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Influence of agrotechnical factors on cotton yield

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Abstract. In the conducted field experiment, three different densities of cotton bushes (80, 100 and 120,000 per 1 ha, as well as 7.2, 9.0 and 10.8 plants per 1 running meter, respectively), two types of irrigation depending on the limited field moisture. the power of the soil (NPK) regime (70-70-60 and 75-75-60%, as well as the irrigation regime 2-3-0 and 2-4-0, respectively) and the mutual proportions of fertilizers (NPK) in two standards (1:0.7:0.5 and 1:1:0.5). The annual fertilizer rates were: N200 P140 and K100 and N200 P200 and K100 kg/ha. At 70-70-60% irrigation regime, depending on the density of the bush and the ratio of fertilizers, the average yield was 35.7-40.9 t/ha, and at 75-75-60% irrigation regime, the average yield by options was 33.2- 36.4 q/ha. It was found that the microneuron index of cotton fiber harvested from the experimental options was 4.3-4.5, and the microneuron index of cotton fiber harvested from the variants irrigated in the 70-70-60% mode was slightly higher than in the irrigation mode 75-75-60%. The highest efficiency cotton was irrigated in the mode of 70-70-60%, with an average of 100,000 bushels per hectare and fertilizers were applied in the ratio of 1:1:0.5, yield was 40.9 t/ha and 32.2% yield was achieved.

1. Introduction

The recent global climate change and ecological issues, as well as the limited availability of land and water resources, have highlighted the need for increasing the productivity of crop production through scientific achievements and innovative technologies in agriculture. In cotton farming, creating high-yielding and stress-tolerant varieties with superior fiber quality and optimizing their cultivation with new innovative agrotechnologies in accordance with local soil and climate conditions are essential factors for achieving high productivity.

Under the leadership of our government, a video selector meeting was held to increase cotton exports by further enhancing productivity and deepening the processing of cotton with added value chains, taking into account the selection potential of cotton varieties based on scientific achievements in agriculture, and by reprocessing the raw materials. In addition, specific tasks were identified in the presidential decree of July 7, 2022, "On additional measures to increase cotton productivity and promote science and innovation in cotton cultivation" [1. 2].

It is known that increasing the income derived from cotton production can be achieved by creating value-added chains through deep processing of cottonseed oil and other cotton by-products. As emphasized by our President, providing domestic textile industries with domestically grown cotton will provide us with the opportunity to earn high profits with low costs. To achieve this goal, it is essential to develop modern bio- and nano-technologies in cotton farming. Nowadays, the textile industry is rapidly developing worldwide, and it imposes new technical and technological requirements on cotton fiber quality. This, in turn, highlights the importance of scientific development in cotton farming. The recent climate change, water scarcity, soil fertility, and land improvement issues have led to an urgent need to increase productivity in cotton farming by improving the quantity and quality of stress-tolerant varieties and optimizing agrotechnical measures. In particular, the relative difference between day and night temperatures caused by abnormal heat and high night temperatures negatively affects generative (flowering) processes in cotton plants. This situation requires breeders to create new cotton varieties that are resistant to these environmental stresses. [2, 4, 12]

As a result of the initiatives taken by our President, a cluster system has been implemented in the agricultural sector, which not only focuses on deep plowing but also emphasizes on efficient use of water resources, improving the quality of agricultural machinery and tractor parks with advanced agricultural technology, and promoting the use of water-saving and resource-conserving technologies. Therefore, creating new crops suitable for local soil and climate conditions, providing high-quality fertilizers to farmers, implementing appropriate agro-technical measures, and collaborating with scientists are all crucial for ensuring high productivity and quality. In this regard, experts in this field are providing scientific recommendations to clusters and farmers. As productivity is directly proportional to the amount of yield, it is essential to create disease-resistant crops that are suitable for local soil and climate conditions and to develop appropriate agro-technical measures to increase both the quantity and quality of production.

Creating suitable agricultural technologies for each region's soil and climate conditions, ensuring proper irrigation and soil quality, and using appropriate fertilizers are essential for achieving high productivity and quality. Therefore, addressing these issues by conducting research and providing scientific recommendations to farmers and clusters is vital. As is known, productivity in the world economy is measured by the amount of crop yield. Therefore, in order to change this indicator, it is necessary to have varieties that are high in productivity and quality of soil suitable for the climatic conditions of the region. As noted, it is necessary to determine the degree of soil fertility based on scientifically based recommendations for the use and duration of mineral and organic fertilizers. To do this, it is essential to analyze the soil composition in modern laboratories.

As a result of the work carried out by farmers, each soil type was studied according to the climate conditions. In the agricultural system, more than 30 types of fertilizers are used, including nitrogen, phosphorus, and potassium, as well as organic matter. However, it is possible to increase productivity by 10-12% by developing new varieties. Therefore, in our republic, it is important to create and produce resistant varieties that are suitable for harsh and changing conditions, and to develop appropriate agrotechnology for them to increase their quantity and quality [3, 6].

It is important to create and introduce agrotechnologies suitable for the soil and climate conditions of each farming region, that is, to ensure water, nutrient regimes, and bush thickness that are optimal for the cultivated varieties, in order to grow an abundant and high-quality harvest from cotton. That is why it is important to study these problems.

The Zarafshan variety of cotton is grown in the main areas of the Samarkand region and in a number of regions of our Republic. In order to widely use the potential of this variety, it is the need of the moment to study the effect of different bush thicknesses, irrigation regimes, and the ratio of mineral fertilizers on cotton yield, fiber, and seed quality.

Taking this into account, as a result of studying the irrigation and nutrition regimes of the Zarafshan variety of cotton, which is grown in large areas in several regions of our Republic, including the Samarkand region, the potential opportunities of this variety will be widely used. For this purpose, in order to study different irrigation regimes in connection with the standards of mineral fertilizers, field experiments were conducted in the conditions of meadow-gray soils of the Samarkand Experimental Station of the Scientific Research Institute of Cotton Selection and Seeding, Agricultural Technologies of Cultivation.

2. Materials and methods

Phenological observations, biometric measurements, analyzes and calculations in all conducted laboratory, field and production experiments were carried out on the basis of methods adopted by the Institute of Cotton Research of Uzbekistan.

"Chipoletti" devices were used to calculate the water consumption of the experimental field, and "Thomson" devices were used for waste water. The amount of total nitrogen and phosphorus was determined by the method of K.S. Ginzburg, E.I.shcheglova and S.V. Wilfius, the amount of mobile nitrogen was determined by the method of Granwald-Lyaju, phosphorus by the method of B.P.Machigin, and humus by the method of I.V. Tyurin.

The obtained results were analyzed by the method of B.A. Dospekhov. Fiber and seed quality analyzes Certification of the quality of cotton fiber of Uzbekistan was carried out in the laboratory of the Samarkand network of the "Sifat" Samarkand regional laboratory, the Cotton Research Institute of Uzbekistan [5, 6].

In order to study the influence of cotton on the Зарафшон variety by combining these technologies, research work was carried out for three years on meadow-gray soils of the fields of the Samarkand branch of the Cotton Research Institute of Uzbekistan.

The soil of the experimental field was irrigated and cultivated for a long time, and according to its mechanical composition, the average level of seepage water is 7-8 meters. On the experimental field, wide rows (90 cm wide) were planted with cotton seeds of the Зарафшон variety.

Three different bush densities were used in the experiment (80, 100 and 120 thousand plants/ha), two irrigation regimes (70-70-60 and 75-75-60% compared to LFWC) and two different ratios of fertilizers (1: 0,7:0.5 and 1:1:0.5, i.e. N200 P140 K100 and N200 P200 K100).

Twelve options that were planned to be studied in field experiments were placed in one layer and carried out in four repetitions. The total area of each field (paykal) was 720 m2 (100x7.2), the estimated area was 360 m2. All agrotechnical processes, biometric measurements and phenological observations in the experimental field were carried out on the basis of the recommendations of the Institute of Cotton Growing of Uzbekistan.

Before the experiment, the average content of nitrate nitrogen was 21.4 mg / kg, phosphorus - 32.2 mg / kg, humus - 1.13% in the arable layer (0-30 cm) and 9.2% in the soil layer 30-50 cm respectively. 14.3 mg / kg, humus - 0.80%, and the total amount of nutrients nitrogen - 0.125%, phosphorus - 0.220%, respectively, 0.078-0.155% in a layer of 30-50 cm.

The volumetric mass of the soils of the experimental field is on average 1.28 g. cm in a layer of 0-70 cm, the moisture capacity of a closed field is 21.3%, and in a layer of 0-100 cm this figure is 1.31 g cm3, 22, it turned out to be 4 percent.

Irrigation of cotton was carried out according to soil moisture in the 0-70 cm layer before flowering and ripening and in the 0-100 cm layer during flowering and harvesting. At the same time, soil moisture before irrigation was 14.6-16.3% with a water regime of 70-70-60%, which was 68.3-71.9% compared to the limited field soil moisture capacity. Under the irrigation regime of 75-75-60%, soil moisture varied from 15.7 to 17.4%, which was about 74.1-76.5% of the maximum field moisture capacity of the soil.

3. Results and Discussion

In the years of the experiment (2018-2020), in the irrigation regime of 70-70-60% compared to LFWC, the average pre-irrigation soil moisture of cotton was from 68.3% to 71.9% compared to LFWC, 75-75-60% planned irrigation and it was determined to change to 74.1-76.5% in the mode.

In the experimental field, the first irrigation of cotton was started earlier than the 70-70-60% regime with respect to LFWC, on June 4 in 2018, June 5 in 2019, and June 7 in 2020.

In the 70-70-60% planned irrigation regime of the experiment, the first watering was carried out on June 10 in 2018, June 9 in 2019, and June 10 in 2020.

In the 75-75-60% irrigation regime of the experiment, the period between irrigations after the first water is 15-17 days in 2018, 14-15 days in 2019, and 14-17 days in 2020, more in the 70-70-60% irrigation regime, i.e. in 2018 It was 18-22 days, 19-22 days in 2019, and 20-22 days in 2020.

Seasonal water consumption per hectare at the end of the cotton growing season in the 70-70-60% irrigation regime changed from 5180 m3 to 5280 m3 during the years of the experiment (2018-2020).

In the 75-75-60% irrigation mode of the experiment, it was determined that the seasonal water consumption per hectare was 5360 m3 - 5555 m3.

Analyzing the results of the phenological observations, it was found that the irrigation regime, the thickness of the trunk, as well as the presence of fertilizers in different proportions, have a great influence on the growth and development of plants.

If the irrigation regime is increased from 70-70-60% to 75-75-60% compared to the limited field moisture capacity (LFWC) of the soil, the head stem of cotton is increased up to 7.6 cm. height was found to be high at the beginning of the growing season (up to 1.2 cm in 1. VI and 3.4 cm in 1. VII) depending on the irrigation regime and the ratio of fertilizers, but, on the contrary, in observations in August, the number of bushes was 80,000 per hectare With an increase of up to 120,000, the reduction of the growth of the main stem of plants to 7.4 cm was taken into account. Because by this period, due to the increase in the leaf level and dry mass of plants, crop elements, the increase in cotton's demand for water and nutrients in the soil and their rapid assimilation, as a result of increasing the number of seedlings to 80-120 thousand, it was observed that the growth of plant height slowed down (Table 1)

Table 1

Cotton in bush thickness, irrigation, and nutrition regimes growth and development (average in 2018-2020)

Experience options	Planned bush thickness, thousand pieces/ha	NPK ratio	Plant height, cm			Number of tines and sympodial branches, pcs			Number of pods, pcs		Opened from that, piece
						chinleaf	sympodial branches				
			1.VI	1.VII	1.VIII	1.VI	1.VII	1.VIII	1.VIII	1.IX	1.IX
70-70-60 % Watered at 70-70-60 % relative to LFWC											
1 (н)	80	1:0,7:0,5	13,4±2,0	47,2±2,4	90,9±0,5	4,1±1,1	8,3±1,2	12,0±0,7	6,5±0,3	10,8±0,5	2,2±1,0
2	100		13,9±2,5	48,2±3,2	88,5±4,8	4,1±0,8	8,1±1,2	11,2±0,7	5,9±0,9	9,9±1,4	1,6±0,6
3	120		14,6±2,6	48,5±4,5	84,0±5,5	3,9±0,6	7,1±1,0	10,6±1,4	5,4±1,4	8,8±0,7	1,1±0,5
4	80	1:1:0,5	13,2±2,8	48,8±3,2	90,1±4,8	4,2±1,4	8,4±1,2	12,6±1,2	6,8±0,2	10,8±0,5	2,5±1,3
5	100		13,9±2,6	48,2±3,4	86,2±6,2	4,1±1,3	8,2±1,3	11,4±1,4	6,1±0,9	10,1±0,8	2,1±1,0
6	120		14,3±2,8	49,4±3,7	84,0±6,7	4,0±0,8	7,1±0,6	10,7±1,8	5,6±1,4	9,0±0,7	1,4±0,5
Watered at 75-75-60 % relative to LFWC											
7	80	1:0,7:0,5	13,4±1,6	52,7±4,1	95,1±5,7	4,3±1,5	8,5±1,8	11,7±1,5	6,3±1,1	10,1±0,6	1,0±0,5
8	100		14,0±2,4	54,6±4,1	92,0±6,5	4,2±1,2	8,0±1,6	10,9±1,9	5,5±0,7	8,8±1,3	0,9±0,6
9	120		14,4±2,5	56,1±4,0	87,7±5,5	4,0±0,7	6,9±1,7	10,4±2,3	4,9±0,8	8,5±1,1	0,7±0,3
10	80	1:1:0,5	14,0±2,6	52,5±3,8	92,7±8,3	4,2±1,3	8,8±1,7	11,8±0,8	6,3±0,8	10,3±0,7	1,1±0,4
11	100		14,8±2,6	53,6±4,1	88,5±9,5	4,0±0,8	8,3±1,2	10,8±1,2	5,3±0,5	9,3±1,3	0,8±0,1
12	120		15,1±2,6	54,5±4,5	85,4±8,0	3,9±0,9	7,3±1,3	10,4±2,0	4,9±0,5	8,5±1,1	0,7±0,2

In relation to the LFWC of the experiment, the height of the main stem of the cotton treated in the 70-70-60% irrigation regime on August 1 in the ratio of NPK 1:0.7:0.5 and the thickness of 80 thousand seedlings per hectare, i.e. 90.9 in the control option cm and the number of harvested branches was 12.0 units per plant, and in the option where the number of bushes was increased to 100,000, the height of the cotton head stem was 88.5 cm, the number of harvested branches was 11.2 units, and the number of seedlings per hectare was further increased, that is when there are 120,000 bushes, the plant height is 84.0 cm and the number of crop branches is reduced to 10.6 units. Similar changes were observed in the options where cotton was irrigated in the 75-75-60% regime.

On August 1 and September 1, the number of bolls and opened bolls per boll of cotton was taken into account, as the number of bolls changed from 80,000 to 120,000.

The increase in the above parameters with increasing the element of phosphorus in the ratio of NPK or reducing the thickness of the trunk from 120 thousand to 80 thousand per hectare can be explained by the nutritional area of one plant and the optimization of the assimilation of nitrogen and potassium by the plant due to the increase of phosphorus and the speed of air exchange.

When cotton was irrigated in a regime of 75-75-60% in relation to LFWC, it was considered that the flowering process was delayed in relation to the 70-70-60% irrigation regime in all studied stem thickness and fertilizer ratios [7, 8, 9].

In the experiment carried out in 2020, it was fed with fertilizers in the ratio of 1:1:0.5, irrigation was carried out in the mode of 70-70-60%, and the number of bushes per hectare was on average 80,000 bushes, as of July 9, 81%, the number of seedlings per 100,000 it was found that 62% in the increased version and finally 46% in the version where the number of bolls increased to 120,000 entered the flowering phase.

It turned out that increasing the phosphorus element in the ratio of fertilizers (1:1:0.5) has an effective effect on the flowering process of cotton.

During the flowering phase of plants, water consumption and the increase in the thickness of the stem and the decrease in the phosphorus element in the ratio of NPK caused a relative delay in the ripening phase [11, 12].

In the 2020 experiment, at the end of the ripening phase on September 11, the average planting thickness of 80,000 plants per hectare was planned and the 70-70-60% irrigation regime was provided. 78% of cotton buds were opened, 72% when 100,000 seedlings were left, and 69% when the number of plants was increased to 120,000, when cotton was irrigated in the 75-75-60% regime, compared to the above number of plants compared to the 70-70-60% irrigation regime, 12; 10; It was found that the ripening phase was delayed by 16%. However, when feeding cotton with fertilizers, increasing the amount of phosphorus element (increased from 1:0.7:0.5 to 1:1:0.5 ratio) was found to cause a significant (up to 8%) acceleration of the ripening phase of cotton, depending on the irrigation regimes.

Similar data were obtained in experiments conducted in other years.

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It has been determined in many experiments that the presence of the factors necessary for the life activity of plants at an acceptable level is of decisive importance in the formation of cotton bushes and their structure (habitus).

Compared to the LFWC, in the background of 70-70-60% irrigation regime and NPK ratio of 1:0.7:0.5, the thickness of seedlings per hectare is on average 80,000. 4 cm, 15.3 cm in the option with 100,000 seedlings, and 16.1 cm in the option with 120,000 bush thickness.

16.6 in accordance with the above in the options where watering is carried out in the 75-75-60% mode; 18.2; 18.7 cm, the emergence of the first harvest branch at a high distance was taken into account in the cotton of variants with a stem thickness of 120 thousand pieces.

Therefore, with the increase of seedling thickness in the background of both irrigation regimes and fertilizers, the height of the first sympodial branches and the joint intervals of the 1-10 crop branches were long, but the length of the joint interval of the 11th and subsequent crop branches and the length of the daily sections of the stems were taken into account.

It was observed that the height of the first sympodia branches was relatively short in both irrigation regimes studied in the experiment compared to the cotton grown in the 1:1:0.5 ratio, i.e., with the increase in the amount of phosphorus nutrient in fertilization.

In order to better understand the influence of seedling thicknesses, and irrigation regimes on the structure of cotton branches and their sizes, biometric measurements were carried out on cotton at the end of the growing season, the number of growth and crop branches, their total length, the length and thickness of the joint intervals of the main stem of the plant, i.e. the appearance of the habitus of the cotton bush were studied [10].

Compared to cotton LFWC, 75-75-60% irrigated variants were found to have longer all shoot branches up to 16 cm and all yielding branches up to 18.1 cm depending on stem thickness and fertilizer ratio compared to variants provided with 70-70-60 % irrigation regime.

In the variant where the seedling thickness is 80,000 bushels when cotton is irrigated in the 70-70-60% mode, the total length of the branches, depending on the ratio of nutrients, is 63.4-66.5 cm. it was found that the thickness of the bush was 79.2-81.4 cm.

While the length of all plant branches and all crop branches was observed with the increase of irrigation regime, the total length of plant branches and sympodial branches decreased with the increase of NPK ratio and bush thickness from 80 thousand to 120 thousand per hectare.

In the flowering and harvesting phase of cotton, in the control option, one bush of cotton plants had an average of 51.4 leaves and their surface area was 1392.2 cm2, when the number of seedlings was increased to 100 thousand per hectare, the number of leaves was reduced to 8.2 compared to cotton grown in the thickness of 80 thousand bushes. , and the leaf surface is reduced by 113.8 cm2 and even more difference is taken into account in the options where the number of bushes is increased to 120 thousand per hectare, compared to the thickness of 80 thousand seedlings in the above irrigation and nutrition regime, the number of leaves is 18.9 pieces, and the level of the leaf surface is 452.4 cm2 was observed to decrease up to

It was found that in both studied irrigation regimes and seedling thicknesses, cotton increased leaf number and dry weight in a 1:1:0.5 ratio compared to a 1:0.7:0.5 ratio [9, 10].

It was found that the number of cotton leaves and their dry mass increased in the irrigation regime maintained at 75-75-60% compared to the irrigation regime of 70-70-60% during the flowering and harvesting phase. However, in both studied irrigation regimes, the number of leaves and their dry mass were sharply reduced due to the reduction of the feeding area of one plant with the increase in the thickness of the bush from 80,000 to 120,000 per hectare.

During the ripening phase of cotton, in the control option, the dry mass of one plant is 141.7 g, of which 21.8% consists of stems and branches, 19.1% of leaf weight, and 59.1% of generative organs (cobs, pods, nodes, and flowers). It was noted that

The dry mass of the plant in the 75-75-60% irrigated variants was much higher (up to 37.9 g), as well as their stem and branch weight (up to 6.8%) and leaf weight, compared to the 70-70-60% regime. high in total dry mass, however, a significant decrease in the number of generative organs (up to 7.9%) was taken into account. This situation can be described by the slightly stunted growth of cotton in the 75-75-60% irrigation regime.

When cotton is irrigated in the 70-70-60% mode, the dry weight of plants increased to 1.1 g and the number of generative organs increased to 3.9% with an increase in the phosphorus element in the ratio of fertilizers (1:1:0.5) in all studied stem thicknesses, but, when the irrigation regime increased to 75-75-60%, as a result of increasing the phosphorus element in the proportion of fertilizers, it was observed that vegetative organs increased and generative organs decreased up to 2.1%.

During the growing period of cotton, when irrigation is carried out in the mode of 70-70-60%, the mutual ratio of fertilizers is 1:0.7:0.5, the amount of the total nitrogen element in the stems of the plants in the control variant with a seedling thickness of 80,000 per hectare is 0.81%, the thickness of the bush per hectare is 0.78% in the above water and food regime when it is 100,000, and 0.76% when the number of bushes is increased to 120,000 was taken into account. In the above irrigation regime, when cotton is fed in the ratio of 1:1:0.5, the total amount of nitrogen in the stem is 0.82 according to the seedling thickness; It was found that it changed to 0.79 and 0.75%.

Therefore, as a result of increasing the thickness of the bush from 80 thousand to 120 thousand, it was observed that the total amount of nitrogen in the stem and other organs of the plant decreases due to the absorption of more nutrients from the soil and the subsequent reduction of these substances in the soil.

It was found that the total nitrogen content in the stems and other organs decreased in the ratio of all studied bush thicknesses and fertilizers in the variants of 75-75-60% irrigation in the experimental field compared to cotton in the 70-70-60% irrigation regime.

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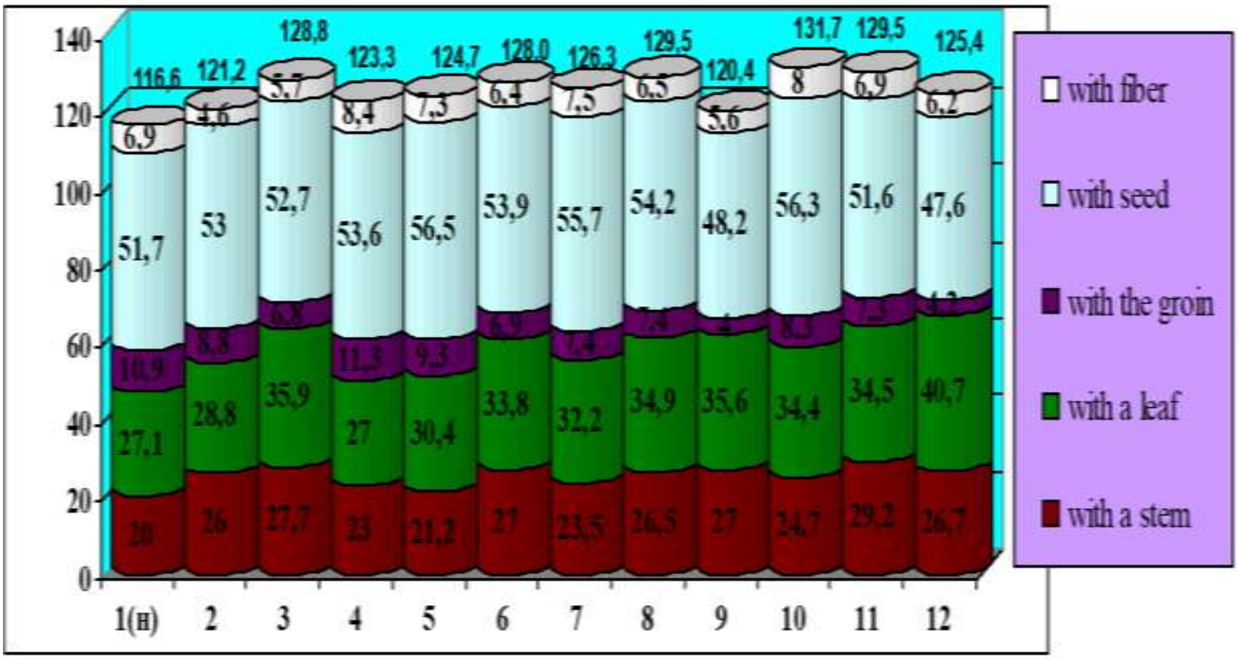
With an increase in the number of seedlings and an increase in the irrigation regime from 70-70-60% to 75-75-60%, a decrease in the total phosphorus element in cotton organs was noted. However, increasing the phosphorus element in the ratio of fertilizers (1:1:0.5 compared to 1:0.7:0.5) resulted in a relative increase in total phosphorus in cotton organs.

In all the factors studied in the experiment, nitrogen and phosphorus elements were removed in large quantities by seeds and leaves.



80	100	120	80	100	120	80	100	120	80	100	120
1:0,7:0,5			1:1:0,5			1:0,7:0,5			1:1:0,5		
watering mode, 70-70-60 %						watering mode, 75-75-60 %					

Figure 1. Removal of nitrogen element through cotton organs at different irrigation regimes and seedling thickness, kg/ha (2019-the 2020 year)

When cotton was cared for in the irrigation regime of 70-70-60%, it was observed that nitrogen absorption by plants increased with the increase in the thickness of the bush. However, when cotton is irrigated in the 75-75-60% irrigation mode and the fertilizer ratio is 1:0.7:0.5, the total nitrogen uptake increased when the seedling thickness increased from 80,000 to 100,000, and decreased when the bush thickness increased to 120,000. It was found that with the increase of seedling thickness from 80 thousand to 120 thousand bushes per hectare in the case of 1:1:0.5, the removal of the nitrogen element decreases and the use of the given nitrogen fertilizer also decreases (Fig. 1).

When cotton is irrigated in the 70-70-60% mode, phosphorus removal is observed with the increase in the number of seedlings per hectare in both proportions of fertilizers studied in the experiment, while

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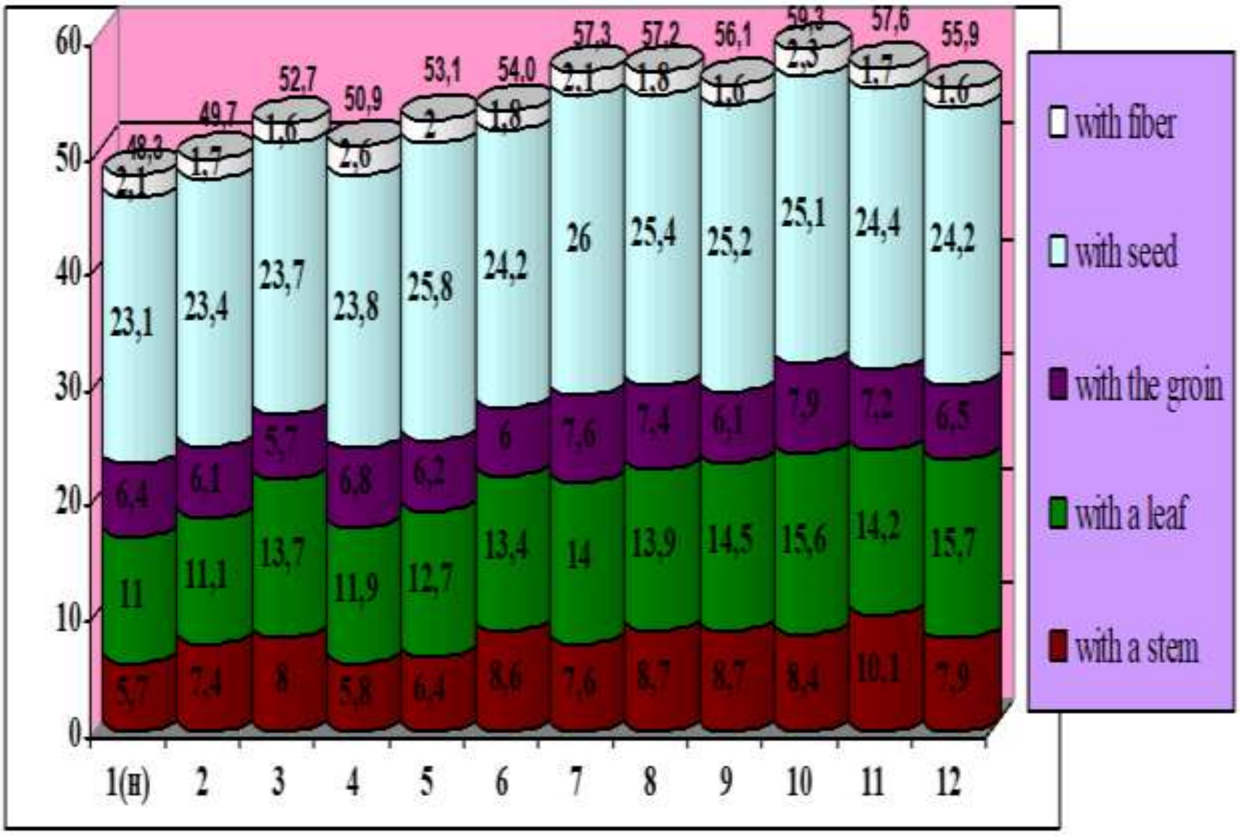
in the 75-75-60% irrigation mode, the phosphorus removal by plants increases from 80,000 to 120,000 per hectare. it was observed that it decreased [3, 4] (Fig. 2).

It is known from the conducted experiments that when cotton is irrigated in the regime of 70-70-60% compared to the LFWC of the soil during the growing season, in both studied proportions of fertilizers, the productivity increases with an increase in seedling thickness from 80,000 to 100,000 on average, but a decrease in productivity was observed when the bush thickness increases to 120,000. However, when cotton is irrigated in the regime of 75-75-60%, it was found that cotton productivity decreases with an increase in the average number of seedlings from 80,000 to 120,000 per hectare in both proportions of mineral fertilizers [3, 4] (Table 2).



80	100	120	80	100	120	80	100	120	80	100	120
1:0,7:0,5			1:1:0,5			1:0,7:0,5			1:1:0,5		
watering mode, 70-70-60 %						watering mode, 75-75-60 %					

Figure 2. Removal of phosphorus element through cotton organs at different irrigation regimes and seedling thickness, kg/ha (2019-2020 year)

Table 2

Cotton yield, ts/ha in different bush thickness, irrigation and nutrition regimes

Experience options	Irrigation regime in relation to LFWC, %	Bush thickness before harvest, thousand piece/ha	Reciprocity of NPK	Years of experience						Average	
				2018		2019		2020		total yield	hence in the form of a pocket
				total yield	hence in the form of a pocket	total yield	hence in the form of a pocket	total yield	hence in the form of a pocket		
1(н)	70-70-60	80,6	1:0,7:0,5	36,4	4,1	37,2	4,0	35,1	4,5	36,2	4,2
2		99,5		38,8	4,6	39,5	5,3	37,4	4,9	38,5	4,9
3		118,5		35,7	4,7	36,1	4,9	34,6	5,5	35,4	5,0
4		79,8	1:1:0,5	38,2	3,3	38,5	3,6	36,4	4,1	37,7	3,6
5		97,4		40,9	3,8	41,2	4,2	39,5	4,4	40,5	4,1
6		119,2		37,3	4,4	37,3	5,2	35,7	5,2	36,7	4,9
7	75-75-60	79,9	1:0,7:0,5	34,7	6,3	36,9	3,8	34,5	4,2	35,3	4,7
8		100,7		35,8	6,1	35,8	4,9	33,2	4,6	34,9	5,2
9		118,6		33,2	6,4	35,2	4,7	32,1	4,9	33,5	5,3
10		81,5	1:1:0,5	35,2	6,1	38,2	3,4	36,1	3,8	36,5	4,4
11		99,6		36,4	5,8	36,1	3,7	34,5	4,1	35,6	4,5
12		118,0		34,6	6,6	35,4	4,8	33,6	4,6	34,5	5,3

2018 y.:	**A(water).** $TSD_{0,5}$=1,22 s/ha	**B(NPK).** $TSD_{0,5}$=1,22 s/ha	**C(thickness).** $TSD_{0,5}$=1,0 s/ha
2019 y.:	**A(water).** $TSD_{0,5}$=1,59 s/ha	**B(NPK).** $TSD_{0,5}$=1,59 s/ha	**C(thickness).** $TSD_{0,5}$=1,3 s/ha
2020 y.:	**A(water).** $TSD_{0,5}$=1,25 s/ha	**B(NPK).** $TSD_{0,5}$=1,25 s/ha	**C(thickness).** $TSD_{0,5}$=1,02 s/ha

During the years of the experiment, the highest average yield (40.5 tons) was obtained during the cotton growing season in the conditions of 70-70-60% LFWC of the soil, the mutual ratio of fertilizers was 1:1:0.5, and the average seedling thickness was 97,000 pieces/ha. was found to have been received.

When cotton is irrigated in the 70-70-60% regime and fertilizers are applied in the ratio of 1:0.7:0.5, in the control variant with a seedling thickness of 80 thousand per hectare, the fiber yield is 36.8%, the fiber length is 33.5 mm, the tensile strength is 4.6 gk, and with the increase in the number of stems, a decrease in these indicators was observed.

When fertilizers are applied in a ratio of 1:1:0.5, when cotton is irrigated in the 70-70-60% mode, in the variants with a bush thickness of 80-100 thousand per hectare, no changes in fiber output and fiber length were observed, however, with an increase in the thickness of seedlings to 120 thousand bushes, these indicators decrease. received.

Especially, in both irrigation regimes, it was found that the breaking strength, microneural index, maturation coefficient and the mass of 1000 seeds decreased with the decrease of phosphorus in NPK ratio and the increase of bush thickness from 80,000 to 120,000 per hectare.

When watering in the mode of 75-75-60%, the thickness of the bush is 80,000 to 100,000 per hectare and the fiber length is 33.5-33.6 mm, the average weight of 1000 seeds is 120-121.1 g, however, the thickness of the bush is up to 120,000 with the increase, it was found that the percentage of fiber output, fiber length, fiber maturation coefficient, as well as the mass of 1000 seeds compared to other investigated variants were significantly reduced.

The microneural index of the fiber in the cotton harvested from the experimental variants was 4.3-4.5, compared to the 75-75-60% irrigation regime of the experimental field, the microneural index of the cotton harvested from the variants irrigated in the 70-70-60% regime was noted to be slightly higher. .

The highest yield is 40.5 t/ha, profitability is 34.0% from the variant in which cotton is cultivated in the 70-70-60% irrigation mode, with an average of 100,000 bushels per hectare and fertilizers are applied in a ratio of 1:1:0.5 did, it was found to be the most economically effective option. Also, compared to the control option, the yield rate was 4.3% higher [3, 4, 6].

4. Conclusion

In conclusion, it can be said that cotton was maintained in the irrigation regime of 70-70-60%, with an average of 100,000 plants per hectare, and fertilizers were applied in the ratio of 1:1:0.5 (N200 P140 and K100 and N200 R200 and K100 kg/ha). the option was found to be the most effective option in terms of economic and technological quality indicators of cotton fiber. It was found that the microneural index of fiber in the cotton harvested from the experimental variants was 4.3-4.5, and the microneural index of the cotton fiber harvested from the variants irrigated in the 70-70-60% regime was slightly higher than in the 75-75-60% irrigation regime table 3.

When cotton was irrigated in the 75-75-60% mode, compared to the variants irrigated in the 70-70-60% mode, a decrease in the industrial grade of cotton was also noted [3, 4].

Table 3

Effect of watering, feeding regimes and bush thickness on technological parameters of cotton fiber

Experience options	Fiber output, %	Fiber length, mm	Breaking strength, gk	Microneer indicator	Maturation coefficient	Industrial grade	Mass of 1000 seeds, g
1(control)	36,8	33,5	4,6	4,4	2,0	I	121,4
2	36,5	33,4	4,4	4,4	2,0	I	120,0
3	35,2	33,0	4,4	4,3	2,0	I	118,0
4	36,8	33,6	4,6	4,5	2,0	I	121,9
5	36,8	33,6	4,5	4,4	2,0	I	121,2
6	35,4	33,1	4,5	4,4	2,0	I	119,0
7	36,4	33,6	4,4	4,3	2,0	I	120,9
8	36,0	33,5	4,3	4,4	1,9	II	120,0
9	35,0	33,0	4,3	4,3	1,9	II	118,0
10	36,5	33,6	4,5	4,4	2,0	I	121,1
11	36,2	33,6	4,5	4,4	1,9	II	120,3
12	35,0	33,1	4,3	4,4	1,9	II	118,2

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