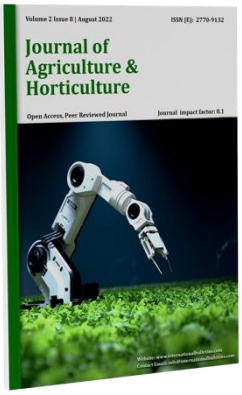

EFFECT OF IRRIGATION METHODS ON COTTON YIELD

Abdurakhimov Nurali Normamatovich
Associate professor, Termiz State University of Engineering and Agrotechnology
Murodov A.M.
leading expert Seed Development Center under the Ministry of Agriculture,
nuraliabduraximov69@gmail.com
https://doi.org/10.5281/zenodo.13789333

Abstract. This article provides information on the current state of global climate change, its consequences, the efficiency of water and mineral fertilizer use of the Hamkor cotton variety, irrigated with a black film bed in the conditions of medium-sandy, barren meadow soils of the Surkhandarya region.

Key words: climate change, drought, temperature, cotton, Partner, crop elements, boll, dynamics, soil, mineral fertilizers, water, irrigation, technology, evaporation, moisture, water consumption.

Introduction. Global climate change has the following negative consequences in Uzbekistan. In particular, the increase in the evaporation rate of water as a result of the increase in temperature affects the reduction and shortage of water resources in the regions. As a result of environmental stress, the number of days without any precipitation during the year is increasing; due to the decrease in the level of underground water, the risk of repeated droughts is increasing due to the decrease in soil moisture, and the yield indicators obtained from crops are dropping sharply; the decrease in the volume of water flowing into the island sea accelerates the desertification of the river delta and the emergence of new desert areas on the dry seabed; pollination in large areas is increasing in atmospheric air; changes in anomalous phenomena such as warming and cooling are leading to the death of agricultural products and fruits [8].

Another big issue related to global climate change is related to fertilizers. As a rule, the fertilizer placed on the ground should increase the yield proportionally. The resulting glucose moves down the phloem in the stem to reach the root, and for this, water must move up through the stem tubes. A nitrate pump is activated so that the water goes up. So, the process of photosynthesis in cotton, an important crop for Uzbekistan, has accelerated several times. As a result, more glucose is being synthesized. Plants need more nitrate to transport it to the roots. Plant biomass increases at higher temperatures. True, the cotton is producing many bolls, but it is not ripening. The reason is that, according to the laws of fundamental plant physiology, the ratio of nitrogen to phosphorus must be maintained precisely for bud ripening [9].

Our scientists have proven that 12-14 centners of cotton can be grown per hectare due to the natural fertility of the soil. If fed in moderation with nitrogenous, phosphorous and potash fertilizers, the yield of cotton reaches 25-35 centners and more. Currently, the cotton crop absorbs 40 percent of the nitrogen fertilizer applied to the soil. Nutrient requirements vary depending on the stages of fetal growth. It needs food not only during the period of operation, but also during the formation of crop nodes [1].

As we mentioned above, the main problem related to global climate change is water scarcity. Uzbekistan ranked 25th out of 164 countries in the ranking of countries suffering

from water stress published by the World Resource Institute. According to research, Uzbekistan is included in the group of 27 countries with high water shortage. Among them are Afghanistan (27th place), Turkey (32nd place), Kyrgyzstan (38th place), Portugal (41st place) and Italy (44th place). Other Central Asian countries, Tajikistan and Kazakhstan, ranked 51st and 60th respectively, and are included in the group with moderately high water scarcity. Turkmenistan was listed in 15th place and was recognized as the country with the least amount of water in the region. Qatar (1st place), Israel (2nd place), Lebanon (3rd place), Iran (4th place) and Jordan (5th place) are in the top five of the rating as countries where the issue of water scarcity is very scarce [11] .

Currently, in order to eliminate the problem of water shortage, it is important to properly place agricultural crops and reduce water consumption during the growing season, increase the quality of irrigation, and use water-saving technologies.

In turn, the further improvement of the elements of irrigation technology presents a number of tasks to officials and scientists of the agricultural sector.

In order to prevent water shortage in the country's agrarian sector and rational use of existing water resources, the President of the Republic of Uzbekistan dated April 19, 2013 "On measures to further improve the land reclamation and rational use of water resources in 2013-2017" and Uzbekistan Resolution No. 176 of the Cabinet of Ministers of the Republic of June 21, 2013 "On measures to effectively organize the introduction and financing of the drip irrigation system and other water-saving irrigation technologies" clearly defines the tasks of effectively organizing the introduction of all water-saving irrigation technologies into production given, and requires conducting a number of scientific research works in this direction. In order to ensure the implementation of these decisions, an experiment was carried out in production conditions to study the difference between the methods of watering cotton with a black film between the rows and using flexible pipes compared to simple irrigation.

Research materials and method. The experiment was conducted in a 12-hectare cotton field belonging to the farm "Khudoinazar Amon" in Termiz district of Surkhandarya region. The mechanical composition of the soil of the experimental field is medium sand, barren meadow soil, underground seepage water is 3-3.5 m in early spring, and 1.5-2 m in the growing season.

In the experiment, the cotton variety "Hamkor" was planted, the area of the calculation is 50 m2, all observations, measurements and analyzes in the research work were carried out based on the methodological manuals of SoyuzNIXI (1981y) and UzPITI (2007y), agrotechnical activities were carried out in the system adopted on the farm.

Analysis and results. In the agrochemical composition of the soil of the experimental field, total nitrogen is 0.084-0.066%, total phosphorus is 0.142-0.116%, nitrogen in the form of nitrate is 18.4-12.3mg/kg, mobile phosphorus is 28.1-14.3mg/kg, and exchangeable potassium is 200-160 mg/kg and are considered to be soils with low supply of nutrients. In the experimental field, after cultivating cotton between the rows twice and softening it deeply, annual mineral fertilizers were given in full (on 28.07) and then a black transparent film was laid on the fields.

In the experiment, the following results were obtained when the effects of irrigation methods on the formation of furrows, their opening dynamics and productivity were

compared. In particular, in the control option 01.09. on average, 12.1 bolls were formed in one plant, and 7.3 bolls or 60.3% of the bolls were opened.

Tabele 1

The number of follicles and the dynamics of follicle opening

Options	01.09.2013 year				
	Yield elements, pcs	from that		Opening of boll	
		boll	flower	piece	%
irrigation-control in a simple way	18,7	12,1	6,6	7,3	60,3
watering with a black polyethylene film bed	12,3	16,5	2,8	12,8	77,5
irrigation using flexible pipes	19,6	14,7	4,9	9,5	64,6

Accordingly, the number of bolls in the options irrigated with the help of flexible pipes was 14.7 pieces on 01.09, of which 9.5 pieces or 64.6% were opened, in the options irrigated by laying a black polyethylene film on 01.09. the number of bolls is 16.5, of which 12.8 are opened or the opening of bolls is 77.5%, in this options the number of bolls is 4.1 more than the control option and the opening of bolls is 5.5 or 27.2% it was observed that it was more. (Table 1)

The experimental field was harvested twice, and the yield of the 3rd harvest was calculated biologically. The yield of cotton in the control option, irrigated from all furrows, is 32.2 centners, in the option irrigated with flexible pipes, it is 34.9 centners or 2.7 ts/ha more than the control option, and the highest yield is 39.7 centners /ha in the option irrigated with a black film on the furrows. (Table 2)

Also, due to the early formation and quick opening of the bolls, the amount of the first harvest was higher in the case of irrigation with a film on the fields compared to other cases.

Table 2

Effect of irrigation methods on the weight of crops and productivity

Options	Harvest, centners/ha			Yield, centners /ha	Percent increase in yield compared to the control.	
	Harvest 1	Harvest 2	Harvest 3		centners /ha	%
irrigation-control in a simple way	19,4	8,2	4,6	32,2	-	-
watering with a black polyethylene film bed	32,4	6,5	0,8	39,7	7,5	23,3
irrigation using flexible pipes	24,2	7,6	3,1	34,9	2,7	8,4

Conclusion. In the experimental field, a part of the mineral fertilizers was removed with wastewater in the conventionally irrigated options, while in the other optionss, the mineral fertilizers given differently remained in the field itself, as a result, the development of the

plant improved in these optionss, a large amount of crop elements were preserved compared to the control options, the ripening of bolls was accelerated and early ripening of the crop was ensured. In particular, the best result in terms of boll formation, early ripening and yield in cotton was observed in the option irrigated with a film on the edge and 7.5 centners /ha additional or 23% compared to the normal method, respectively, the yield in the option irrigated with flexible pipes compared to the control option. It was observed that it increased by 2.7 centners /ha or 8.4%.

References:

1. Avliyakulov M.A. The procedure of irrigation and nourishing cotton-plant variety "Bukhoro-102" on barren soils in southern zones. // Agrarian science bulletin journal of Uzbekistan. - Tashkent, 2010. - No. 1-2 (39-40). - P. 7-13
2.Avliyakulov A. A set of agro-measures system for obtaining abundant harvests from crops in the cotton-grain-cereal complex under conditions of water scarcity/ a collection of reports of the Republican scientific-practical conference. Tashkent, 2011.- 113 p.
3.Boltabaev Kh.Efficient technology in irrigation/ Kh.Boltabaev, A.Shokirov// Collection of lectures of the international scientific and practical conference. Tashkent, 2012.- 287 p.
4. Bezborodov Yu.G. Planning irrigation of agricultural crops on saline lands / Yu.G.Bezbordov, G.A.Bezbordov, M.Yu.Esanbekov // Conference of Agricultural Research Councils. Tashkent, 2011.- 10 p.
5.Ibragimov N.M. Ways to improve the efficiency of nitrogen fertilizers on cotton in irrigated soils of the sierozem belt. // Abstract of the dissertation of Doctor of Agricultural Sciences. - Tashkent 2007. - p. 27.
6.Ierna, A., Pandino, G., Lombardo, S., Mauromicale, G., 2011. Tuber yield, water and fertilizer productivity in early potato as affected by a combination of irrigation and fertilization. Agric. Water Manag. 101 (1), P. 35–41.
7.Xie, G., Han, D., Wang, X., Lv, R., 2011. Harvest index and residue factor of cereal crops in China. J. China Agric. Univ. 16 (1), P. 1–8 (in Chinese with English abstract)
8.https://kun.uz/uz/news/2021/08/12/iqlim-ozgarishi-va-insoniyat-global-isish-natijasida-yuzaga-kelishi-mumkin-bolgan-tahdidlar
9.https://yuz.uz/news/global-iqlim-ozgarishi
10.https://telegra.ph/KUNUZDA-YORITILGAN-MAQOLAGA-MUNOSABAT-02-18
11.[https://qalampir.uz/news/suv-tank-isligi-buyicha-davlatlar-reytingi-e-lon-k-ilindi-7103