NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 7, ISSUE 7, July. -2021

INFLUENCE OF INOCULANTS ON GROWTH, DEVELOPMENT AND YIELD OF SOYBEAN CULTURE

Rakhmonova Khursheda Kurbanbaevna
PhD of Samarkand State University at Department of Soil Science and Agrotechnology

Khalilov Nasriddin
Professor, Head of the Department of Botany and
Forage Production at Samarkand Institute of Veterinary Medicine

Kuldashov Bobomurod Husanovich
Independent researcher of the Department of Botany and
Forage Growing at Samarkand Institute of Veterinary Medicine

ANNOTATION:

The article presents the results of studies in the conditions of meadow-gray soil soils of the Samarkand region to study the effect of the use of inoculants on the growth, development and productivity of new soybean varieties included in the State Register

Keywords: shade, cultivar, Brachirizobium japonicum, boron, molybdenum, bacteria, population, irrigated, meadow-gray soil, soils, effects.

INTRODUCTION:

Relevance of the Topic:

One of the most important concerns in agriculture is the selection of varieties for the cultivation of high yields of shade in the irrigated lands of the country, research on improving the technology of cultivation based on varietal characteristics, soil and climatic conditions of the region. Currently, preparations of strains of soybean (Brachirizobium japonicum) that meet the requirements of production are not developed in our country.

In the Republic in 2017-2021 years, preparations of several endemic bacterial strains (Rizovit-AXS, Rizoazot), which were used in the planting of soybeans in large areas, did not give the expected results, as a result, most of the soy received low yields in farmer farms, increasing the fertility of the soil from the account of endemic bacteria, as well as the Therefore, taking into account the soil-climatic conditions, features of cultivated varieties, experiments on testing the effectiveness of newly created strains of finished bacteria and strains from the Russian Federation in different soil-climatic conditions, environmental testing, studying in the cross-section of varieties were conducted. Complete refusal or reduction of nitrogen fertilizers when growing soybeans, increasing soil fertility, developing resource-saving technologies for growing soybeans is one of the most pressing problems.

Biological fixation of nitrogen (ABF) is an environmentally important process and is carried out by two ecological groups of prokaryotes: 1- free living cells often in close contact with plants or 2- root rhizomes of N2 gas molecule to ammonium ions through rhizobial bacteria in endosymbiotic contact by rhizobia is called symbiotic nitrogen fixation (SAF) and is a more efficient process in terms of delivering nitrogen to the plant. Researchers estimate that ABF increases the amount of nitrogen in soil in global agriculture several times each year, saving billions of dollars in nitrogen fertilizers (3.4; 5). Inoculants based on rhizobial bacteria on irrigated lands in Uzbekistan are several times cheaper than industrially produced nitrogenous mineral fertilizers, meet environmental requirements and significantly increase crop yields and soil fertility (1: 2).

Many researchers believe that the benefits of symbiotic nitrogen fixation (SAF) in agriculture can be increased in practice using two strategies:

– The first is to optimize the amount of nitrogen formed as a result of symbiosis of legumes and rhizobial bacteria, which includes not only the rate of nitrogen fixation in the root tuber, but also increase the competitiveness of inoculants in soil and rhizosphere;
– The second is the creation of new nitrogen fixation symbiosis with non-leguminous plants. The main crops of the world, for example, Virgo plants, do not enter symbiosis with nitrogen-fixing rhizobial bacteria (8), therefore, engineering with these crops create synthetic symbiosis. This is an incredibly huge but difficult opportunity to use the ranks.

Consequently, the use of safdan allows to reduce the production of mineral nitrogen fertilizers on an industrial scale and to save energy, resources, reducing the hydrocarbon fuels spent on their development (9). Therefore, the use of biological preparations created on the basis of fixing bacteria N2 in the air as sources of nitrogen in agriculture of the Republic is inexpensive and allows to grow environmentally friendly products. Many scientists note that during the season on soy-irrigated lands collect 150-250 kg of pure biological nitrogen per 1 hectare (2;3;4). In the Bunda, the negative effect of nitrogen, which is used as a mineral fertilizer, is eliminated.

METHODOLOGY:

Soybean seeds were treated with inoculants in an indoor facility prior to planting based on appropriate methodology. The following options were used in the experiment: 1) .Control– (P90K60-background, no inoculant was used), 2) .Fon + Nitroforte-J, 3) .Fon + Nitroforte – P, 4) Fon + Rizovit – AKS, 5) Fon + Bradyrhizobium japonicum + Bacillus subtilis BS-26, 6). Soils (dark gray, talcum) were obtained from the area of the Agricultural Research Institute (Uzbekistan), where shade was planted for 5 years and a population of Bradyrhizobium japonica bacteria was present.

Inoculated seeds were planted in a row between 60 cm and 90 cm, protected from sunlight. Norms for planting seeds-200; 300; 400, 500 thousand seeds/ha, planting depth - 4-5 cm. The duration of planting is 2 ten days of April. The goose of the past. During the growth period of soybeans, moisture in the soil was captured no less than 70% of the limited field wet capacity (ChDNS) of the soil. Soy care was conducted on the agrotechnics adopted in the region. The experiment is on 4 repetitions. The bearing surface of the socks is 50 m2.

The soils of the area where the experiments were conducted were Meadow-Burrow, high - carbon threeraydi, the soil water absorption medium was neutral and weak alkaline - rn = 7,1-7,4.

The amount of humus in the soils of the experimental field in accordance with the layer of 0-30 and 30-60 CM 1,20; 0,79; total nitrogen 0,12; 0,06; total phosphorus 0,24; 0,17; total potassium 2,27; 2,16 %, movable phosphorus 4,6; 17,6; replaceable potassium 209-187 mg/kg. Soil absorption capacity 13,4-13,6 mg. on ECV / 100 g of soil. The mechanical composition of experimental field soils is average sand.

NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 7, ISSUE 7, July. -2021

RESULTS OF THE EXPERIMENT:

In the experiment, the seeds sprouted on average 8-9 days after planting. In comparison with the seeds of the refined variety, the seeds of the Selecta-302 variety germinated for 1-2 days. The field fertility of the seeds varied from 88.0 to 90.4% depending on the varieties and inoculant strains.

As a result of the effects of inoculants used in the studies, it was noted that the plant height increased significantly compared to the control–(p90k60-background, inoculyant not used) and ranged from 127.1 to 153.4 CM. When background+Nitroforte-J was applied in the refined variety, the height of the plant was 153.4 cm compared to the control option (119.1 CM) and it was determined that it was 26.3 cm higher. In the Selecta-302 variety of shade, these figures were 117.3;150.4 and 33.1 cm, respectively. Such changes in the color of the soybean crop occurred as a result of the activity of bacteria in the endings formed in the roots under the influence of inoculants.

In the experiment, the number of legumes in 1 plant was significantly increased in the inoculations used, and the number of legumes was observed from 98.7 to 64.6 units in the refined varieties, in the Selecta-302 varieties from 97.1 to 63.6 units. It should be noted that due to the addition of Rizovit-ax 1 to 10 g of molybdenum, the number of legumes in relation to control was observed from 4.5 to 5.5 pieces, in the variety of Selecta-302 more than 4.5 pieces.

Fon + radyrhizobium japonicum + Bacillus subtilis BS-26 shade created in the Republic of Nafis variety 90.7 pieces per 1 plant or 26.1 pieces compared to the control, respectively 89.7 in Selekta-302 variety; There were 26.1 more.

When counting the number of stems per plant in the roots of soybean varieties in the budding phase in the variant using Fon + Rizovit – AKS, it was noted that Nafis and Selekta-302 did not form stalks. When Fon + Nitroforte – J was used in the delicate variety, 71 tufts were formed on 1 plant and their weight was 5.4 g. In the Fon + Nitroforte – P variant, these figures were 83 and 4.6 g.

In this case, although the number of ends in the variant Fon + Nitroforte-P was large, their weight was 0.8 g less than in the variant Fon + Nitroforte – J.

Effect of Inoculants on the yield of soybean varieties

Inocules	Plant height, cm	Number of pods per plant,	Number of pods per plant, (in the pulse phase)	Mass of pods per plant, (in the pulse phase)	Yield, ts / ha	Additional yield due to inoculation	
						ts / ga%	%
Nafis							
Control - (background P90K60, no inoculants)	119.1	64.6	-	-	22.1	-	-
Fon + Nitroforte – J	153.4	98.7	71	5.4	36.5	14.4	65.1
Fon + Nitroforte – P	148.3	92.4	83	4.6	35.7	13.6	61.5
Fon + Rizovit – AKS	127.1	70.1	-	-	23.4	1.3	5.8
Fon + Bradyrhizobium japonicum + Bacillus subtilis BS-26	141.6	90.7	63	5.1	34.1	12	54.2
Fon + Soil with a population of Bradyrhizobium japonica bacteria	144.5	91.3	56	4.5	32.6	10.5	47.5
Selekta-302							
Control - (background P90K60, no inoculants)	117.3	63.6	-	-	19.2	-	-
Fon + Nitroforte – J	150.4	97.1	79	4.4	32.4	13.2	68.7
Fon + Nitroforte – P	141.5	92.0	82	4.7	30.1	10.9	56.7
Fon + Rizovit – AKS	120.2	68.1	-	-	19.4	0.2	1.0
Fon + Bradyrhizobium japonicum – Red colour preparations + Bacillus subtilis BS-26. White preparation	140.7	89.7	67	5.3	31.1	11.9	61.9
Fon + Soil with a population of Bradyrhizobium japonica bacteria	139.3	90.1	58	4.1	28.6	9.4	48.9

When using the inoculant Fon + Bradyrhizobium japonicum + Bacillus subtilis BS-26, created in our country, it was found that on average 1 plant produces 63 nodules and weighs 5.4 g. Due to the size of the tubers, 0.3 g less was observed. than Von + Nitroforte-J.

In the elegant cultivar, the soil in which the population of bacteria 1 Fon + Bradyrhizobium japonicum was present was 56 units per plant, and their weight was 4.5 g.

Similar patterns were observed in the Selecta-302 cultivar, but the indicators were slightly lower than in the Nafis cultivar.

Yield analysis shows that grain yield was obtained at 22.1 ts/ha Selecta-302 varieties at 19.2 ts/ha in the refined variety control option. The highest yield was generated to 36.5 ts/h when fon+Nitroforte–J was applied, and the additional yield compared to control was 14.4 ts/H (65.1%). Nitroforte-J inoculant has demonstrated its advantage even if it is less than Nitroforte–P. Bradyrhizobium japonicum+Bacillus subtilis BS-26 strain created in our Republic gained 3 indicators on the effectiveness, and the yield in it was determined to be 34.1 ts/ha, additional yield 12.0 ts/ha (54.2 %). Such legalities were also observed in the Selecta-302 variety, it should be noted that, although inoculants have not been used in soybean planted areas for many years, it has been proved that as a result of the formation of endings in the roots of soybeans, additional cereals can be obtained from 1 to 10.5 ts/h depending on the varieties. But it was found that when new strains of inoculations are used together with sowing every year, their effectiveness may increase significantly.

CONCLUSION:

In summary, when comparing the effectiveness of different inoculants in the Nafis and Selekta-302 varieties of soybeans in the irrigated meadow-gray soils of the Zarafshan oasis, the highest yield was 36.5 ts / ha in the Nafis variety Fon + Nitroforte – J, with an additional yield of 14 ts / ha. was 32.4; 13.2 ts / ha, respectively, in the Selekta-302 variety. . The new inoculant Fon + Bradyrhizobium japonicum + Bacillus subtilis BS-26, created in the country, recorded 3 indicators of efficiency, and the yield in Nafis variety was 34.1 ts / ha, additional yield was 12 ts / ha, in Selekta-302 variety was 31.1; Yield was 11.9 ts/h. Even when active indigenous bacteria have been found in soils that have been planted in shadow for many years, treating seeds with inoculants at sowing increases yield significantly.

REFERENCES:

1) Khalilov N., Rakhimov A. Biological nitrogen efficiency and environmental problems. Thesis of reports of the Republican scientific-practical conference "Problems of development of rural economy in ecological conditions of the Priarly". May 20-21. 2005.
2) Khalilov N., Z.Islamova. "Soybean planted in the angiz increases soil fertility, increase the cultivation of nutrientstiradi". Scientific-practical cooperation of the Republic on the achievements and prospects of livestock and veterinary science. Samarkand, 2010.-162-165 bet.
3) Koldashov B.X. , Khalilov N., Khamzaev A.X. Asobennosti viratshivaniya sortov soi na aroshaemix zemlyax. Life Sciences and Agriculture, 2020, No. 1, R., 48
4) Varieties., Biological products, growth regulators, agrochemicals and technologies. Krasnodar: 2017.- 43 p.
5) Remigi., P., Zhu, J., Young, J.P.W., and Masson-Boivin, C. Symbiosis within symbiosis: evolving nitrogen-fixing legume symbionts. // Trends Microbiol. -2016. –V.24. -№1. –P. 63–75.
6) De Vries, W., Leip, A., Reinds, G.J., Kros, J., Lesschen, J.P., and Bouwman, A.F. Comparison of land nitrogen budgets for European agriculture by various modeling approaches. // Environ.Pollut. -2011. –V.159. -№11. –P.3254–3268.
7) Ladha, J.K., Tirol-Padre, A., Reddy, C.K., Cassman, K.G., Verma, S., Powlson,D.S.Global nitrogen budgets in cereals: a 50-year assessment for maize, rice, and wheat production systems. // Sci. -2016. –V.6. -№1. –P.153.
8) Oldroyd, G.E.D., and Dixon, R. Biotechnological solutions to the nitrogen

problem. // Curr. Opin. Biotechnol. -2014. –V.26. –P.19–24.

9) Erisman, J.W., Sutton, M.A., Galloway, J., Klimont, Z., and Winiwarter, W. How a century of ammonia synthesis changed the world. // Nat. Geosci. -2008. –V.1. -№10. –P. 636–639.