

INFLUENCE OF MINERAL FERTILIZERS OF DIFFERENT NORMS ON THE YIELD AND PRODUCT QUALITY OF WHITE CABBAGE VARIETIES

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Abstract

The yield was 58.0 t/ha in the recommended control variant for the Sharkiya-2 variety and 66.1 t/ha for the "Saratoni" variety. Compared with the recommended control, in the variants with the application of 200-250 and 300 kg/ha of nitrogen fertilizers, the yield was 9.7-17.1-17.7% for the Sharkiya-2 variety, 10.4 for the Saratoni variety; It reached 15.7 and 16.6%.

As the yield increased, the cost of 1 ton of products decreased from 201.6 thousand sums to 179.3 thousand sums for the Sharkiya-2 variety, from 208.7 thousand sums to 167.5 thousand sums for the Saratoni variety. The level of profitability depends on the yield and total costs, and the highest rate (background + N250) was 39.5% for the Sharkiya-2 variety and 49.2% for the Saratoni variety.

Keywords: background, control, absolute fertilizer-free, optimal, norm, cabbage, vegetation, phase, factor, correlation, least importance.

To ensure the implementation of the priority tasks set by the President of the Republic of Uzbekistan in the "2020-2030 strategy for the development of agriculture of the Republic of Uzbekistan" in terms of providing employment, effective use of arable land, satisfying the population's demand for food products, ensuring the stability of prices for agricultural products, export volume to increase, as well as setting special tasks for planting repeated crops in the fields that will be freed from autumn grain and tomorrow's crops in their terms, conducting agrotechnical activities, supplying the required material resources, and timely harvesting, processing, stockpiling and export of the cultivated crop given

Relevance of the topic. Cabbage is very important among the vegetables grown in repeated crops, and it is characterized by a very high demand for processing, storage and export of its grown products. In order to meet the demand for white cabbage, it is important for agricultural producers to improve the technology of growing this crop as a repeated crop, in which research on determining the optimal planting period, plant nutrition area, fertilization and irrigation standards, as well as the selection of high-yielding and high-yielding varieties and hybrids is relevant.

On issues of improvement of white cabbage cultivation technologies by researchers in different

soil and climatic conditions: A.S. Bolotskih, M.S. Grigorov, M.V. Damkov, M.A. Likhomanova, V.M. Zhidkov, A.A. Nazarenko, L. E. Soloveva, V. M. Pivovarov, N. N. Chernysheva, R. D. Almasker, S. V. Koroleva, S. V. Sitkinov, L. K. Gurkina, T. V. Lizgunova, V.A. Denisov, R.D. Almasker, I.D. Rajabli, N.B. Petrov, O.N. Vishnevskaya, L.I. Uralets, M.N. Shapturenko, V.N. Lukyanets, G. A. Kostenko, A. D. Dzhakhangirov, V. P. Kuzmishchev, G. F. Monakhos; in our republic, scientific researches and recommendations were conducted by V.I.Zuev, O.Kadirkhojaev, B.J.Azimov, A.M.Abbasov, M.Kh.Aramov, S.S.Lapasov, and many other scientists.

In 2009-2012, special studies were conducted to study the effect of feeding norms and periods on the growth, development and productivity of white cabbage in repeated crops in the fields free from grain crops in the conditions of Tashkent region.

It is important to determine the rate of fertilization depending on the type and condition of the soil in order to get a good and high-quality harvest from white cabbage. The main field experiments were conducted in Boka district, Tashkent region, in the conditions of long-irrigated meadow-gray soil. Aqbosh cabbage of Sharqiya-2 variety was planted as a repeated crop on the field from which the autumn grain crop was harvested.

In conducting research, B.J. Azimov and B.B. Azimov's "Methodology of conducting experiments in vegetable, vegetable and potato growing", V.F. Belik's "Metodika opytnogo dela v ovoshchevodstve i bakchevodstve", "Metodicheskie ukazaniya po ekologicheskomu ispytaniyu ovoshchnyx kultur" as well as N. The methods of I. Savvinov and V. E. Kabaev were used. The statistical analysis of the research results was carried out using the "Metodika polevogo opyta" dispersion method of B.A. Dospheov in "Excel 2010" and "Statistica 7.0 for Windows" computer programs, with a confidence interval of 0.95%.

In studies, after harvesting the grain crop, before plowing, all the organic fertilizers and phosphorous fertilizers are applied according to the established annual rate - 70%; 30% of the remaining phosphorus fertilizer and 20% of the annual rate of nitrogen fertilizer before planting; annual rate of nitrogen in the 1st feeding after planting - 40%; when cabbage begins to harvest - in the second feeding - 40% of nitrogen and the remaining - 50% of potassium fertilizer were applied (Table 1).

1- Table. Variants of field experiments on norms of mineral fertilizers.

№	Options	Annual rate of fertilizers, kg/ha; t/ha	Application periods of fertilizers, kg/ha; t/ha			
			Before plowing	Before planting	1-feeding when the seedling takes hold	2nd feeding when the cabbage begins to ripen
1	Without fertilizer - abs. control	-	-	-	-	-
2	NPK – control is recommended	N-150, P-150, K-100	P-105, K-50	N-30, P-45	N-60	N-60, K-50
3	P-K- background	P-150, K-100	P-105, K-50	P-45	-	K-50
4	background + N	N-250, P-150, K-100	P-105, K-50	N-40, P-45	N-80	N-80, K-50
5	background + N	N-250, P-150, K-100	P-105, K-50	N-50, P-45	N-100	N-100, K-50
6	background + N	N-300, P-150, K-100	P-105, K-50	N-60, P-45	N-120	N-120, K-50

The experiment was carried out in 4 repetitions. The field is 20 m long with 4 lanes. The level

of one site is 56 m², the total area of the experiment is 1568 m², the planting scheme is 70x40-50 cm. A 1.5-2 m protective lane was left at the beginning and end of the field.

When the soil composition was analyzed by layers before the experiment, it was found that the amount of humus was 0-5 cm. 2.82% in layer; 5-25 cm. 1.85% in the layer and 1.36% in the 25-40 cm layer. As they fell to the lower layer, their index decreased. The amount of humus in the plowed layer was 2.3% and 2.0% in the 0-40 cm layer, mobile nitrogen was 30.9% in layers; 27.9 and 25.9 mg/kg. The amounts of phosphorus and potassium were moderate in the 0-5 and 5-25 cm layers and low in the 25-40 cm layer at 27.1 and 163.1 mg/kg. pN content was 7.1-7.2 mg/kg alkaline in 0-25 cm layer and 7.0 mg/kg neutral in 25-40 cm layer.

The rate of different fertilizers showed its effect on the phenological parameters of white cabbage varieties. It took 45 days for Sharqiya-2 variety to reach 10% of cabbage after the seedlings took hold for the plants of the absolute control option without fertilizers. In the second control, which was recommended with the full rate of fertilizer, this period was reduced by 6 days or 15.4%. It was 42 days in the background where nitrogen fertilizer was not used. In the background, when nitrogen fertilizer was applied in different rates, the 10% cabbage wrapping of the plant was accelerated by 38-33 days or 5-6 days from the second control.

The rate of different fertilizers also had an effect on yield. In the first option, in the Sharqiya-2 variety, where no fertilizer was applied, the crop was harvested in 125 days. in options 2 and 6, harvest in 116 days; background – 118; In the 4th option - 114, and in the 5th option, the cabbage crop was harvested as early as 112 days. In the Sharqiya-2 variety, the average indicator of all options was 117 days.

It took 40 and 50 days in the absolute control variant to reach 10% and 75% of cabbage after germination. In the second control option, this period was accelerated to 5-6 days.

10 and 75% cabbage is reaped in 38 and 47 days in the background without nitrogen fertilizer, and when compared to it, when more nitrogen rate is used in the background, it is as follows: in the 4th option, 34 and 42 days; It was 32 and 40 days in option 5 and 30 and 38 days in option 6.

In most vegetable crops, an increase in the rate of nitrogen fertilizer delays the ripening of the crop. But since white cabbage is formed from the aggregate of leaves, nitrogen fertilizer has a positive effect on it. Acceleration of karambosh packing also accelerated harvesting.

The unfertilized control took 116 days to reach full harvest. In other fertilized options, this period was somewhat earlier. 2- if the crop of control and background variants is harvested in 110-112 days; fon+ 107-109 days were enough when 200-300 kg of nitrogen fertilizer was applied, or this process was accelerated by 2-3 days compared to control 2.

The effect of fertilization rates on cabbage weight was 1.95 kg in the 2nd control in the Sharqiya-2 variety. 1- in the non-fertilizer variant, it is 1.71 kg, 87.7% compared to the 2-control; In option 3 (1.86 kg) it was 95.4%. Cabbage weight increased by 5.6% when 50 kg more nitrogen was applied per hectare in the 4th option compared to the 2nd control; In option 5, it was 21.0% higher when 100 kg was added, and in option 6, when 150 kg was used more, it was 22.2% higher.

In the "Saratoni" variety, the weight of cabbage in the 2nd control option was 2.27 kg, compared to it by 39.6% in the 1st option; In option 3, it was 22.9% lighter. On the background of P₁₅₀K₁₀₀, when the rate of nitrogen increased from 200 to 300 kg per hectare, the weight of

cabbage increased by 9.3-16.7%. Compared to the absolute control, the indicator of option 3 was higher by 27.7%, options 4-6 by 81.0-93.4%. The average index of all variants was 5.1% more in Sharqiya-2 variety and 11.8% less in "Saratonii" variety compared to the 2nd azorat variant.

In the experiment, the biochemical analysis of the content of cabbages in the variety "Saratonii" in control option 2 contained 6.5% dry matter of cabbage, and compared to it, it was 21.5-10.8% less in options 1 and 3. Compared to control option 2, the indicator (113.8%) was the highest in option 5, where 250 kg/ha of nitrogen was used. The indicator of variant 6 was 9.2% higher than the control. The amount of dry matter in options 4-5-6 is 13.8 compared to background (P150K100 kg/ha) in option 3; It increased by 27.6 and 22.4%. The average indicator of options was 25.5% higher than option 1, and 10.3% higher than option 3 (background).

The amount of sugar in cabbage was 2.6% in the 2nd control in the phase when the cabbage started to harvest, compared to it, it was a little less 2.0-2.3% in the 1st and 3rd options, and it was 76.9-88.5% compared to the control. .

When studying the biochemical composition of cabbages of the Sharqiya-2 variety, compared to the control, when 50-150 kg/ha more nitrogen was added, the sugar content of cabbages was 111.5-130.8%. The indicator of option 5 was the highest by 146.2% compared to the control. The average of variates was 2.83%, which was 8.8% more than the control.

In the "Saratonii" variety, the absolute fertilizer-free option 1 contained 1.8% sugar in cabbage, and compared to it, the indicator of options 2-3 was higher by 28.0-33.3%. 2- compared to control, the indicator of options 4-5-6 is high, 124, respectively; 148; made 132%. The average number of variants was 2.8% and was 12% more than the control. Compared to the 3rd variant (background), the amount of sugar in the 4th-5th-6th variants with 200-250-300 kg/ha of nitrogen is 29.2; 54.2 and 37.5% more (Table 2).

2- Table *The effect of fertilizer types and rates on the quality of cabbage, %*

Fertilizer rate, kg/ha	When the cabbage starts picking			Before my last skin		
	dry matter	sugar	vitamin C, mg	dry matter	sugar	vitamin C, mg
Sharqiya-2 variety						
Absolute control without fertilizer	4,8	2,0	31,5	6,3	2,6	35,4
N ₁₅₀ P ₁₅₀ K ₁₀₀ control	6,3	2,6	33,3	8,1	4,3	54,8
P ₁₅₀ K ₁₀₀ – background	5,4	2,3	32,6	7,3	4,0	50,1
background +N ₂₀₀	7,0	2,9	34,3	8,4	4,4	60,4
background + N ₂₅₀	7,4	3,8	35,7	10,8	5,3	69,5
background + N ₃₀₀	6,8	3,4	35,4	10,1	5,0	63,6
\bar{X}	6,28	2,83	34,5	8,5	4,27	55,6
«Saratonii» variety						
Ўғитсиз абсолют назорат	5,1	1,8	30,0	6,5	2,8	36,1
N ₁₅₀ P ₁₅₀ K ₁₀₀ назорат	6,5	2,5	33,1	8,4	4,4	51,6
P ₁₅₀ K ₁₀₀ – background	5,8	2,4	31,2	7,6	4,2	48,2
background +N ₂₀₀	6,6	3,1	35,2	8,7	4,6	63,1
background + N ₂₅₀	7,4	3,7	39,7	11,3	5,5	68,4

background + N ₃₀₀	7,1	3,3	35,3	10,5	5,3	64,5
\bar{x}	6,4	2,8	34,1	8,8	4,47	55,3

When studying the content of vitamin C in the "Saratonii" variety at the time of cabbage harvesting, it was 33.1 mg/% in the 2nd control variant, and compared to it, the indicator of the 1st and 3rd variants was 90.6-94.3% compared to the 2nd control. In options 5-6, the amount of vitamin C ascorbic acid is 6.3; 19.9 and 6.6% more; 3- compared to the background option, the amount of vitamin C is 12.8 in the options with 200-250-300 kg/ha of nitrogen; 27.2 and 13.1% more. The average value of variants was 34.1mg/%, which was 103.0% compared to control 2.

In the "Saratonii" variety, compared to the 3rd option (R₁₅₀K₁₀₀), the amount of dry matter in cabbage is 14.5 when the background + 200-250-300 kg/ha of nitrogen fertilizer is added; 48.7 and 38.2% more. The amount of dry matter is 3.6 when 50-100-150 kg/ha of additional nitrogen is added compared to control option 2; 34.5 and 25.0% more. The mean of variants (6.4%) was 35.4% higher than the absolute no-fertilizer control.

In the "Saratonii" variety, the sugar content of cabbage was 1.8% in the control option without absolute fertilizers. In options 2-3, it was (2.5-2.4%) and was higher by 57.1 and 50.0%. Compared to the 3rd option (background), the amount of sugar is 9.5 when nitrogen is added to the background +N₂₀₀₋₂₅₀₋₃₀₀ kg/ha; 31.0 and 26.2% higher. The indicator of options 4-5-6 is slightly higher 104.5 compared to control 2; It was 125.0 and 120.5%. The average indicator of options (4.47%) was 59.6% higher than option 1 without absolute fertilizers.

Correlation coefficient between vitamin C (ascorbic acid) and dry matter content of cabbage in Sharqiya-2 variety ($r=+0.79\pm 0.30$) and "Saratonii" variety ($r=+0.87\pm 0.25$) is strong and the result is convincing.

During the harvesting period, when the composition of cabbage was analyzed again, in the Sharqiya-2 variety, the amount of vitamin C was 54.8 mg/% in the 2nd control option, compared to it, it was 35.4% less in the 1st option and 8.6% less in the 3rd option. The amount of ascorbic acid is 10.2 when an additional 50-100-150 kg/ha of nitrogen fertilizer is given to the background compared to the recommended control option 2; 26.8 and 16.1% more. The amount of vitamin C in options 4-5-6 is 20.6 compared to option 3 without nitrogen (background); 38.7 and 26.9% higher. The average vitamin C content of the variants was 55.6 mg/%.

The amount of vitamin C in the 2nd control variant recommended in the variety "Saratonii" was 51.6 mg/%, and its amount was 30.0 and 6.6% higher than in the 1st non-fertilizer and 3rd (background) variants. 2- vitamin C content of cabbage is 22.3 when an additional 50-100-150 kg/ha of nitrogen fertilizer is given compared to the control; 32.6 and 25.0% higher. Compared to option 3 (background), when N₂₀₀₋₂₅₀₋₃₀₀ kg/ha is added, the content of vitamin C in cabbage is 30.9; 41.9 and 33.8% higher. The average value of variants was 55.3 mg/%, which was 53.2% more than control 1 and 7.2% more than control 2.

The 4-year average yield in the Sharqiya-2 variety is 58.0 t/ha in the recommended control option. was 26.7% lower in the control without fertilizer and 9.5% lower in the 3rd option without nitrogen (background). Compared to the 3rd (background) option, the yield is 17.5 when background + 200-250-300 kg/ha of nitrogen fertilizer is used; 22.7 and 25.5% higher.

Compared to the 2nd control, the yield increased to 9.7-17.1-17.7% when 50-100-150 kg of nitrogen fertilizer was added per hectare. The average of all variants (59.2 t/ha) is 2.0% higher than the control; 1 was 23.3% higher than the control (Fig. 1).

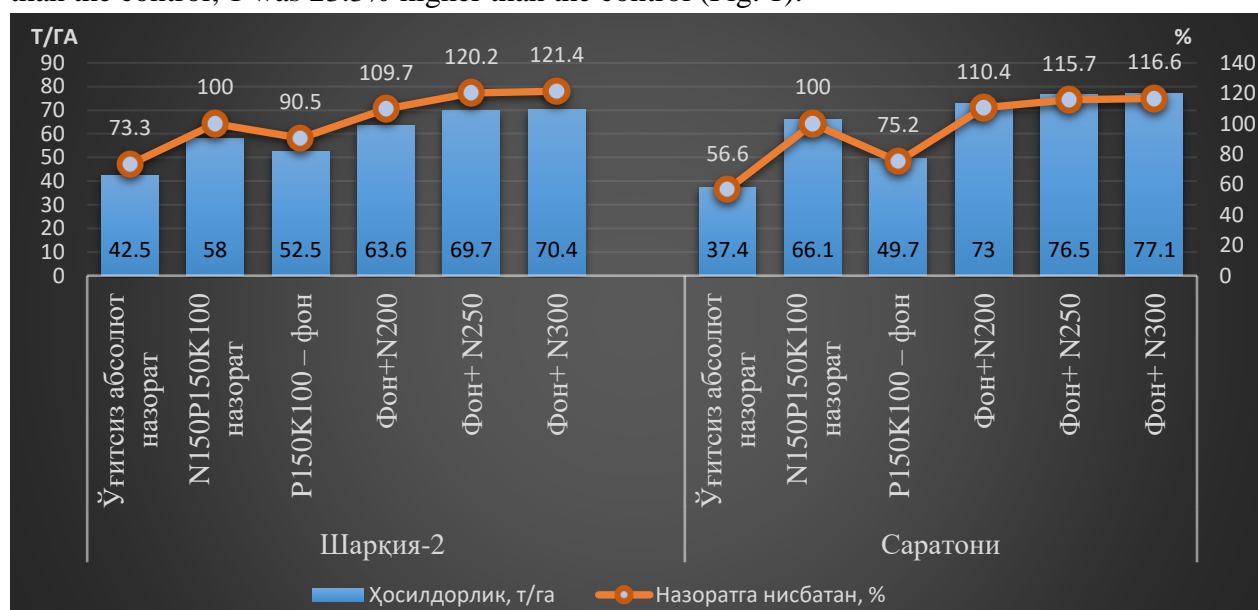


Figure 1. Changes in the yield of cabbage varieties depending on the rate of fertilization, 2009-2012

The 4-year average productivity of the "Saratoni" variety is 66.1 t/ha in the recommended control option 2. formed Compared to the 2nd control, the yield was lower by 43.4% in the 1st variant without fertilizer. Compared to control option 2, the yield is 10.4 when an additional 50-100-150 kg of nitrogen is applied per hectare; It was higher by 15.7 and 16.6%. 4-5-6-variants with a higher rate of nitrogen compared to the 1-fertilizer-free variant have a yield of 48.2; 51.2 and 51.5% more. The average yield of all options (63.6 t/ha) was 95.7% compared to the 2nd control.

In terms of 4-year average yield, when comparing EKMFO5 with factors, the effect of factor V (fertilizer) on yield was greater than factor A (variety). The reason is that their indicators are 1.1-3.2 t/ha in factor A. and factor V fluctuated between 1.9-5.4 t/ha. Correlation coefficient relationship between cabbage weight and yield was completely reliable ($r=+1.0\pm 0.9$) in Sharqiya-2 variety for correct correlation; The correlation of the "Saratoni" variety with these signs was strong ($r=+0.99\pm 0.07$).

When calculating the economic efficiency of feeding with different levels of mineral fertilizers in the cultivation of white cabbage in the late period, the cost of 1 ton of product in the Sharqiya-2 variety increased from 201.6 thousand to 179.3 thousand soums as the yield increased, and in the "Saratoni" variety from 208.7 thousand to 167 decreased to 5 thousand soums. The level of profitability depends on the productivity, according to the options, Sharqiya-2 variety is 28.8; 24.0; 35.2 and 39.5% in the highest (background+N₂₅₀) option; In "Saratoni" variety, it increased from 19.8% in variants (background+N₂₅₀) to 49.2% in variant.

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