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## INFLUENCE OF DIFFERENT NITROGEN NORMS ON THE COLLECTION OF NUTRIENTS IN TOMATO PLANT IN THE BACKGROUND OF ORGANIC FERTILIZERS

### ВЛИЯНИЕ РАЗЛИЧНЫХ АЗОТНЫХ СОЕДИНЕНИЙ В ОРГАНИЧЕСКИХ УДОБРЕНИЯХ НА НАКОПЛЕНИЕ ПИТАТЕЛЬНЫХ ВЕЩЕСТВ В ТОМАТАХ

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*Abstract.* Determination of optimal fertilizer norms under tomato vegetation related to vegetable growing is a very important issue. For this purpose, the influence of various forms of nitrogen on the background of organic fertilizers on the background of the biometric data of the “Preliminary” tomato varieties, the total nitrogen, phosphorus and potassium content of tomato bushes have been studied. Also, the biochemical indicators of tomatoes were studied.

It has been shown that no fertilization of the fertilizers in the fertilizer (10 t/ha) + N<sub>90</sub>P<sub>90</sub>K<sub>90</sub> was observed in the fertilizer, but the tomato fruit weight and diameter increased, and the nitrates contained in it did not exceed the norm.

*Аннотация.* Определение оптимальных норм удобрений для томатов, является очень важным вопросом. С этой целью было изучено влияние различных соединений азота в органических удобрениях на биометрические данные томатов сортов «Preliminary», а также общее содержание азота, фосфора и калия в растениях томатов. Также были изучены биохимические показатели плодов томатов.

Показано, что при внесении удобрений (10 т/га) + N<sub>90</sub>P<sub>90</sub>K<sub>90</sub> — масса и диаметр плодов томатов увеличивались, а содержащиеся в нем нитраты не превышали нормы.

*Keywords:* tomato, nitrogen, plant height, fruit.

*Ключевые слова:* томат, азот, высота растения, плод.

#### *Introduction*

The intensive growth of the world population and the restriction of soil and water resources caused a serious problem for the safety of human nutrition in the world. only 3% of water resources of fresh water. According to the report of FAO, if in any country the amount of fresh water is less than 1700 m<sup>3</sup> per capita, this country faces a shortage of serious water. Currently, the share of fresh water per capita in less than 100 m<sup>3</sup> in 18 countries is more than 2000 m<sup>3</sup> in 22 countries. Consequently, Azerbaijan is one of the countries with a shortage of water resources problems in the sphere of agricultural production and the population as a whole. Therefore, it is necessary and takes into account for this purpose the optimum humidity and ground temperature in the production management system up to the agricultural product, which is necessary first of all for making

operative decisions when developing environmentally friendly technology for growing crops to achieve maximum yield. However, it should be recognized that of the number of crops grown in these conditions, and tomatoes occupy a special place, which requires a special approach to solving the problems ahead.

Tomatoes are one of the most cultivated vegetables in the world. Fertilization with nitrogen is due to an increase in the amount of photosynthesis source, affecting the growth of vegetative growth and biomass [6]. Growth phase and environmental conditions should be taken into account when selecting the optimum nitrogen norm according to the requirements of the fertilizer plant.

However, during the growth phase, producers typically tend to restrict the use of nitrogen because excessive dose may cause excessive growth of vegetative growth. In fact, it provides growth of vegetative growth from reproductive development, leads to frustration, fertility loss, insect damage, as well as increased herbal diseases and contributes to the weak development of flower, fruits and their size. This is basically true in the most favourable conditions during high rainfall and humidity. In order to increase productivity in fruits and reproductive development, the norm of nitrogen is increased.

Nitrogen deficiency results in the faded leaves of the plants and their neck low. First of all, due to the circulation of nutrients in the plant, the deficiency is manifested in older leaves.

The flowers begin to play in dark yellow, and in the sharp state of nitrogen deficiency, they are poured, fruits are smaller, which affects productivity. Excessive nitrogen fertilization results in the formation of dark green leaves. Although the number of flowers is very high, buds remain intact. It also prevents flowers, fruits and their formation, and increases the inclination of the plant to bend, banish disease and attack the pests [4].

Increase in the norm of nitrogen fertilizer from 0 to 200 kg/ha leads to the increase of tomato productivity and improvement of fruit quality. There are important differences between the nutritional quality of organic and traditional grown tomatoes.

Carotenoid accumulation and antioxidant activity in organic tomatoes grow. Nitrogen is one of the key elements of plant growth and development. It plays an important role in the nutrition of plants and is thus a factor limiting plant productivity in many areas, especially in weak organic lands. Nitrogen fertilizers are often transported on land, polluting soil and groundwater. So, it should be controlled for nitrogen fertilizer: the norm, the type of nitrogen fertilizer, and the duration of delivery [3].

The purpose of this research is to evaluate the effect of the amount of nitrogen on the background of organic fertilizers in collecting common nitrogen, phosphorus and potassium in the quality of tomatoes and tomato bushes on grey-brown soils.

#### *Materials and methods*

The research was carried out in the field of expertise of the Institute of Vegetable Science Scientific Research Institute of the Ministry of Agriculture of the Republic of Azerbaijan in the territory of Absheron region (Pirshagy massif).

The width of the research area is 40°31', its length is 49°52', at the altitude of 20,4-34,7 meters above the Caspian Sea level [1].

The amount of sunny hours is 2400-2500 per year. The climate is very dry - the spring is warm and long, the winter is moderate. Average annual temperature is -14°C. The lowest temperatures are 2,8-3,4 °C in January and 25,5-25,7 °C in July. Favourable conditions for the development of plants continue from March to October.

In the study area, average annual sediments are 150-300 mm. Rainfall in summer is very coincident and its duration is short. Biological and biochemical processes in the study area are subject to acute shortage of moisture.

Water sources are very poor. The water for irrigation is taken from the Absheron canal. Artificial irrigation is needed for the normal development of vegetable crops [5].

The experiments were conducted with “Primary” tomato sort. “Primary” sort was obtained by crossing the 294-VD1-D1-DVK-DVK and Brigantine varieties [2].

“Initial” is the first localized sort of canned food. The handle is ordinary, determinant type, medium leaf. The leaves are of an ordinary type, large (28-37 cm), green, the surface is brittle. Flowerpots are simple, medium-sized (13-16 cm).

According to the length of the vegetation period, “Initial” is a group of medium-grown varieties. Thus, the length of the period from the occurrence of the mass seedlings to the first fruits is 110.

The experiments were performed 4 times for the purpose of obtaining high yields from “primary” tomato varieties, with the area of each unit 15,12 m<sup>2</sup> being 70 cm in diameter and 30 cm from the plant distance [1, 2].

The scheme of practice is as follows:

1. Control (no fertilizer)
2. Pentecost (10 t/ha) + N0P90K90 (Background)
3. Background + N<sub>30</sub>
4. Background + N<sub>60</sub>
5. Background + N<sub>90</sub>

After tomato seedlings were buried in mid-May, soil fertilized, nitrogen fertilizer, ammonium nitrate (NH<sub>4</sub>NO<sub>3</sub> — 34%), where nitrogen is 25% of the total norm. One month later, as a first-fertilizer fertilizer, carbamide fertilizer (CO(NH<sub>2</sub>) — 46%) was added to the soil, where nitrogen was 50% of the total norm, and a month later, again, and nitrogen constitutes 25% of the total norm.

#### Results and diversion

The height and root of the plant during adulthood: In the experimental field a number of observations have been made on the tomato plant. The length of the tomato leaf was measured centrally from the ground to the highest point of the plant (on 10 plants) and the common figure was removed. Also, the root length of the plant is measured. The results are given in Table 1.

Table 1.

TALL HEIGHT OF THE TOMATO PLANT AND THE LENGTH OF THE ROOT  
(DURING THE RIPENING PERIOD – 72 and day)

Practice options	The height of the tomato plant (72 days), cm	Increase		The root length of the plant (In 72 days), cm	Increase	
		cm	%		cm	%
Control (no fertilizer)	59,3	-	-	20,5	-	-
Peanut (10 t/ha) + N <sub>30</sub> P <sub>90</sub> K <sub>90</sub> (Background)	66,3	7,0	11,8	23,0	2,5	12,2
Background + N <sub>30</sub>	67,5	8,2	13,8	24,5	4,0	19,5
Background + N <sub>60</sub>	68,0	8,7	14,7	25,5	5,0	24,4
Background + N <sub>90</sub>	71,5	12,2	20,6	31,0	9,5	46,3

As seen from Table 1, the height of the tomato plant is higher than the effect of fertilizers given in 72 days (fertilization): 10 kg/ha + N<sub>90</sub>P<sub>90</sub>K<sub>90</sub> in the nitrogen value of 30 kg of active substance in the background, cm or 13,8%; in the same nitrogen variant with 60 kg of active substance in the same background, on an average of about 8,7 cm or 14,7% of a plant in the same nitrogen variant with 90 kg of active substance, height increased by 12,2 cm or 20,6%.

Also, the root length of the tomato plant has increased by an average of 9.5 cm or 46.3% compared to the control variants in the nitrogen variant with 90 kg of active substance on the background (10 t/ha) + N<sub>0</sub>P<sub>90</sub>K<sub>90</sub>.

Nutrients in the plant's arm during adulthood: During the growing period of tomato herbicides, two cane roots were removed from each variant, both large and small.

The tomatoes on them were torn, and the plant branches were dried in the shade, then dried in a thermostat.

Then, the roots, stems and leaves of the plant were mixed, and the total nitrogen, phosphorus and potassium were analyzed.

The results are given in Table 2. As can be seen from the table, the amount of nitrogen, phosphorus and potassium in the tomato plant does not exceed the norm in all variants.

Table 2.

WEIGHT AND DIAMETER OF TOMATO FRUIT

Order	Practice options	Weight of tomato fruit, (qr)	Increase		The diameter of the tomato fruit, (cm)	Increase	
			qr	%		sm	%
1	Control (no fertilizer)	134,3	-	-	6,7	-	-
2	Manure (10 t/ha) + N <sub>0</sub> P <sub>90</sub> K <sub>90</sub> (Fon)	138,6	4,3	3,2	6,8	0,1	1,5
3	Background + N <sub>30</sub>	147,1	12,8	9,5	7,0	0,3	4,5
4	Background + N <sub>60</sub>	150,1	15,8	11,8	7,2	0,5	7,5
5	Background + N <sub>90</sub>	156,4	22,1	16,5	7,2	0,5	7,5

Weight and diameter of ripe tomatoes: Each sample was taken from 10 ripe tomatoes, weighted and diameter was measured, then a common figure was found (Table 3). As shown in Table 3, as the nitrogen norms increase, tomato fruit weight and diameter increase also. Of course, as a background, manure, phosphorus and potassium fertilizers are also provided.

Table 3.

FOODSTUFFS COLLECTED IN THE TOMATO PLANT BRANCH

Practice options	Total nitrogen (%)	Common phosphorus (ppm)	Total potassium (ppm)
	The name of the method		
	(Kjeldahl)	(Age-burning ICP-OES)	(Age-burning ICP-OES)
Control (no fertilizer)	1,89	3325	23480
Peanut (10 t/ha) + N <sub>90</sub> P <sub>90</sub> K <sub>90</sub> (Background)	2,24	3530	25380
Background + N <sub>30</sub>	2,41	3776	31410
Background + N <sub>60</sub>	2,42	3864	31730
Background + N <sub>90</sub>	2,42	4298	34950

**Biochemical Indicators of Tomatoes:** A sample of tomatoes was sampled and analyzed from the nitrogen variant with 90 kg of active ingredient in the background of 10 t/ha of the experimental scheme. As a result of biochemical analysis, it was found out that the content of “Ilkin” tomato was 7,5%, sugar was 3,6%, total acidity was 0,39%, vitamin C was 24,86%, nitrate was 96,7 ppm. As it has been seen here, the norm of nitrogen has not been exceeded in the amount of nitrates contained in the tomatoes for the open field.

### *Conclusion*

Compared to the results of the observations, the amount of nitrogen given as an ingredient in the background (10 t/ha)+N<sub>0</sub>P<sub>90</sub>K<sub>90</sub>, compared with the control variant, increased by 12,2 cm or 20,6%, and was 71,5 cm. The weight and diameter of the tomato fruit has also increased, and there are no adverse effects in biochemical parameters (Figure).



Figure.

Also, the removal of fertilizers to the norm (10 t/ha)+N N<sub>90</sub>P<sub>90</sub>K<sub>90</sub> from the control (fertilized) variant did not result in excessive accumulation of excess nitrogen, phosphorus and potassium in the tomato plant.

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