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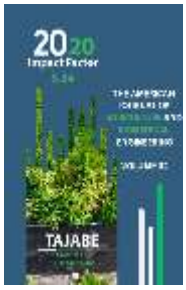

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Effect Of Nitragine And Mineral Fertilizers On Soil Microbiological Properties In Planted As Secondary Legume Crops

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ABSTRACT

The article provides information on the effects of inoculation with nitragin and application of mineral fertilizers on the microbiological properties of the soil before sowing the seeds of legumes (soybeans, beans, mungbeans), grown as a secondary crop after winter wheat. At the end of the vegetation period of repeated crops, it was observed that the amount of microorganisms in the soil increased compared to the initial indicators, the amount of ammonifiers and oligonitrophils increased, and the amount of micromycetes and actinomycetes decreased. Before sowing the seeds of legumes (soybeans, mungbeans, beans) grown as a secondary crop, the amount of ammonifiers, oligonitrophils and micromycetes increased, and the amount of actinomycetes increased compared to the control option in the backgrounds treated with nitrogen-fixing bacteria.

KEYWORDS

Nitragin, nitrogen, phosphorus, potassium, microorganisms, ammonifiers, spores, oligonitrophylls, micromycetes, actinomycetes.

INTRODUCTION

Soil fertility and effective properties are closely related to the development and activity of soil microorganisms.

Microorganisms are actively involved in soil processes with high biochemical energy. They carry out the basic soil biological process, breaking down organic residues and forming

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new organic matter humus. It also creates the conditions for optimal growth and development of the crops grown by cleaning the environment using plant residues during the life cycle.

THE DEGREE OF THE PROBLEM HAS BEEN STUDIED

It was found that oligotrophies increase the amount of microorganisms, increase the concentration of carbon-containing organic compounds, and decrease the pedotrophils index and denitrifiers, microorganisms in nitrogen-containing compounds in short-rotation [6].

The use of nitragin in combination with mineral fertilizers, i.e., P90 K60 + nitragin and N30 P90 K60 + nitragin variants, resulted in the formation of the highest number of tuberous bacteria and an increase in yield of 3.3–5.4c / ha. An increase in the amount of nitrogen led to a decrease in the production of tuberous bacteria or no production at all. It was observed that the yield increased only due to nitrogen fertilizer [3].

Once the bacteria enter the roots of legumes, they undergo a series of changes, initially in the form of like wands, then forming bacteroids, which absorb free nitrogen from the air and begin to accumulate in the roots of legumes [4].

RESEARCH CONDITIONS AND METHODS

Our research was conducted in 2015-2017 in the sierozem soils of Tashkent region. Before sowing soybean seeds as a secondary crop, nitragin in Bradyrhizobiumjaponicum SB5, mungbean seeds, Phaseolusradiatus148, and bean seeds Rhizobium phaseoli143 the following mineral fertilizer standards, PK 90:60, NPK 30:90:60, NPK 60:90:60 and NPK 90:90:60 kg / ha were tested.

The experiment included 24 options, each with an area of 240 m2, of which 120 m2 were taken into account. It was performed in three repetitions and the total area of the experiment was 1.73 ha.

Microbiological analyzes to determine the microbiological properties of soil were conducted at the Research Institute of Microbiology of the Academy of Sciences. Microbiological analyzes were performed on three replicates using the elective feed method based on a generally accepted methodology.

Indeed, when the agro-physical, water, water-physical properties of the soil are normal, the movement of microorganisms in it becomes more active, resulting in increased soil fertility. Therefore, it is important to study the extent and scope of the impact of mineral fertilizer standards applied to the activity of microorganisms in the soil in cultivation as secondary legume crops grown as a repeat crop in short-crop rotation systems [1,5].

RESEARCH RESULTS

The soil micro-flora of the experimental field was determined from the main agronomic soil microorganisms - ammonifiers, spores, oligonitrophils, micromycetes, actinomycetes.

Ammonifiersconvert organic nitrogen in humus into a plant-derived form.

Oligonitrophils– carbon-hydrates in humus plant convert into plant-derived form.

Actinomycetes are among the most common microorganisms in the soil, eliminate plant diseases and assimilate organic and mineral forms of nitrogen [2].

According to the results of the initial microbiological analysis of the experimental field soils, in the 0-30 cm layer of soil from microorganisms aminifiers 5.2x107 g / koe,

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spores 4.6x106 g / koe, oligonitrophils 3.1x106 g / koe, micromycetes 5.5x104 g / koe, actinomycetes were observed to be 4.2x105 g / koe.

At the end of the application period, it was observed that the amount of microorganisms in the soil increased compared to the initial indicators, the amount of ammonifiers and oligonitrophils increased, and the amount of micromycetes and actinomycetes decreased. With the increase in the amount of mineral fertilizers in the backgrounds treated with nitragin before sowing the seeds of legumes (soybeans, mungbeans, beans) grown as a secondary crop, the amount of ammonifier, oligonitrophil and micromycetes increased and the amount of actinomycetes decreased (1), (Table 1).

Table 1

The amount of microorganisms in the soil of the experimental field, KOE / g in the soil (2016, at the end of the vegetation period).

№ opt	Norms of mineral fertilizers, kg / ha	Soil layer, cm	Ammonium-fixers	Spores	Oligonitro-phils	Micromy-cetes	Actinomyc etes
Repeated crop, soybean							
1	Without Fertilizers	0-30	$7,5x10^6$	$1,5x10^5$	$4,5x10^5$	$3,5x10^4$	$7,5x10^4$
2	$N_{30}P_{90}K_{60}$	0-30	$7,5x10^6$	$2,2x10^5$	$5,2x10^5$	$4,5x10^4$	$1,5x10^5$
3	$N_{60}P_{90}K_{60}$	0-30	$7,5x10^7$	$3,0x10^6$	$3,7x10^6$	$6,5x10^4$	$2,2x10^5$
4	$N_{90}P_{90}K_{60}$	0-30	$6,0x10^7$	$4,2x10^6$	$9,7x10^5$	$5,7x10^4$	$2,5x10^5$
5	Nitragin (without fertilizers)	0-30	$7,5x10^7$	$4,5x10^6$	$2,7x10^6$	$6,7x10^4$	$3,5x10^5$
6	$P_{90}K_{60}$+Nitragin	0-30	$7,5x10^7$	$4,6x10^6$	$3,5x10^6$	$7,5x10^4$	$4,5x10^5$
7	N_{30} $P_{90}K_{60}$+Nitragin	0-30	$7,5x10^8$	$4,7x10^6$	$4,5x10^6$	$8,5x10^4$	$6,5x10^5$
8	N_{60} $P_{90}K_{60}$+Nitragin	0-30	$9,0x10^7$	$4,5x10^6$	$3,7x10^6$	$7,5x10^4$	$5,5x10^5$
Repeated crop, mungbean							
9	Without Fertilizers	0-30	$3,0x10^6$	$1,5x10^6$	$9,0x10^5$	$4,5x10^4$	$3,5x10^4$
10	$N_{30}P_{90}K_{60}$	0-30	$7,5x10^7$	$2,2x10^6$	$1,9x10^6$	$4,5x10^4$	$4,2x10^4$
11	$N_{60}P_{90}K_{60}$	0-30	$3,7x10^8$	$6,0x10^6$	$3,9x10^6$	$6,5x10^4$	$4,5x10^4$
12	$N_{90}P_{90}K_{60}$	0-30	$7,5x10^7$	$3,7x10^6$	$2,6x10^6$	$7,2x10^4$	$1,5x10^5$
13	Nitragin (without fertilizers)	0-30	$4,5x10^7$	$4,0x10^6$	$3,2x10^6$	$7,2x10^4$	$2,5x10^5$
14	$P_{90}K_{60}$+Nitragin	0-30	$2,3x10^8$	$4,2x10^6$	$3,9x10^6$	$7,2x10^4$	$4,2x10^5$
15	N_{30} $P_{90}K_{60}$+Nitragin	0-30	$5,2x10^8$	$4,7x10^6$	$3,7x10^6$	$7,5x10^4$	$4,7x10^5$
16	N_{60} $P_{90}K_{60}$+Nitragin	0-30	$7,5x10^7$	$3,0x10^6$	$6,2x10^6$	$7,3x10^4$	$4,5x10^5$
Repeated crop, bean							

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17	Without Fertilizers	0-30	$4,2x10^7$	$3,5x10^6$	$8,2x10^5$	$2,2x10^4$	$3,5x10^5$
18	$N_{30}P_{90}K_{60}$	0-30	$4,5x10^7$	$4,0x10^6$	$1,1x10^6$	$3,2x10^4$	$4,2x10^5$
19	$N_{60}P_{90}K_{60}$	0-30	$6,7x10^7$	$4,7x10^6$	$4,1x10^6$	$7,5x10^4$	$4,5x10^5$
20	$N_{90}P_{90}K_{60}$	0-30	$7,5x10^7$	$4,5x10^6$	$2,9x10^6$	$5,5x10^4$	$4,3x10^5$
21	Nitragin (without fertilizers)	0-30	$3,0x10^8$	$3,5x10^6$	$4,7x10^6$	$6,5x10^4$	$4,5x10^5$
22	$P_{90}K_{60}$+Nitragin	0-30	$6,7x10^8$	$4,2x10^6$	$5,2x10^6$	$7,5x10^4$	$5,5x10^5$
23	N_{30} $P_{90}K_{60}$+Nitragin	0-30	$9,0x10^8$	$4,8x10^6$	$7,5x10^6$	$8,5x10^4$	$5,7x10^5$.
24	N_{60} $P_{90}K_{60}$+Nitragin	0-30	$7,5x10^8$	$4,5x10^6$	$6,8x10^6$	$7,5x10^4$	$5,5x10^5$

According to the results of the study, in variants 1, 9, 17 (control) ammonifiers 7.5x106, which did not use nitragin and no mineral fertilizers; 3.0x106; 4.2x107 koe / g. 7.5x108 in variants 7, 15, 23, where the norm of mineral fertilizers NPK 30:90:60 kg / ha was applied on backgrounds treated with nitragin before sowing soybean, mungbean and bean seeds; 5.2x108; 9.0x108 koe / g. formed. The above results were also observed in the number of oligonitrophils.

CONCLUSION

Application of mineral fertilizers NPK 30:90:60 kg / ha when sowing seeds of legumes (soybeans, mungbeans, beans) as a repeat crop after autumn cereal crops in short-rotation crop rotation systems with NPK 30:90:60 kg / ha, ammonifiers, oligonitrophils and causes an increase in the amount of micromycetes.

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