Reduce the Rate of Mineral (Nitrogen) Fertilizer by Using the Biological Opportunities of Soybean Plant

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Abstract: Effective use of symbiotic activities of legumes is a cost-effective way of growing these plants. The formation of nodular bacteria that fix nitrogen in the root system of soybean was achieved as a result of the use of soil containing nodular bacteria and bacillus subtilis bs-26 bacteria. As a result of the study, it is recommended to apply 1500 kg per hectare to the fields where soybean seeds are planted from the soil layer of 0-15 cm of the soil where the soybeans were previously planted.

1 INTRODUCTION

Today, providing the world's population with quality food products is becoming more complicated than ever. It is also observed that “due to the global climate changes that are occurring in the world, as a result of the desertification of cultivated areas and land degradation in many countries, nearly 2 billion hectares of land around the world are becoming unusable.” In order to solve this problem, soybean, which belongs to the legume family, is considered a valuable crop not only as food, but also in maintaining and increasing soil fertility. Development of a system of efficient use of crops is one of the urgent issues of today. Level of study of the problem: due to the activity of soybean nodule bacteria, due to the conversion of free nitrogen in the air into biological nitrogen and its accumulation in the soil, productivity can be improved "for free" with an average of 86-150 kg/ha of nitrogen per hectare (Tangirova , 2007). Bacteria of Rhizobium group can multiply in infected soil for 15-17 years, waiting for its "master" i.e. soybean plant, when favorable conditions are created, soil moisture and air permeability are good (Rinaudi et al., 2006). The interactions between legumes and rhizobia form symbiotic associations that are particularly sensitive to several factors, particularly nutrient levels in the growing medium. (Egamberdieva et al., 2016). The purpose of the research: to infect the soils where soybean seeds are grown by fertilizing the nitrogen-fixing nodule bacteria Bradyrhizobium japonicum, which is present in the soil where soybean seeds are planted for many years, and to infect the nitrogen-fixing nodule bacteria in the roots of soybean plants in these soils. to produce Together with this process, the effect of new phosphorus-dissolving FOSSTIM-3 biofertilizers was studied in order to transfer phosphorus compounds remaining unabsorbed in our soils to the level where plants can actively absorb them (Mannopova et al., 2017).

2 MATERIALS AND METHODS

Placement of the experimental system, phenological observations and calculation works based on the methodical manual of UzPITI (1985y, 2007y) and the scientific methods produced in the Scientific Research Institutes of Cereals and Legumes (2000-2020) The experiments were carried out in the field of the experimental station of the scientific research institute in Fergana region

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found in places. According to the mechanical composition, these soils are medium and heavy sandy. These soils are weakly saline. The experiment area was carried out in 4 repetitions, the surface of the padel was 100.8 sq.m (width 4.80 m, length 21 m), there were 4 calculated rows, 4 protective rows, and the number of options was 14. Maris MM-3, and the field experiment of pre-mixing the seeds and planting soil of Baraka varieties was conducted in 2019-2020.

3 RESULTS AND DISCUSSION

When comparing the preliminary results of the research, obtained in 2019, with the results of the research obtained in 2020, there was no significant difference in the number of nitrogen-accumulating nodules in the roots of the soybean plant. The results of the analysis are presented in Table 1. The obtained two-year data show that the average number of nitrogen-fixing nodules in each plant root is up to 46.95 and 58.9 units in the 2-3 variants of the soybean variety "Baraka" compared to the control variety. It was observed that these variants were more formed. Compared to the control, it was found that in the variety "To'maris MM-3" there was an increase of 34.45 and 59.25 pieces in the root of each soybean plant. (see the picture). 15-25 cm used in the experiment the number of nitrogen-accumulating nodules in the soil layer was less compared to the 0-15 cm layer. For example, in variants 4 and 5 of the soybean variety "Baraka" it was found that the number of plants in the roots increased by 23.6 and 33.85 units on average compared to the control variant.

In the same variants "To'maris MM-3" compared to the control variant, the 15-25 cm layer of soil at 1000 kg/ha increased by 26.25 grains and from the 15-25 cm layer of soil at 1500 kg/ha FOSSTIM3 variant increased by 33.6 grains compared to the control was found to have increased. It was observed that the formation of nodules on the roots of plants that have reached the stage of full ripening begins to decrease significantly, their color turns brown and they sink into the soil. This situation was observed earlier in the "Tomaris MM-3" variety. Because the "Tomaris MM-3" variety is early ripening, the formation of buds slows down. It is explained by the faster transition of the plant to the ripening stage. According to the results of studying the grain yield of the main product obtained from soybean plants in the experiment, the yield of soybean grains obtained from plants of options 2 and 5 was on average 4-12 percent compared to the control options. It was found that the "Baraka" variety produced 4-7.2% more soybeans in 2 years, and the Tomaris MM-3 variety produced 10-11.6% more soybeans.

Table 1: The number of nitrogen-accumulating nodules (Bradyrhizobium japonicum) formed in the roots of soybean (Glycine hispida L) cultivars in the flowering-pod phase, on average per plant.

№	Experience options	Soyabean varieties	2019 year	2020 year	On average, piece
1	Experimental planting area 0-30 cm layer, CONTROL (traditional method)	Baraka	8,4	12,4	10,4
		To‘maris Mman-3	4,0	8,0	6,0
2	1000 kg/ha SOIL from 0-15cm layer	Baraka	48,5	66,2	57,35
		To‘maris Mman-3	35, 4	45,5	40,45
3	FOSSTIM3 with 1500 kg/ha of soil in the 0-15cm layer	Baraka	62,0	76,6	69,3
		To‘maris Mman-3	60,5	70,0	65,25
4	1000 kg/ha SOIL from 15-25cm layer	Baraka	24,0	44,0	34,0
		To‘maris Mman-3	22,0	42,5	32,25
5	1500 kg/ha SOIL +FOSSTIM3 from 15-25cm layer	Baraka	33,0	55,5	44,25
		To‘maris Mman-3	36,6	42,6	39,6
6	Soil FOSSTIM3 from the 0-15 cm layer (mixing at the same time as the seed)	Baraka	32,6	40,5	36,55
		To‘maris Mman-3	38,0	40,5	39,25
7	Soil FOSSTIM3 from a layer of 15-25 cm (mixing at the same time as the seed)	Baraka	28,0	35,0	31,5
		To‘maris Mman-3	26,6	30,5	28,55

According to the obtained results, when the grain yield was determined in option 1, in which the seeds of the "Baraka" variety of soybean were prepared and planted in the traditional way, it was determined that an average grain yield of 35.4 t/ha was obtained in three years, and 0- When the soil was taken from the 15 cm layer and 1000 kg per hectare was used, the grain yield was determined in the 2nd option, which was 38.5 t/ha on average in three years, and compared to the 1st option, the grain yield was 3.1 t/ha. was found to be received as Soybean seeds were treated with Fosstim-3 bacterial fertilizer at the rate of 1.0 kg/ha before planting, soil was taken from the 0-15 cm layer of the existing soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum), 1500 kg per hectare was used, and Serhosil biopreparation was used during the growing season. 10 l/ha in combs, 10 l/ha in pods and 10 l/ha in the 3-variant, when the grain yield was analyzed in the form of a suspension, an average grain yield of 39.4 tons/ha was obtained in three years, control.

Compared to option 1, it was observed that a higher grain yield of 4.0 t/ha was obtained, before sowing soybean seeds with 10 kg of soil taken from the 0-15 cm layer of the soil containing nitrogen-fixing (Bradyrhizobium japonicum) budding bacteria and Fosstim-3 bacterial fertilizer 1, In variant 4, which was cultivated and planted with 0 kg standards, the average grain yield was 37.8 t/ha in three years, and it was observed that the grain yield was higher up to 2.4 t/ha compared to control option 1. Along with sowing soybean seeds, soil was taken from a 15-25 cm layer of soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum) and applied at 1000 kg per hectare with

5-variant and Fosstim-3 bacterial fertilizer at the rate of 1.0 kg/ha before sowing soybean seeds. obtained from the 15–25 cm layer of the soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum).1500 kg/ha of soil application and 10 l/ha of Serhosil biopreparation during the growing season, and 10 l/ha of the suspension during the growing season.38.1-38.8 ts/ha was recorded and it was determined that 2.7-3.4 ts/ha additional grain yield was obtained compared to the control option 1. 10 kg of soil taken from the 15-25 cm layer of the soil and 1.0 kg of Fosstim-3 bacterial fertilizer were treated and planted in the 7-variant. When analyzing the grain yield, it was 37.5 t/ha on average in three years, control 1- 2.1 ts/ha higher grain yield compared to the variant was noted.

When analyzing the results obtained from the options where To'maris Mman-3 soybean seeds were planted, it was observed that the above laws were repeated. Before planting, high-yielding soybean seeds were treated with Fosstim-3 bacterial fertilizer, and soil containing nitrogen-fixing (Bradyrhizobium japonicum) nodule bacteria was used. it was determined that it was taken from options.

In particular, the field for sowing soybean seeds was prepared in the traditional way, and the control was planted with the seeds of "Tomaris Mman-3" variety of soybean.

When the 8th option was studied, it was determined that an average grain yield of 30.2 t/ha was obtained in three years, while in the 9th option, soil was taken from the 0-15 cm layer of the existing soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum) and 1000 kg per hectare was used. it was noted that the grain yield was 3.0 tons/ha higher than control 8-variant, showing an average of 33.2 tons/ha in three years.

Soybean seeds were treated with Fosstim-3 bacterial fertilizer at the rate of 1.0 kg/ha before planting, soil was taken from the 0-15 cm layer of the soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum), 1500 kg per hectare was used, and Serhosil biofertilizer 10 l/ha, sprinkled in the

form of a suspension at the rate of 10 l/ha during podding When analyzing the grain yield of the soybean plant maintained in option 10, it showed an average of 34.1 tons/ha in three years, and it was noted that an additional seed yield of up to 3.9 tons/ha was obtained compared to the control option 8.

Before sowing soybean seeds, 10 kg of soil taken from the 0-15 cm layer of soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum) and treated with 1.0 kg of Fosstim-3 bacterial fertilizer 11-variant and nitrogen-fixing (Bradyrhizobium japonicum) were planted. When analyzing the 12-variant, which used 1000 kg per hectare, the soil was taken from the 15-25 cm layer of the soil containing the bacteria, it was noted that an average grain yield of 32.7-32.9 t/ha was obtained in three years, compared to the control 8-variant, on average 2 If it was determined that the seed yield of 5-2.7 t/ha was obtained as a supplement, before planting soybean seeds, it was treated with Fosstim-3 bacterial fertilizer at the rate of 1.0 kg/ha, and 15-25 of the soil containing nitrogen-fixing (Bradyrhizobium japonicum) nodular bacteria soil was taken from the cm layer and 1500 kg per hectare was used and Serhosil biopreparation was used in the form of a suspension at the rate of 10 l/ha during the growing season and 10 l/ha during podding, and 15- of the soil containing nitrogen-fixing bacteria (Bradyrhizobium japonicum) before sowing soybean seeds. 10 kg of soil taken from a 25 cm layer and treated with 1.0 kg of Fosstim-3 bacterial fertilizer and planted

When taking into account the grain yield of the soybean plant maintained in option 14, it showed an average of 33.5-32.5 t/ha in three years, and the control

It was found that the grain yield was 3.3-2.3 tons/ha higher than option 8.

According to the data obtained from the variants used in the study, it can be seen that the influence of the treatment of soybean seeds with Fosstim-3 bacterial fertilizer and the use of soil containing nitrogen-fixing (Bradyrhizobium japonicum) bacilli was significant on the grain yield of the soybean plant. it was found that grain yield increased from 2.1 t/ha to 4.0 t/ha.

In soybean variety "To'maris Mman-3" the grain yield of soybean plant was 2.3 to 3.9 t/ha higher than the control variant.

4 CONCLUSIONS

According to the results of the research, based on the results of the two-year experimental experience, we came to the following conclusions: As a result of the addition of Bradyrizobium soil to newly planted soybean soils, an average of 72.0-155.5 nitrogen-accumulating nodules were formed in the roots of each soybean plant. On average, 6.0-11.8 more nitrogen-accumulating nodules were found in late-ripening soybean varieties compared to early-ripening varieties.

Early (20 years ago) as a result of infecting Rhizobium-enriched tubers to other soils, the yield of soybeans grown in the early "To'maris MM-3" variety is on average 10-11.6% per hectare, and in the mid-late "Baraka" variety. provides an additional grain yield of 4-7.2% on average.

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