

# The influence of time and scheme of sowing and norms of fertilizer application on the quality indicators of plants of soyboy variety bravo in Nakhchivan autonomous republic

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Protein is the most valuable part of the human diet. Soybean is the most promising plant in the world and ranks first in the biologization of agriculture. Soybean is the main and leading plant in providing food and feed protein in world agriculture. Research work was carried out in 2019-2021 on the experimental site of the institute of bio-resources of the Nakhchivan Branch of Nanazerbaijan. 31 soybean varieties brought by us from the institute of genetic resources of ANAS and the scientific research agricultural institute belong to different ecological groups. From these samples, the Bravo variety was taken, which is suitable both in terms of its productivity and the soil and climatic conditions of the autonomous republic. Various doses of nitrogen fertilizers were applied (Control without fertilizer, organic fertilizer 10 t/ha+P<sub>60</sub>K<sub>60</sub> (Background), background +N<sub>30</sub>, background +N<sub>60</sub>, background +N<sub>90</sub>) for crops with a sowing period of April

20, with a planting pattern of 70 × 10 cm. Thus, it can be concluded that at the time of sowing, in the experiments conducted on April 20 and the sowing scheme of 70 × 10 cm, the yield of protein and fat was high, depending on the amount of protein and fat. Thus, as a result of the research, the most productive variety Bravo was determined in the conditions of the autonomous republic, either according to the planting period or the planting scheme, and after applying different fertilizer rates, the quality indicators were: When comparing all three planting schemes, the highest results were obtained with a planting scheme of 70 × 10 cm and a fertilizer rate of Fon +N<sub>60</sub>. In the experiments conducted on April 20, quality products (protein, fat, fiber, moisture) and fat was highest at a planting pattern of 70 × 10 cm and a normal fertilizer background +N<sub>60</sub>; protein 39.74-39.98%, fat 18.9-19.09%, fiber 6.69-7.18%, humidity 5.21-5.78%, protein yield composition 1084.9-1179.4 kg/ha, and the fat yield is 515.7-563.2 kg/ha.

**Key Words:** Autonomous republic; Biologization; Leguminous grains; Bravo; Amino acids

## INTRODUCTION

The protein deficit in the world is 117 million tons per year, and in the CIS-600 thousand tons. In the world, soybeans rank 4<sup>th</sup> after wheat, corn and rice and 1<sup>st</sup> among leguminous crops. This shows how important the soybean plant is currently, the soybean planting area in the world is 90 million hectares, and the total grain yield is 200 million tons per year. Due to the high protein-fat yield, profitability, use in various fields, food, feed, medical, agrotechnical and technical importance, the production of soybean plant products is constantly increasing programs to increase soybean production are being implemented in many countries every year.

Protein is the most valuable part of the human diet. Soybean is the most promising plant in the world and ranks first in the biologization of agriculture. Its seeds contain 34-45% protein, 17-26% fat and up to 2% vitamins. Soybean is the main and leading plant for providing food and feed protein in world agriculture. In many countries, soybeans are used as food and feed. It contains 32-50% protein. Similar figures are 9-12% for corn, 10-14% for wheat, 16-20% for sunflower, 22-28% for peas. The highest yield was 4 t/ha in Sweden [1].

Soybean is the most important plant among legumes, its grains (up to 50% protein, up to 25% fat, vitamins (A, B, C, D, E), mineral salts (Ca, Mg, K, P), rich in essential amino acids (valine, isoleucine, leucine, lysine, methionine, tryptophan, etc.), is quickly absorbed and is a valuable animal feed; milk, brine, butter, meat, etc. are obtained from soybean seeds.

Leguminous grains have 3 main meanings in agriculture: Increasing soil fertility, providing industry with grain and protein. Legumes contain large amounts of protein in their stems, leaves and pods, which are considered

high-protein food in animal nutrition and high-protein food in human nutrition. Compared to grains, legumes contain 2-3 times more protein, and straw 3-5 times. Soy contains 27-35% protein, 20-27% fat, 25-40% starch, 4% minerals and a large number of microelements beneficial to humans [2].

Soybean is the most valuable plant among legumes. Its beans contain proteins (up to 50%), fat (25%), vitamins (A, B, C, D, E), mineral salts (Ca, Ma, K, P) and essential amino acids (valine, isoleucine, leucine, lysine, methionine, tryptophan, etc.). Soy is a valuable and highly digestible feed for farm animals. Milk, cottage cheese, fats, meat and other products are obtained from soybeans.

One of the options for solving the problem of feed protein deficiency in livestock farming is the cultivation of soybeans. A distinctive feature of soybeans is that the culture contains up to 50% protein, 27% oil, which has high nutritional qualities, and over 30% carbohydrates; protein digestibility by animals is more than 80%. Possessing a high nitrogen-fixing ability that satisfies up to 70% of its own nitrogen needs, soybean is capable of accumulating up to 120 kg/ha of nitrogen in the soil, which increases soil fertility and the yield of subsequent crops in field crop rotations [3].

The main goal of the study is to determine the influence of timing and sowing scheme on the quality indicators of the resulting product and, based on the results of the study, to select samples suitable for the conditions.

## Main objectives of the study

Providing proposals and recommendations for planting selected promising samples in the farms of Nakhchivan municipality.

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**Received:** 15-Nov-2023, Manuscript No. AGBIR-23-120208; **Editor assigned:** 17-Nov-2023, PreQC No. AGBIR-23-120208 (PQ); **Reviewed:** 01-Dec-2023, QC No. AGBIR-23-120208; **Revised:** 21-Jan-2025, Manuscript No. AGBIR-23-120208 (R); **Published:** 28-Jan-2025, DOI: 10.37532/0970-1907.24.41.2.13



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## MATERIALS AND METHODS

The studies were carried out at the experimental site of the institute of bio-resources of ANAS, on irrigated gray soils. The soybean variety "Bravo" was chosen as the material for the work, which is suitable both in terms of productivity and soil conditions of the Nakhchivan autonomous republic. Different doses of nitrogen fertilizers were applied (Control without fertilizer, organic fertilizer 10 t/ha+P<sub>60</sub>K<sub>60</sub> (Background), background +N<sub>30</sub>, background +N<sub>60</sub>, background +N<sub>90</sub>) to the crops with a sowing date of April 20, planting pattern 70 × 10 cm. In the experimental nitrogen-ammonium nitrate 34% and semi-rotted manure (nitrogen 0.5%, phosphorus 0.25%, potassium 0.6%). Manure was applied for plowing in the fall, nitrogen was given only once when sprouts emerged. Phenological observations were carried out on 25 plants. Agrotechnical measures were carried out in accordance with the procedure adopted for the autonomous republic [4-6].

It can be concluded that the climate of the Nakhchivan autonomous republic is a sharply continental climate, although some varieties are productive, but due to the long growing season, the beans do not dry out in time and the quality of the product decreases. Therefore, we have identified the most productive Bravo variety in terms of timing and pattern.

Precipitation in an autonomous republic. Various doses of fertilizers were applied to this variety and the following results were obtained.

## RESULTS AND DISCUSSION

The influence of sowing timing, sowing scheme and different rates of nitrogen fertilizers on the quality (chemical composition) of soybean grain was studied. The results of the study are shown in Table 1.

TABLE 1

The influence of Nitrogen (N) fertilizer rates on the quality of grain yield of soybean plants with a sowing scheme of 70 × 10 cm soybeans (in dry matter, %).

Sowing time	Norm (nitrogen) dov	Protein %	Fat %	Cellulose %	Humidity %	Varies %
<b>2019</b>						
20 April	Control (no fertilizer)	35.15	15.12	3.46	2.78	-
	Навоз 10т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	36.12	16.69	4.75	4.12	-
	Фон+N <sub>30</sub>	37.45	17.05	5.89	4.38	1.3
	Фон+N <sub>60</sub>	39.74	18.69	6.69	5.21	3.6
	Фон+N <sub>90</sub>	38.36	18.14	6.23	4.78	2.2
<b>2020</b>						
20 April	Control (no fertilizer)	35.22	15.41	3.66	3.13	-
	Навоз 10 т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	36.52	17.01	5.06	4.38	-
	Фон+N <sub>30</sub>	37.68	17.56	6.34	4.69	1.2
	Фон+N <sub>60</sub>	39.89	19.05	7.10	5.72	3.4
	Фон+N <sub>90</sub>	38.9	18.45	6.69	5.09	2.4
<b>2021</b>						
20 April	Control (no fertilizer)	35.56	15.89	3.89	3.16	-
	Навоз 10 т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	36.86	17.05	5.16	4.46	-
	Фон+N <sub>30</sub>	37.9	17.69	6.45	4.75	1.1
	Фон+N <sub>60</sub>	39.98	19.09	7.18	5.78	3.1
	Фон+N <sub>90</sub>	38.86	18.59	6.88	5.29	2.0

The table shows that in the sowings carried out on April 20. The highest quality indicators were obtained with fertilizer Fon+N<sub>60</sub>; protein 39.74-39.98%, fat 18.9-19.09%, fiber 6.69-7.18% and moisture 5.21-5.78%. In addition, we also studied the protein and fat yields of soybeans.

Depending on the amount of protein and fat in the experiments performed, the yield of protein and fat was also high. The results of the experiment are shown in Table 2.

TABLE 2

The influence of different rates (NPK) of mineral fertilizers on the yield and quality of seeds in a 70 × 10 cm sowing scheme for soybeans

Sowing time	Norm (Nitrogen) dov	Grain yield c/ha	Protein %	Protein yield kg/ha	Fat %	Oil yield kg/ha
<b>2019</b>						
20 April	Control (no fertilizer)	17.2	35.15	604.6	15.12	260.1

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	Навоз 10 т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	19.6	36.12	707.9	16.69	327.1
	Фон+N <sub>30</sub> P <sub>60</sub> K <sub>30</sub>	22.1	37.45	827.6	17.05	376.8
	Фон+N <sub>60</sub> P <sub>90</sub> K <sub>60</sub>	27.3	39.74	1084.9	18.69	515.7
	Фон+N <sub>90</sub> P <sub>120</sub> K <sub>90</sub>	26.5	38.36	1016.5	18.14	480.7
<b>2020</b>						
20 April	Control (no fertilizer)	18.0	35.22	633.6	15.41	275.8
	Навоз 10 т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	20.1	36.52	734.1	17.01	341.9
	Фон+N <sub>30</sub> P <sub>60</sub> K <sub>30</sub>	23.5	37.68	885.5	17.56	412.7
	Фон+N <sub>60</sub> P <sub>90</sub> K <sub>60</sub>	28.6	39.89	1140.9	19.05	544.8
	Фон+N <sub>90</sub> P <sub>120</sub> K <sub>90</sub>	27.2	38.9	1058.1	18.45	510.0
<b>2021</b>						
20 April	Control (no fertilizer)	18.9	35.56	672.1	15.89	300.3
	Навоз 10 т/га+P <sub>60</sub> K <sub>60</sub> (Фон)	20.8	36.86	766.7	17.05	354.6
	Фон+N <sub>30</sub> P <sub>60</sub> K <sub>30</sub>	24.2	37.9	917.2	17.69	428.1
	Фон+N <sub>60</sub> P <sub>90</sub> K <sub>60</sub>	29.5	39.98	1179.4	19.09	563.2
	Фон+N <sub>90</sub> P <sub>120</sub> K <sub>90</sub>	26.4	38.86	1025.9	18.59	490.8

The table shows that in terms of quality the highest indicator was obtained with the fertilizer Fon+N<sub>60</sub>P<sub>90</sub>K<sub>60</sub>; the protein yield was 1084.9-1179.4 kg/ha, and the fat yield varied between 515.7-563.2 kg/ha.

#### CONCLUSION

Thus, we can conclude that at the sowing time, in the experiments conducted on April 20 and the sowing pattern of 70 × 10 cm, the yield of protein and fat was high, depending on the amount of protein and fat. If we compare all three planting schemes, the highest results were obtained with a planting scheme of 70 × 10 cm and a fertilizer rate of Fon+N<sub>60</sub>P<sub>90</sub>K<sub>60</sub>.

Thus, as a result of the research, the most productive Bravo variety was determined in the conditions of the autonomous republic, both in terms of planting time and planting scheme, and after applying various fertilizer rates, the quality indicators were: In experiments conducted on April 20, high-quality products (protein, fat, fiber, moisture) and the yield of protein and fat were maximum with a planting pattern of 70 × 10 cm and at a fertilizer rate of background +N<sub>60</sub>; protein 39.74-39.98%, fat 18.9-19.09%, fiber 6.69-7.18%, moisture 5.21-5.78%, protein yield 1084.9-1179.4 kg/ha, and fat yield is 515.7-563.2 kg/ha.

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