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THE EFFECT OF NITROGEN FERTILIZER FORM AND RATE ON THE GROWTH AND DEVELOPMENT OF BEETROOT

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ABSTRACT

Ammonium nitrate fertilizer N150R100K150 and N200R150K200 kg/ha of nitrogen fertilizer forms for sugar beet with good plant growth and development provides Soaking sugar beet seeds 100% before planting and encapsulating them with biohumus will result in flat seedlings. As a result, the average weight of one plant is 639.7 g/plant in the first case, and 605.3 g/plant in the second case.

Key words

beetroot,roots, growth and development, germination, seedling thickness, nitrogen fertilizers, nitrogen, phosphorus, potassium.

Introduction: To meet the demand of the world's population for sugar and sugar products, one of the most urgent tasks is to increase the area of crops with high sugar content and increase their yield. Sugarcane and beetroot plants, which have a high sugar content, are cultivated in large areas all over the world. Beetroot is planted on large areas in European and Asian countries. Its rhizome contains up to 20% sugar, 14-15% of which is isolated, and the rest can be used in industry and livestock. That is why two large sugar production enterprises are operating in our republic.

In order to supply the required amount of raw materials for these enterprises, it is being planted as a repeated crop after wheat and early vegetables in the irrigated land areas of our republic. Beetroot seeds require high soil moisture to produce full seedlings. However, it is difficult to maintain moisture in the soil for the seed that is being replanted to meet its moisture requirements. Therefore, beetroot seeds are 100% soaked and encapsulated with biohumus before sowing.

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Literature review

According to O.A. Minakov [6; pp. 32-36] et al. It has been established that in the steam link hybrids beetroot of domestic selection react to improvement of nutritional conditions by a significant increase in productivity and sugar content of root crops in comparison with a foreign hybrid, and in clover - their responsiveness is approximately the same. It's mathematically proven that the level of fertilization to a greater extent determined the productivity of the studied hybrids in comparison with their genotype. To obtain a crop of domestic hybrids within 43.245.1 t/ha in the link with fallow and 38.440.2 t/ha in the link with clover under the crop were applied: in the steam link under RMS 120 – N 135 P 135K135 + 25 t/ha of manure, N120P120K120+ 50 t/ha of manure and also N190P190K190 (without manure), for hybrid PMC 127 N135P135K135+ 25 t/ha of manure and N90P90K90+25 t/ha of manure; in the clover link-N90-135P90-135K90-135 for both hybrids.

I.V. Chechetkina, M.I. Gulyaka [7; p. 21-23] concluded that the optimal dose of nitrogen for beetroot on soddy-podzolic medium and light soils against the background of manure must not exceed 120 kg/ha a.i. when it is included in one acceptance for pre-sowing tillage.

According to S.I. Tyutyunov [12; 22-25-p.] and others the results of studies are presented, completed in 2019–2020, 2020–2021 in Belgorodskaya area in order to determine the effect of various doses of mineral fertilizers on the change in the yield value and the content of raw gluten grain wheat. The material for the study was domestic varieties: Almera, Sloboda and Surava - local selection; Alekseich, Bezostaya100 and Timiryazevka 150- selection of the Federal State Budgetary Scientific Institution "NTsZ named after P.P. Lukyanenko.

Planting agricultural crops as a repeat crop on fields vacated by winter wheat increases the efficiency of irrigated land use. Sugar beet is distinguished among other agricultural crops by its high yield even when planted as a repeated crop. Especially for replanted sugar beet, giving mineral fertilizers at the rate of N200P150K200 kg/ha ensures root and fruit yield of 370 tons/ha (Juroev, Sulaymanov, [5; 53–57 b].

I. J. Sulaimanov and others [6; 25-27 p.] made the following conclusions based on the results of the experiment: mineral fertilizers given to obtain a high yield from sugar beet have a good effect on the growth and development of the plant. That is why it has a positive effect on soil fertility and other soil properties when it is planted as a repeat crop after the harvest of winter wheat grain.

Sufficient nutrients are very important for sugar beet. Therefore, their application in a sufficient amount, N200P150K200 kg/ha, especially when nitrogen

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fertilizers are given in the form of ammonium nitrate, gives a good effect. It is more effective in the conditions of gray-meadow soils (Sulaymanov et al., [8; p. 140-144]).

I.J. Sulaimanov and D.T. Ergashev [7; 122-126 p.], when replanted sugar beet is grown in conditions of typical gray soils, it is appropriate to use ammonium nitrate form of nitrogenous fertilizers, setting the norms of mineral fertilizers as N150P100K150 kg/ha. With this, they emphasized that sugar beet depends not only on nutrients, but also on their form.

In field experiments on irrigated sierozem-meadow soil under the conditions of the Mirzachul oasis, the effect of laser processing on the degree of salinity was studied, the content of water-soluble salts, the quality of salts and components were shown. In the summer period, in the first option, where the leveling was not carried out, the content of toxic salts was 0.351%, of the total amount of 65.11%, in the second option, the planning was carried out in the usual way, respectively, amounted to 0.265% of the total amount of 57.92%, and in the third option, where laser layout-0.186% and from the amount of 55.74%.

Research Methodology

In the experiment, in order to study the effect of the forms and rates of nitrogen fertilizers on the germination of the plant, the thickness of the real seedling formed, and the effect on the growth and development of the plant, we set the experimental system as shown in Table 1. All observation, analysis and calculations were adopted at UzPITI "Methods of conducting field experiments" [3; p. 147], "Metodyagrokhimicheskih, agrofisicheskihimicrobiologicheskikhissledovaniy v polevykhhlopkovykhrayonakh" [5; p. 187], "Metodokiyapolevyxopytov s xlopchatnikom" [6; p. 233] was carried out on the basis of methods. Experimental data of B.A. Dospekhov [4; p. 352] Mathematical analysis was performed based on the "Metodikapolevogoopyta" method.

To take into account the germination of a plant, a 16.6-meter thread is taken, and according to the planting system, it is determined how many plants have germinated within this thread. It is taken from several places in each option and the average is found. Germination begins when 10% of the theoretical seedling thickness has germinated according to the Dospekhov method, and is considered complete when 75% has germinated.

Table 1

Analysis and results

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Options	Forms of gen fertilizers	Annual rates of eral fertilizers			Under the er		Before planting	When it forms 2-3 true s	Roots is eveloping ly
		N	P.	K	P.	K	N	N	N
1	Without izer	-	-	-	-	-	-	-	-
2	Without gen fertilizer	-	100	150	100	150	-	-	-
3		-	150	200	150	200	-	-	-
4	NaNO3	150	100	150	100	150	40	60	50
5		200	150	200	150	200	50	80	70
6	NH4 NO3	150	100	150	100	150	40	60	50
7		200	150	200	150	200	50	80	70
8	(NH4)2SO4	150	100	150	100	150	40	60	50
9		200	150	200	150	200	50	80	70
10	CO(NH2)2	150	100	150	100	150	40	60	50
11		200	150	200	150	200	50	80	70

Table 2

Plant thickness of sugar beet in the experiment, thousand bushes/ha, three-year average, 2017-2019.

№	Theoretical seedling kness	Germination rate, 2019 y, %				Actual seedling thickness	
		23.08	24.08	25.08	26.08	At the of ning ation	At the end of owing season
1	90X10-1 111111		36	65	87	97,1	94,3
2		16	39	76		96,3	93,8
3		18	35	72	88	97,0	94,2
4		16	29	79		95,3	93,1
5		17	38	72	93	97,2	94,1
6		15	35	63	90	96,1	93,7
7		15	38	79		96,6	94,1
8		17	38	68	91	96,2	94,0

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9		17	38	65	91	96,9	94,3
10		15	38	80		97,3	94,7
11		18	40	69	87	96,5	94,0

Table 3

The effect of forms and rates of nitrogen fertilizers on the formation of roots and leaves of sugar beet, in grams, three-year average

Options	August			September			Oktober		
	Laef	Roots	Total	Laef	Roots	Total	Laef	Roots	Total
1	14,7	10,2	24,9	54,3	106,3	160,6	115,6	331,9	447,5
2	20,2	16,4	36,6	67,8	118,9	186,7	126,9	369,9	496,8
3	23,4	18,3	41,7	77,4	136,7	214,1	135,9	392,8	528,7
4	29,3	22,5	51,8	83,5	140,2	223,7	143,5	454,4	597,9
5	34,1	27,4	61,5	74,3	129,5	203,8	139,6	433,6	573,2
6	32,4	25,7	58,1	87,4	147,5	234,9	147,7	492,0	639,7
7	39,8	31,5	71,3	76,9	133,7	210,6	137,7	467,6	605,3
8	28,9	22,0	50,9	80,2	138,5	218,7	135,7	442,6	578,3
9	32,3	26,9	59,2	73,2	128,8	202,0	124,5	426,3	550,8
10	30,7	27,7	58,4	74,7	142,7	227,4	138,3	428,7	567,0
11	35,4	22,8	58,2	84,8	131,6	216,4	154,3	414,9	569,2

In our research, we also sowed beetroot seeds 100% wet and encapsulated with a mixture of biohumus and soil before planting. As a result, full germination of seeds was achieved in early periods (Table 2). In all years of the experiment, it was observed that the germination of the seeds began on the third day after planting beeroot seeds, and within four days they were fully germinated. The effects of mineral fertilizers, especially forms of nitrogen fertilizers, on seed germination and completion were not noticed. Germination of beetroot seeds in the control variant can be seen starting one day later and ending in three days. Although the germination started in one day in the remaining options of the experiment, in options 2, 4, 7, and 10, it was observed that the germination ended in three days, and in the remaining options (var. 3, 5, 6, 8, 9, and 11), the germination was completed on the fourth day.

When we determined the actual thickness of seedlings according to experimental options, the number of seedlings was in the range of 95.3-97.3 thousand pieces. The number of seedlings was the highest in the 10th option and made up 97.3 thousand pieces, the least number of seedlings was in the 4th option and made up 95.3 thousand pieces. As a result of the agrotechnical measures

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carried out during the plant's vegetation, the number of seedlings in the field has decreased. In particular, it was seen that in the 5th option it decreased by the most 3.1 thousand units, and in the 8th option by the least 2.2 thousand units.

When we studied the growth development of sugar beet plant (Table 3), initial determinations showed that leaf weight was greater than root weight. This is due to the fact that during the true leaf formation phase of the sugar beet vegetation, leaf formation is faster than that of the rhizome. As for the experimental options, the weight of the leaf in the control option without mineral fertilizers was 14.7 g. and the weight of the root fruit is 10.2 g. corresponded to In options 2 and 3, which are controls for nitrogen fertilizers, their amount is relatively increased, and correspondingly, that of leaves is 20.2; 23.4 g. 16.4 and 18.3 g of wheat and root crops. established such growth of sugar beet leaf and root fruit must have been applied with phosphorus and potassium fertilizers in the amount of R100K150 and R150K200 kg/ha. With the application of nitrogen fertilizers at 150 and 200 kg/ha (based on R100K150 and R150K200 kg/ha), the growth and development of plants became higher. For example, in options 4 and 5, where sodium nitrate was used as a form of nitrogen fertilizer, the leaves were 29.3; 34.1 g. if it was 22.5; 27.4 g. corresponded to According to the experimental options, the highest leaf and root weight was obtained in the 7th option, i.e., when N200R150K200 kg/ha of fertilizer was given and nitrogen fertilizers were given in the form of ammonium nitrate, the leaf was 39.8 and the root was 31.5 g. established

It should be noted that in the next month of our observation (October), the plant developed rapidly, compared to the previous observations, the total weight of the plant increased sharply, and the weight of the root compared to the leaf was significantly different. For example, the total weight of the plant is 160.6-234.9 g according to the experimental options. was between In this case, the weight of the root fruit is 106.3-147.5 g. was 62-66% more than the total weight of the plant. Increasing the rate of mineral fertilizers used for sugar beet did not have a strong effect on their growth and development, especially the rates and forms of nitrogen fertilizers. Only phosphorus and potassium were used from mineral fertilizers (R100K150 and R150K200 kg/ha) in the 2nd and 3rd options, with an increase in the fertilizer rate, its amount was 186.7, respectively; 214.1 g. established We can see that the application of nitrogen at 200 kg/ha (based on R150K200 kg/ha) compared to the rate of nitrogen fertilizers set at 150 kg/ha (based on R100K150 kg/ha) resulted in lower plant growth and development. According to the experimental options (except options 1-3) 16.7-24.3 g. we can see that it was less than . In particular, ammonium nitrate was used as a nitrogen fertilizer (150 kg/ha) from option 6 (200 kg/ha) and plant growth and development in option 7 was 24.3 g. was less than

Determinations in October show that the weight of the plant increased by 2.6-2.8 times, and the weight of the plant according to the experimental options was 447.5-639.7 g. was between As in the previous month, it was observed that increasing the rate of mineral fertilizers to N200R150K200 kg/ha was less in plant growth compared to N150R100K150 kg/ha. 550.8-605.3 g when the rate of mineral fertilizers increased according to experimental options. 567.0-639.7 g when the fertilizer rate is reduced. was found to be. The percentage of rhizomes in the amount of the plant was in the range of 74.2-76.9% compared to the leaves.

Conclusion.

Based on the obtained data, it can be said that from the forms of nitrogen fertilizers for sugar beet, ammonium nitrate fertilizer N150R100K150 and N200R150K200 kg/ha mineral fertilizer provides good plant growth. As a result, the average weight of one plant is 639.7 g/plant in the first case and 605.3 g/plant in the second case.

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