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The Importance of Intermediate Crops in Increasing Soil Fertility in Areas Where Regular Rice Paddy is Grown

Kashkaboeva Chulpanoy Tulkunovna
Head of the laboratory of agrotechnologies and mechanization of rice cultivation at the rice research institute

Khojamkulova Yulduzoy Jakhonkulovna
Head of the laboratory "plant physiology and biochemistry"

F. Y. Ibragimov
Head of the agrotechnical Laboratory of selection and cultivation of legumes

Abstract: this article covers the study of the impact of continuous rice cultivation on soil characteristics and productivity at the Rice Research Institute, as well as its data on the importance of intermediate crops in the short-queue crop rotation system.

Keywords: rice, soil, sustainable, intermediate crops, climate, seed, fertility, fertilizer, productivity, norm, term, system, crop rotation.

Relevance of the topic: today the world community recognizes climate change as the main and one of the most serious problems before humanity of the 21st century. The growing shortage of food in the world and the growing desertification conflict in our region are also being put on urgent tasks for agricultural workers. In the framework of the strategy for the development of the agrarian sphere for 2020-2030, radical reforms were carried out and a number of positive results were achieved. In particular, Uzbekistan's place in the Global Food Security Index rose from 85 to 73 places or 12 pagans out of 113 countries [5].

Uzbekistan was ranked 1st in 10 countries with the highest food safety growth rates in 2019-2022.

The rapid change in weather and the sharp cold and hot weather are causing a number of problems in the rice industry.

This year, January-February began with the entry of a stream of cold air from animals that had not been observed for many years. The season of planting rice begins in April-may. It was when the daily air temperature rose to 140 degrees, but in the 3-decade of April, the air temperature dropped to 10-120 degrees. This year it is observed that the weather cools sharply and becomes very capricious. In the following years, during the period when the same rice is produced and blooms, the increase in air by 55-600 negatively affects the yield of rice. Such problems are achieved in such difficult years at the expense of the placement of newly established and zoned early, medium and rice varieties, taking into account the soil and climatic conditions of the regions, and the systematic organization of research work.

A number of scientific research works have been carried out at the Rice Research Institute since 1974 to study the importance of intermediate crops in the system of short-shift crop rotation on the soil characteristics of continuous rice cultivation. There has been a dramatic decrease in productivity as a result of a negative change in the composition of soils under continuous rice cultivation. In such

conditions, soil density is observed from 1.30 g/cm3 to 1.55 cm3/in comparison with fields where an alternating planting system is applied, the seed of curmacoid and hilal weeds is 65-70%, and the tubers are 50% more [4].

Scientific research work on continuous rice cultivation consists of 5 options, the control option is to determine the natural possibility of soil for 48 years.

I. Fertilizer-free option (control)

II. 30 tons of manure per hectare 1 time in two years.

III. Giving n150r120 K150 kg of fertilizer per hectare every year

IV. Drive for fertilizer by planting intermediate crops every year.

V. Mowing an intermediate crop to a Blue Mass once every two years.

The control option consists only in the implementation of water and weed removal measures of the shawl, and in other options, maintaining soil fertility in one norm, increasing the amount of product obtained from the field unit using advanced agrotechnologies.

When growing regular rice, it will be necessary to use various agrotechnical methods to prevent a sharp decrease in grain yield. When continuous rice is grown, organic matter in the soil decreases. The density of the soil increases, which negatively affects the growth, development and yield of rice [1;2;3]. When solving the problem of maintaining the balance of the amount of humus in the soil, the rotting of the plant residue in the soil, especially the sagging of organic fertilizers, is large. Mineral fertilizers cannot continuously increase the fertility of the soil, which is considered the most important from an agronomic point of view [3;5]. Scientific research is being carried out to study the impact of organic and mineral fertilizers and intermediate crops on the natural fertility of the soil, its importance in increasing its physical and chemical properties.

Intermediate crops not only increase the fertility of the Earth and become a means of supplying nutrients to livestock, but also act as a phytosanitary that cleans the soil from weeds, various harmful insects and disease infections [1;2;3].

In the experimental field of cultivation of continuous Rice, after the harvest of rice grain, when the rice was cleared of rice and weeds, softened to a depth of 25-27 CM, leveled and planted barley, triticale, blue peas, autumn rapeseed seeds at a depth of 2-5 cm in the III-IV-V variants in the I-ten days of November. It is important that the root system and the mass of the vegetative organs of the earth are increased, the accumulation of dry matter is absorbed according to the norm of nitrogen fertilizers being given to the rice plant by the plant. Because the technical indicators of rice grain depend precisely on the mineral fertilizers being given. The quality indicators of the rice product obtained during the rice processing period are inextricably linked with the composition of the soil in which the rice seeds are planted, as well as the norms of nitrogen fertilizers being given. The best quality and technical indicators were determined in the options given nitrogen fertilizers in the norm N_{150} and N_{120} [3;4].

The soil in the Central Experimental Farm is not saline, the reaction is neutral (rN-7,08 - 7,39), the mechanical composition is heavy sand. When analyzing soil samples from the areas where scientific research is carried out, in 2022, the total humus, motile nitrogen, phosphorus, potassium contained in soil samples in the driving layer of the continuous rice cultivation area is presented in Table 1.

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Table 1. Determination of the amount of total humus and motile nitrogen, phosphorus, potassium and water-soluble salts in soil samples.

13- map 3 check								Ph
Variants	Depth	Gumus %	Phosphorus P_2O_5 mg/ kg	Potassium K_2O mg/ kg	Nitrogen N NO_2 mg/ kg	Salting		
						type	Degree	
1	0-30	1,92	17,6	108	20,7	Chloride-sulfate	Low salinity	7,08
2	0-30	2,32	14,4	106	22,9	Sulphate	unsalted	7,19
3	0-30	2,35	9,6	106	21,6	Chloride-sulfate	low salinity	7,30
4	0-30	2,12	7,04	115	20,4	Sulphate	unsalted	7,39
5	0-30	2,16	11,2	96	25,6	Sulphate	unsalted	7,22
12- map 1 check								
1	0-30	2,53	14,4	120	15,6	Chloride-sulfate	low salinity	7,35

Option 1 of the field under the experiment showed humus 1.92%, nitrogen 20.7 mg/kg, phosphorus 17.6 mg/kg, potassium 108mg/kg, salinity type chloride-sulfate and low salinity. The soil environment was Rh 7.08. Variant 2 contains humus 2.32%, nitrogen 22.9 mg/kg, phosphorus 14.4 mg/kg, potassium 106mg/kg , salinity type sulfate, and levels unsalted. Rh 7,19. Variant 3 contains humus 2.35%, nitrogen 21.6 mg/kg, phosphorus 9.6 mg/kg , potassium 106mg/kg, salinity type chloride-sulfate and low salinity. Rh 7,30. Variant 4 contains humus 2.12%, nitrogen 20.4 mg/kg, phosphorus 7.04 mg/kg, potassium 115mg/kg , salinity type sulfate, and levels unsalted. Rh 7,39. Variant 5 contains humus 2.16%, nitrogen 25.6 mg/kg, phosphorus 11.2 mg/kg, potassium 96mg/kg , salinity type sulfate, and levels unsalted. Rh 7,22. we can see that it was.

Also, samples from the experimental field carried out in 3 directions of the project amounted to the following. Humus is 2.53%, nitrogen is 15.6 mg/kg, phosphorus is 14.4 mg/kg, potassium is 120 mg/kg, the salinity type is chloride-sulfate and the level is poorly saline. RN 7,35. There are no mineral salts due to the fact that the area under the experiment is partially sloping, the bottom layer of the soil is made up of sand and small stones, groundwater flows from the Northeast to the Southwest. For many years, scientific research has been carried out at the Rice Research Institute to study what changes in the physical and chemical composition of the soil and the effect on increasing the yield of rice. In the area where the experiment was carried out, soil samples were taken before planting 2022 to determine the aggregate composition of the soil, volume weight and chemical composition (nitrogen, phosphorus, potassium, humus).

Based on the results of analysis work on these obtained samples, fractions of 10 - 0.25 mm greater than 10 mm in terms of aggregate content in soil samples were 25-35%. It was found that the volume weight in the soil plow layer (0-30 CM) was 2.35/cm3 in the control variant and 2.36-2.46 g/cm3 in the rest of the variants.

Based on geomorphological conditions, the Middle Chirchik district belongs to the I-II - alluvial deposits of the Chirchik River. It is located at an altitude of 340-360 m above sea level. It consists of wide undulating plains, oriented in its south-west direction in relief. The plane of the territory stretches through Crown peaks and depressions, ashy depressions characteristic of river stretches. on the

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aboveground terraces of the place III, II and I make soil grunts from 0.5-1.0 m according to groundwater conditions.

Water at a depth of 0.5 –1.0 m consists of Meadow-swamp or swamp-meadow at 1.0-2.0 m, meadow at 2.0-3.0 m, meadow at 3.0-5.0 m.

In scientific research on how this area and the rice plant can undergo changes when continuously growing rice under different conditions for 48 years in a continuous area, the Iskandar variety of rice was sown in 5.0 million units per hectare (150 kg) of unsweetened seeds on May 30 according to the options. In the variants under scientific research, during the phenological observation work, seeds were observed to germinate completely 7-9 days after sowing, that is, on June 7, it was found that during the germination period, seeds (grass) there were several plants, weeds, that is, hilol and courmac – like grasses on an area of 1m2. In Control Option 1, where mineral fertilizers were not applied in the research work, it was found that on an area of 1 m2, rice plants germinated in the same period as 216 rice sprouts during the germination period, hilol 71 pieces, courmac weeds 27 pieces.

In 2 variants with 30 tons of rotted manure per hectare once every two years before autumn plowing, the rice plant during the germination period is 241 Pieces, The Crescent is 52 pieces, and the Palm Grass is 31 pieces. In this variant 2, it was found that in the germination period compared to the 1st control variant, the rice was 25 pieces more, the hilol was 24 pieces more, and the courmacs were 4 pieces more. In Option 3, in which only mineral fertilizers were applied in the recommended amount for growing the middle-growing variety "Iskandar", on an area of 1 m2, during the average germination period, the rice plant was 260 Pieces, The Crescent was 28 pieces, the Palm Grass was 22 pieces in Option 3, compared to the Control Option 1, it was found that.

The experiment showed that the recommended amount of mineral fertilizers for the same variety was in Option 4, the number of rice plants on an area of 1 m2 on average was 272 pieces during the germination period, 32 pieces of Rice, 23 pieces of courmac herbs, and before harvesting, the rice was 218 pieces, hilol 8 pieces, courmac herbs 9 pieces.

Table 2. Seedling thickness of rice and weed plants dona/m2

Variant	During germination			Pre-harvest		
	Rice	Hilol	Kurmak	Rice	Hilol	Kurmak
			2022 й			
1	216	52	27	176	6	9
2	241	76	31	187	8	14
3	260	28	22	212	5	10
4	272	32	23	218	8	9
5	262	56	32	204	14	12

In the experiment, mineral fertilizers were applied to grow rice, but in Option 5, which herbicide was not used against weeds for the purpose of growing an environmentally friendly product, the average number of rice seedlings on an area of 1 m2 was found to be 262 pieces during the germination period, 37 pieces of hilol, 28 pieces of courmac-shaped weeds were.

According to the table above, the growth rate of rice in terms of continuous rice cultivation was determined to be 8-10 CM difference between the options during the full germination period. These were 10.5 cm in the control variant, while the plant height in Option 2 was 11.3 CM, in Option 3, i.e. the recommended amount of mineral fertilizers for medium rice varieties (N120 R120 k120) was 14.7 cm in the applied variant. Option 4-(N120 R120 k120) seed fertilization option with mineral and

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microelements complex fertilizer observed plant height of 19.5 cm and plant height of 11.6 CM in Option 5.

Table 3. Growth rate of plants in conditions of continuous rice cultivation

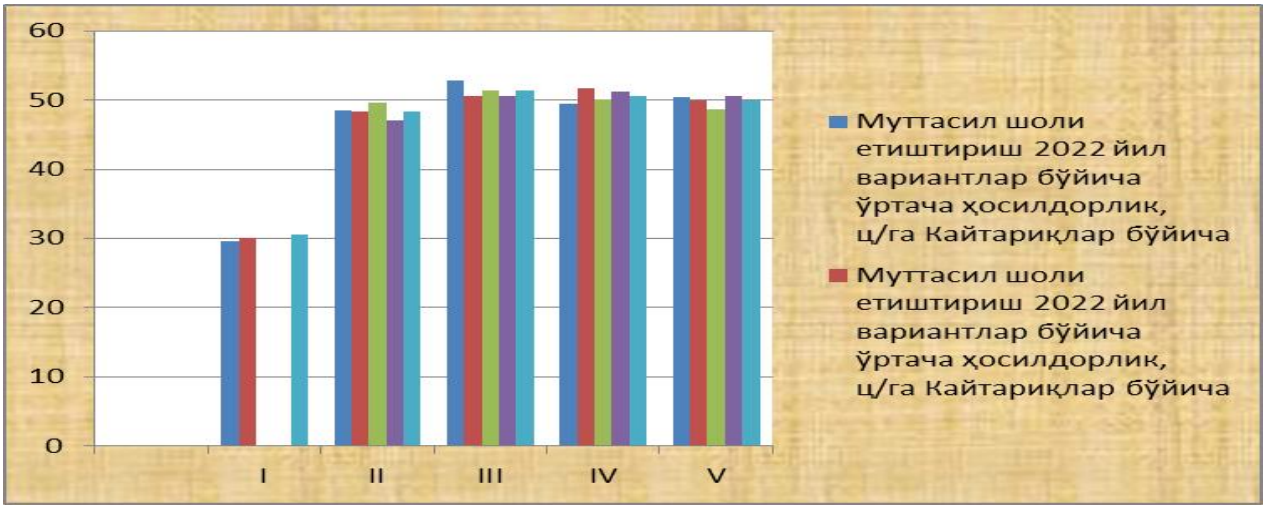
Variant	Height of plants in periods of development , sm.					
	Germination	Collection	Tube lash	Rovak lash	Flowering	Full ripening
2022						
1	10,5	17,4	69,1	75,3	92,8	104,0
2	11,3	26,8	72,0	78,6	107,4	118,4
3	14,7	22,7	78,0	83,9	108,5	120,3
4	19,5	21,0	80,1	88,4	118,5	125,9
5	11,6	20,0	76,8	80,7	110,7	117,5

At the expense of mineral fertilizers given to the plant in each phase, the stems of the upper organs of the Earth, the leaves grew rapidly. Options Fed to seeds and plant leaf with Biopreparat were 5-10 cm higher than control. This condition also had an effect on the onset and completion of the fasting phase. After each feeding, the growth of the plant height was observed to accelerate. At the beginning of the fasting phase, it was observed that the height of the plant is 10-13 cm higher compared to the control option.

In the research work, the control option, in which Rice has been planted for a period of 48 years, achieved a yield of 30.6 centners per hectare, in Option 2, that is, in an experiment with 40 tons of rotted manure per hectare once every two years, 48.4 per hectare, in Option 3, 52.5 centners per hectare.

When the mineral fertilizer norm and microelements biopreparations were applied to the area under experiment (N120 P120 K120), the yield was 52.3 ts/ga, and in option V it was 53.8 ts/ha, with an average yield of 23.2 centners per hectare compared to the control option 3.3.1 - fig.

The average yield obtained on returns as well as the additional yield obtained using biopreparations are shown in Figure 1.



Draw 1. Average yield in terms of options when growing regular rice, ts / ga

Conclusion. Based on the results obtained, it can be noted that in increasing soil fertility of the areas of continuous rice cultivation, it was determined that by planting intermediate crops and using timely

agrotechnical measures, processing rice seeds using bopreparations and feeding the plant from its Leaf will create a basis for higher yields from the rice. A rich harvest of rice, in turn, is considered necessary in ensuring the growing population's need for rice products.

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