



THE EFFECT OF IRRIGATION AND FERTILIZER RATE ON THE PRODUCTIVITY OF MEDIUM FIBER "ANDIJON-36", "C-6541" VARIETIES OF COTTON

Аннотация:

On the condition of typical sierozem soils of Tashkent province the research were conducted to study the optimal irrigation and fertilizer application scheduling of Andijan-36 and C-6541 cotton varieties. The paper presents materials that on sierozem soils, it was recommended to irrigate cotton variety Andijan-36 with irrigation scheduling 65-65-60% Fc, irrigation scheme 1-2(3)-1(2) with 4 to 6 irrigation events, seasonal irrigation norm were 4450 to 5890 m³ ha⁻¹, on cotton variety C-6541 with irrigation scheduling 70-70-60% Fc, irrigation scheme 1-3(4)-1(2) with 5 to 7 irrigation events, seasonal irrigation norm totaled 4730 to 5990 m³ ha⁻¹ and in both cotton varieties optimal fertilizer application rate was N190 P133 K95kg ha. It was recommended to begin the irrigation events at the end of May, in the first decade of June months, the last irrigation events was considered to finish at the first 5 and 10 days of September months, irrigation duration till flowering 20 to 24 hours, flowering – yield accumulation 26 to 35 hours, maturation – boll opening phase 21 to 31 hours, irrigation intervals 12 to 28 days were recommended.

Ключевые слова:

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Introduction. In the agrotechnical measures of cotton cultivation in the world cotton cultivation, by developing optimal standards of irrigation and mineral fertilizers, it is possible to optimize soil moisture and increase the coefficient of use of fertilizers by the plant. Long-term sustainable cultivation of cotton varieties in cotton farming is directly related to the applied agrotechnological processes. As a result of the full satisfaction of the physiological demand for irrigation water and



nutrients during the growth period of the plant, it is possible to achieve high technological quality indicators of large pods and fiber [1,2,3].

In recent years, a number of new cotton varieties have been created in our republic, which are quick-ripening, productive, have high fiber quality, and are resistant to diseases and pests. In order to obtain a high and quality cotton crop from these cotton varieties, it is required to pay special attention to the development of effective agrotechnical methods of cultivation based on the soil-climate and hydrogeological-ameliorative conditions of each region. In the researches in the direction of agrotechnics of cotton varieties carried out by the scientists of our republic, it was emphasized that the need to develop optimal water-nutrition standards is very important, in which changes in cotton yield can be observed on the plots. Optimal standards and periods of watering and feeding with mineral fertilizers of newly created cotton varieties have been developed and are being used in large areas [2,4,5,6,7].

Research object and methodology.

It was ensured that the research works will be carried out in the old irrigated typical gray soils of the Tashkent region, in fields with underground water deeper than 18-20 meters, and production experiments will be carried out in the fields of farms in Boka, Piskent districts.

In order to solve the tasks set for the experiment, fixed researches were conducted in the field, in which the nutrient (NPK) standards and irrigation procedures of cotton varieties with medium fiber "C-6524" (template), "Andijan-36", "C-6541" were studied. The studied cotton cultivars were planted as the main crop and maintained according to the program (Table 1) [8,9,10,11].

Table 1. Experience system

Variant	Varieties of cotton	Soil before irrigation humidity to LFWC in comparison, in %	Rate of mineral fertilizers, kg/ha		
			N	P	K
1	C-6524 Control	70-70-60	200	140	100
2	Andijan-36	65-65-60	160	112	80
3	Andijan-36	65-65-60	190	133	95
4	C-6541	65-65-60	160	112	80
5	C-6541	65-65-60	190	133	95
6	Andijan-36	70-70-60	160	112	80
7	Andijan-36	70-70-60	190	133	95
8	C-6541	70-70-60	160	112	80
9	C-6541	70-70-60	190	133	95
10	Andijan-36	70-75-60	160	112	80
11	Andijan-36	70-75-60	190	133	95
12	C-6541	70-75-60	160	112	80
13	C-6541	70-75-60	190	133	95

All observations and analyzes in the research were carried out based on the methods of conducting field experiments of the Scientific-Research Institute of Cotton Selection, Seeding and Cultivation of Agricultural Technologies [4,21].

According to the initial agrochemical analysis of the soil in the experimental field, the amount of humus in the soil layers of 0-30, 30-50 cm was from 0.965 to 0.690%, and it was observed that it decreases towards the lower layers. The amount of nitrogen in the soil changed in proportion to the amount of humus. According to the obtained data, it was found that the soil of the experimental field was provided with low levels of mobile forms of nutrients, nitrogen and phosphorus, and moderate levels of exchangeable potassium [12,13,14,15].



Research results and their discussion.

From the agrophysical properties of the soil of the experimental field, bulk mass, specific gravity, porosity, water permeability and field moisture capacity were determined. According to the analysis of the volume mass of the soil at the end of the spring compared to the beginning of the application period, the volume mass of the soil in the 0-30 cm layer is 0.02 g/cm³ when irrigated in the order of 65-65-60%, and 0.03 g/cm³ when irrigated in the order of 70-70-60%. per cm³, it was observed that it increased by 0.04 g/cm³ when irrigated in the order of 70-75-60%, and by 0.02-0.05 g/cm³ in each watering order in the 0-100 cm layer [15,16,17].

According to the results of the conducted three-year research, it was observed that the volume mass of the soil slightly increased at the end of the season as a result of the annual agrotechnical activities, especially irrigation. During the research years, it was observed that the porosity of the soil decreased by 0.3-0.8% from year to year, that is, the soil became relatively denser [17,18,19].

During the experimental years, the water permeability of the soil at the beginning of the operation period was 899-904 m³/ha on average in 6 hours. Soil water permeability is 96-106 m³/ha in the 65-65-60% irrigation regime, 116-121 in the 70-70-60% irrigation regime compared to the limited field moisture capacity (LFWC) for a total of six hours from the beginning of the operating period to the end of the growing season. m³/ha, it was observed that 152-159 m³/ha decreased in 70-75-60% irrigation[20].

It was determined that the field moisture capacity of the soil of the experimental field was in the range of 21.7-21.9% in the 0-70 cm layer and 21.9-22.0% in the 0-100 cm layer.

In order to determine the duration and rate of irrigation in the research, soil moisture was determined in calculated layers, i.e. from the plant germination to the flowering phase and from the 0-70 cm layer during the ripening period, and from the 0-100 cm layer during the flowering-harvest period [15,17,18].

According to the results of the three-year research, the soil moisture before irrigation was 65-65-60% in the order of LFWC, cotton was irrigated 4-6 times according to the 1-2-1, 1-3-1, 1-3-2 systems. Soil moisture in the order of 65-65-60% compared to LFWC is explained by the fact that the number of waterings is low and the interval (17-27 days) is in the range of 60.8-66.2% of soil moisture. Irrigation procedure 70-70-60% in relation to LFWC was irrigated 5-7 times according to 1-3-1, 1-4-1, 1-4-2 systems [19,20].

Andijan-36 cotton variety (65-65-60%) according to 1-2-1, 1-3-1, 1-3-2 systems, one-time irrigation rate is 810-1180 m³/ha, and seasonal irrigation rate is 4450-5890 m³/ha, duration of irrigation was 22-35 hours, irrigation interval was 17-27 days. Cotton variety C-6541 was irrigated 5-7 times according to 1-3-1, 1-4-1, 1-4-2 systems in the order of 70-70-60% compared to LFWC, 680-990 m³/ha in each irrigation, season 4730-5990 m³/ha of water was consumed, the duration of irrigation was 20-33 hours, and the interval between irrigation was 13-27 days. High and high quality cotton yield was achieved when these optimal irrigation periods and rates were applied [12,13,14].

Variations in weather conditions during the years of the study had an effect on seasonal irrigation rates.

In the research, the water consumption for 1 centner of cotton crop was 5990 m³/ha, and the total water consumption was 6545.5 m³/ha. The amount of seasonal water used for 1 centner of cotton yield according to the varieties in this irrigation system is 145.3 m³/ts, 142.3 m³/ts in the options with high yield, and 158.8 m³/ts, 155.4 m³/ts in the total water consumption formed

In the 70-70-60% irrigation system, the lowest water consumption for 1 centner of cotton crop was recorded in the C-6541 variety, when the fertilizer standards N190, P133, K95 kg/ha were used, compared to the seasonal water amount, it was 142.3 m³/t, total water and the amount was 155.5 m³/h.



It was observed that water consumption increased proportionally in all options with the increase in irrigation pattern [3,4,5].

For the Andijan-36 cotton variety studied in the research, the optimal soil moisture is 65-65-60% relative to LFWC, and when mineral fertilizer standards N190, P133, K95 kg/ha are applied, an average yield of 35.3 tons/ha of cotton was achieved in three years. For the C-6541 cotton variety, the optimal soil moisture before irrigation is 70-70-60%, respectively, compared to LFWC, and when mineral fertilizer standards N190, P133, K95 kg/ha are used, an average cotton yield of 34.6 tons/ha was achieved in three years. It was observed that the yield of cotton variety C-6541 decreased when the soil moisture was reduced from 70-70-60% to 65-65-60% and increased to 70-75-60% compared to LFWC (Table 2).

Mineral fertilizer standards N160; P112; K80 kg/ha to N190; P133; It was found that the cotton yield of both cotton varieties increased with the increase of K to 95 kg/ha regardless of the irrigation regime. However, it was observed that the yield of Andijan-36 cotton variety decreases with the increase of soil moisture from 65-65-60% to 70-70-60% and 70-75-60%. This is explained by the somewhat lower water demand of the cotton variety compared to other varieties and the strong development of the root system [12,13].

It was noted that the average three-year cotton yield decreased by 1.8 t/ha in the Andijan-36 cotton variety as the soil moisture increased from 65-65-60% to 70-75-60% compared to LFWC. It was found that the productivity of cotton variety C-6541 was lower than that of Andijan-36 variety by 0.7 t/ha.

In the model C-6524 variety, soil moisture before irrigation is in the order of 70-70-60% according to LFWC and fertilizer rate is N200; P140; When K100 kg/ha was applied, the average cotton yield was 30.6 tons/ha. It was found that in acceptable options, it is 4.7 ts/ha less than the Andijon-36 variety, and 4.0 ts/ha in the C-6541 variety.

Table 2. Productivity of cotton varieties, water consumption and water consumption for 1 centner of cotton crop, (2018-2020)

№	Varieties of cotton	Soil moisture relative to LFWC, %	Mineral fertilizer (NPK) norms, kg/ha s.h.			Irrigation system	Irrigation rates, m ³ /ha		Cotton yield, ts/ha	Water consumption for 1 centner of crop, m ³ /h
			N	P	K		one time	seasonal		
1	C-6524 (Control)	70-70-60	200	140	100	1-3(4)-1(2)	680-990	5376	30.6	175.7
2	Andijan-36	65-65-60	160	112	80	1-2(3)-1(2)	810-1180	5186	26.8	193.5
3	Andijan-36	65-65-60	190	133	95	1-2(3)-1(2)	810-1180	5186	35.3	146.9
4	C-6541	65-65-60	160	112	80	1-2(3)-1(2)	810-1180	5186	29.4	176.4
5	C-6541	65-65-60	190	133	95	1-2(3)-1(2)	810-1180	5186	32.6	159.1
6	Andijan-36	70-70-60	160	112	80	1-3(4)-1(2)	680-990	5376	28.5	188.7
7	Andijan-36	70-70-60	190	133	95	1-3(4)-1(2)	680-990	5376	34.5	155.8
8	C-6541	70-70-60	160	112	80	1-3(4)-1(2)	680-990	5376	29.8	180.4
9	C-6541	70-70-60	190	133	95	1-3(4)-1(2)	680-990	5376	34.6	155.4
10	Andijan-36	70-75-60	160	112	80	1-4(5)-1(2)	670-880	5413	29.2	185.4
11	Andijan-36	70-75-60	190	133	95	1-4(5)-1(2)	670-880	5413	33.5	161.6
12	C-6541	70-75-60	160	112	80	1-4(5)-1(2)	670-880	5413	28.4	190.6
13	C-6541	70-75-60	190	133	95	1-4(5)-1(2)	670-880	5413	33.4	162.1

On average, in three years, cotton yield of 35.3 t/ha was obtained from Andijan-36 cotton variety when soil moisture was 65-65-60% according to LFWC, mineral fertilizers were used at the rate of N190,



P133, K95 kg/ha. The additional cotton yield obtained in this case was 6.9-8.5 t/ha compared to the fertilizer standards, and 0.2-4.4 t/ha compared to the irrigation methods [14,15].

Conclusion.

It was found that providing water and fertilizer standards in optimal terms, standards and procedures ensures a high cotton yield from cotton varieties, including, in typical gray soils, the concentration of leaf cell juice of Andijan-36 cotton variety before flowering is 9.6-9.8%, during flowering-harvest period 10, 0-11.9% and when it is equal to 12.7-12.9% during the ripening period, the soil moisture is 65-65-60% according to LFWC in the order of 1-2(3)-1 scheme, 4-6 times irrigation and seasonal and the irrigation standards are 4450-5890 m³/ha, the concentration of cotton leaf cell juice of the C-6541 cotton variety is 8.5-8.8 before flowering, 10.5-11.0 during the flowering-harvest period, 12.8-12 during the ripening period, When it is equal to 9%, in the order of 70-70-60% in the order of 1-3(4)-1(2) 5-7 times, irrigation at the rate of 4730-5990 m³/ha during the season and the rate of mineral fertilizers for both cotton varieties is N190 R133 It is recommended to set a standard of K95 kg/ha.

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