsequent phases of plant development. The reserves of P in the soils of the region are medium and only in the fields of crop rotation, where large doses of phosphate fertilizers are applied annually, phosphates accumulate in the topsoil.

Table 1

Effect on various forms of nitrogenous fertilizers applied before sowing on rice crops

Experience option	Rice crop		Increase	
	centners per hectare	%	centners per hectare	%
No fertilizer	25,9	100,0	-	-
N90P60 (ammonium nitrate)	34,4	132,0	8,4	32,0
N90P60 (ammonium sulfate)	45,5	175,7	19,6	75,7

In carbonate soils, such as the soils of the region, with increased alkalinity of the medium, soluble phosphates pass into less accessible compounds. This transition is pronounced in the dry period, when the field is free from flooding. In the conditions of not long-term field finding under water and development of recovery processes, the mobility of phosphates increases. This means that the phosphorus availability of both soil and fertilizer for rice is practically unlimited.

As a result of our experiments and other research data, we showed that as the OV potential decreases, the content of mobile phosphorus in the soil increases, reaching a maximum in the tillering-flowering phase of rice. Then the process diminishes and the least amount of rolling P2O5 falls on the post-harvest period [17].

Taking into account the high mobility of phosphorus in flooding the soil and its availability, plants are advised to apply the entire dose of phosphate fertilizers for rice before sowing, once every two years 2-3-year-old alfalfa in the reservoir, and for the turnover of plaza rice uses residual P fertilizers.

Among phosphate fertilizers, powdered or granular superphosphate is preferable; other fertilizers are much inferior to superphosphate in their effect on rice yield (Table 2).

Rice needs potassium. With its deficiency, the growth is slowed down and the size of the leaves decreases, the synthesis and movement of carbohydrates is disturbed, the dry mass formed by the plant is inhibited, and the yield is reduced as a result. The use of potash fertilizers only little effective, their effect is enhanced by the joint application with nitrogen or phosphorus on engineering-planned lands of light mechanical composition of the poor in potassium.

Table 2

Rice crop when making various forms of nitrogen fertilizers

Nitrogen Fertilizer Forms	Rice crop	Yield increase
	ц/га	ц/га
Nitrogen free	42,8	-
Ammonium sulfate	59,6	16,8
Ammonium chloride	56,4	13,6
Urea	58,8	16,0
Ammonium nitrate	50,9	8,1
Calcium cyanamide	53,0	10,2

Note: The table shows the averaged data fertilizers were made at the rate of 120 kg / ha a.v. against the background of 60 kg / ha of phosphorus.

In the experiments of UzNIIris, the introduction of 90 kg / ha of potassium against the background of N 180 R 90 kg / ha of potassium provided a yield of 65.5 rice at the same doses of P without potassium -63.0 c / ha. At the same time, on the background of potash fertilizers, good grain performance and a smaller number of immature spikelets were observed.

Table 3

Rice crop for phosphate fertilizers

Nitrogen Fertilizer Forms	W r o f a nd	
	centners per hectare	centners per hectare
No fertilizer	51,0	100,0
Powdered superphosphate	54,1	106,0

Defluorinated superphosphate	51,3	100,0
Superphosphate	49,7	97,4
Phosphate slag	48,8	95,7
Phosphoric Flour	43,1	84,5
Precipitate	50,4	99,0

In general, the efficiency of mineral fertilizers increases with the joint application of N and P, and on lighter soils and K. According to our data, the joint introduction of nitrogen (120-150 kg / ha a.v.) and phosphorus (90-120 kg / ha).) increases the yield of rice 2.3-3.4 times as compared with the control (23.0-21.7 c / ha), whereas the application of single and phosphate fertilizers alone is 1.2-1.0 times, and potash fertilizer by 15-20%.

3. FINDINGS:

Thus, on the basis of summarizing the obtained data, it is recommended to add: 50-70 nitrogen and 100% phosphate fertilizers before sowing and 30-50% nitrogen - during the growing season of rice by two supplements (the first - by germination before the beginning of tillering, the second - in the tillering stage).

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