Water Consumption and High Temperature Tolerance in Cultivation Using Different Irrigation Methods of Developed, New and Prospective Varieties of Cotton in the Conditions of Barren Grass Soils

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Abstract. The article presents the results of field experimental research on selection of regionalized, new and promising varieties of cotton suitable for root system drip irrigation (TS) and their maintenance based on drought-resistant and resource-efficient technologies in the conditions of barren soils of old irrigated meadows of Surkhandarya region. In the conducted research, cotton varieties Bukhara-102 (control), Sultan, Istiqlal-14, SP-1601, Surkhan-106 were watered before irrigation with respect to the limited field moisture capacity (ChDNS) in the control variants of 70-70-60 percent, drip irrigation. and in the experimental options of irrigation, field studies were conducted on irrigation at 65-70-65 and 70-75-65 percent. As a result, in the southern climatic region of our Republic, the optimal irrigation procedure, irrigation rate and seasonal irrigation rates, as well as indicators of high temperature tolerance, were studied in the irrigation of local regionalized, new and promising varieties of cotton.
Key words: barren grassland soils, cotton, irrigation, horizontal irrigation, drip irrigation, norm, useful temperature, soil moisture, calculation layer, technology, water saving, productivity.

1 Introduction

In recent years, consistent measures have been implemented in our country to radically reform the mechanisms of water resources use, to ensure their rational and efficient use, to support and encourage the introduction of water-saving technologies in economic sectors, as well as to improve the reclamation of irrigated lands. In this regard, rational use of land, water and natural resources in the field of cotton production today requires the development and introduction of resource-efficient new technologies for the production of abundant and high-quality cotton that meets the requirements of world standards at a low cost [1].

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In addition, all this becomes relevant with the proper use of the achievements of digital technologies and their implementation in practice, with the improvement of legal support mechanisms for this activity, as well as with the introduction of other support measures[2,3].

It should be noted that cotton is one of the most important and water-demanding agricultural crops in the world, and "taking into account that the global water deficit will be 40 percent by 2030", it is necessary to implement improved irrigation methods and measures that will save water when irrigating cotton. is enough

In order for cotton to grow and develop normally, it is necessary to meet the plant's demand for water and nutrients in the right amount and at the right time. The role of water in growing high and quality crops is very important. Water is necessary for the entire life of a plant, from seed germination to cotton ripening, it participates in the normal course of all life processes (biochemical and physiological)[4]. Cotton reacts differently to water deficit at different stages of the ontogeny process. In particular, the demand for water increases during cotton's water deficit, during the differentiation of buds on the stem and during the formation of generative organs, especially during the priming period. If the demand for water is not met during this development period of cotton, it will have a negative impact on the quantity and quality of the planned crop.

Also, as a result of the global climate change observed in recent years, the increase in the population, and the rapid development of economic sectors, especially the industrial sector, the demand for water resources is increasing every year[5].

Today, the average annual amount of water used by networks in our Republic is 51-53 billion cubic meters, of which 97.2 percent comes from rivers and streams, 1.9 percent comes from collector-conservation networks, and 0.9 percent comes from underground water. reduced by 20 percent compared to the limit [6].

In the conditions of this water shortage, it is necessary to reduce the amount of water used in agriculture, increase the efficiency of water use, and introduce modern water and resource-saving irrigation technologies in the cultivation of agricultural crops.

In most cases, water shortage leads to irreversible changes in the metabolism of plant cells, to a decrease in raw cotton and its quality. The maximum indicator of cotton's water consumption is considered to be the periods of early flowering and harvest, and during this period, the elements of the crop formed on the basis of lack of water are suddenly shed. In this case, it is necessary to try to preserve the number of crop organs in cotton as much as possible in the lower and middle layers through irrigation, to achieve a generative advantage over vegetative growth in the process of plant development. Water deficit during the cotton boll ripening period has little effect on cotton productivity.

The total water consumption of the field is formed by adding the amount of water used by the plant for harvesting and evaporation from the soil surface. If the total water consumption of the field is taken as 100 percent, 60-80 percent is consumed by plants (transpiration), and 20-40 percent is evaporation from the soil. The more the soil is cultivated and the agrotechnics suitable for the crop grown on it are used, the more water evaporation decreases, and the plant's water utilization rate increases. The average daily water consumption of the field varies during the growing season of cotton. At the beginning of the growing season, it is not high, then it gradually increases, and the highest value corresponds to the period of early accumulation of cotton elements, then it decreases again towards the end of the growing season. Accordingly, cotton's demand for water changes during the season, that is, 15-20 percent before carding, 60-65 percent during flowering-harvest, and 10-15 percent during the ripening period. It should be noted that this indicator varies to a certain extent depending on the mechanical composition of the soil, its location in genetic layers and melioration, that is, the depth and mineralization of seepage water, as well as the physiological demand for water of the cultivated cotton variety and other factors. Water is considered a necessary source of plant development from the first days, and depending on its type, origin and size, a plant seed that falls into the soil requires drinking a certain amount of water for germination. Cotton seed requires 90 percent water relative to its absolute dry weight for germination. Plant cells can develop normally only when they are sufficiently saturated with water, as a result of which the activities of life processes are coordinated in them, and the rest is used for the formation of some complex organic substances in the process of photosynthesis[7,8].

Plants contain up to 80-90 percent water. Plants evaporate most of this water during the growing season. According to observations, plants spend only 0.01-0.03 percent of the water they absorb during the entire vegetation period for the formation of their organism. The water requirements of plants vary according to their developmental stages. For example, cotton is water demanding during flowering and fruiting.

About 80-85 percent of the 4.3 million irrigated lands in our republic today are irrigated using the traditional drip irrigation method. Cotton care due to the increase in the consumption of fuel and lubricants, the decrease in labor productivity, the use of water for filtration in deep layers, the loss to evaporation from the field, and the loss of yield, in the case of edge irrigation of cotton, during the processing of cotton between the rows after each irrigation, leads to a violation of agrotechnology and a decrease in productivity. The main way to solve this problem is to use water wisely[9].

Taking into account the above, it is urgent to carry out scientific research aimed at the development of optimal periods, norms and procedures of irrigation, in order to satisfy the demand for water and determine the real consumption of cotton based on the need to ensure the efficiency of irrigated farming, increase its productivity, and implement the rational use of available resources.

2 Literature review

The results of the conducted analyzes show that effective technologies for irrigation of agricultural crops and technical means for their implementation have been developed in countries such as the USA, Israel, Turkey, China, and the Commonwealth of Independent States (CIS), where irrigation farming has developed. It is directly related to the agrotechnical measures used to increase the yield of cotton and improve the fiber quality, as well as the introduction of new innovative irrigation technologies in irrigation. This makes it possible to supply the plants with water and nutrient elements at the required level at the right time and in the required amount. Favorable conditions for plant growth and development are provided, and a high level of use of natural resources is ensured.

Many studies have been conducted by scientists to determine the duration and rate of watering cotton based on the lowest acceptable limit of soil moisture in the layer covering the root system of the plant. It is known from many sources that the moisture content of the soil before irrigation should be between 60-80 percent compared to the limited field moisture capacity (ChDNS) for cotton and its complex crops, especially technical crops.

According to A. Alekseev (1948), water is one of the main factors in the life of plants. The good growth and development of the plant and all the physiological processes that take place in it are fully realized when the cell's demand for water is fully satisfied [10].

S.N. Ryzhov (1953) conducted many scientific experiments on determining the water regime of the cotton plant under the conditions of different soils of Uzbekistan. According to them, the main part of the cotton root system is located in the 1 m layer of the soil, and depending on the season, the main part of the water is absorbed for transpiration from a depth of 30-90 cm. Therefore, 100 cm of soil during irrigation. It was found that the effect of moistening the lower layer after [11].

According to N. Bespalov and others (1992), water makes up 75-90 percent, even 98 percent of the plant organism. Cotton seed needs 90 percent of its dry mass to germinate [12].

Sh. Ibragimov et al. (1994) stated that as a result of their research, drip irrigation method is an ecologically safe method, and compared to drip irrigation, most of the mineral fertilizers do not leave the field and do not have a negative effect on the chemical composition of underground water. They also recognized that as a result of drip irrigation of crops, the efficiency of mineral fertilizers increases, the fertile layer of the soil is not washed away, and its water-physical properties are kept in an optimal state[13].

M. Khamidov (2008) stated that it is harmful to give cotton more water than it needs during the harvesting period, because the plant grows, leaves and buds with difficulty. The cotton bush thickens by rotting, and due to over-moistening and shading of the soil, many elements of production (cobs, knots) are shed.

G. Bezborodov et al. (2009) in the research conducted on the cultivation of cotton in the conditions of automorphic, typical gray soils of the Tashkent region on the basis of drip and drip irrigation technology, during the growing season, water consumption was on average 5673 m3/ha in drip irrigation and 3663 m3/ha in drip irrigation. 1810 m3 or 31.9 percent water saving per hectare was achieved when cotton was drip-irrigated compared to drip irrigation [14].

T.Djalilova and J.Matkarimov (2011) in the Khorezm region researches showed that drip irrigation of cotton saves twice as much water compared to drip irrigation, seasonal irrigation rate is 2883 m3/ha, cotton yield is 38.1 tons/ha. Also, according to the results of the authors' research on drip irrigation of cotton, it was observed that indicators such as mineral nitrogen fertilizers, fuel lubricants, and labor costs are saved [15].

R. Ikramov and S. Gapparov (2011) conducted studies on adapting the international FAO method to local conditions in determining the norms and deadlines for the implementation of this technology in the use of high-efficiency drip irrigation in the care of agricultural crops [16].

According to M. Sarimsakov (2006), when cotton is grown through the drip irrigation system on typical gray soils, the soil moisture before irrigation should be in the order of 75-75-60% in relation to ChDNS, during the growing season, 1-5-2, 2-5-2 system, 8 - It is recommended to irrigate 9 times, at the rate of 2800-3200 m3 per hectare [17].

Z. Artukmetov and H. Sheraliev (2006) stated that the yield of cotton is directly related to the level of water supply during its growth and development phases. The critical period of water demand is from flowering and harvesting to ripening. Cotton grown in the central climatic region of the republic is irrigated 2-3 times in the conditions of meadow-swamp soils with close (0.5-1 m) seepage water, and 6-8 times in gray soils located deep (3 m). In this case, it is recommended to provide soil moisture at a level of not less than 70-75-70 percent compared to ChDNS [18].

A. Haydarov (2006) according to the results of the research conducted in the conditions of the light gray soils of the Fergana Valley, when the cotton variety "Andijan-36" was irrigated in the order of 65-65-60% relative to ChDNS, the growth and development of the plant was accelerated and the yield and quality of cotton fiber was high. cultivation is possible [19].

According to the data of G. Bezborodov and others (2009), based on the experiments carried out in the conditions of the gray-meadow soils of Mirzachol, it is noted that irrigating cotton 2 times in the 0-2-0 irrigation system, the first irrigation is 500 m3 per hectare in the first ten days of July, the second time is 1000 m^3 It was determined that it should be given in the first ten days of August and that the length of the egate should be 200 m, and the water consumption should be carried out with a flow of 0.75 l/s [20].

The results of the research show that in our Republic, TS of agricultural crops was mainly conducted or introduced in small experimental areas as a test. In the conditions of Uzbekistan, the TS system has been applied in orchards and vineyards since 1977. During this period, TS systems were introduced and tested in a 1.5-hectare garden in Khiva district of Khorezm region, in a vineyard of 200 hectares in an experimental farm of SANIIRI in Zomin district of Jizzakh region, and in a 2.0-hectare orchard of Schroeder Research Institute of Horticulture, Viticulture and Winemaking.

Since the 1990s, work on the localization of drip irrigation system elements has been started in our republic. In particular, drip irrigation (TS) in the central experimental base of the Scientific Research Institute of Agrotechnology of Cotton Selection, Seeding and Cultivation (formerly UzPITI) in the automorphic conditions of typical gray soils, in the Jizzakh test site in the conditions of meadow gray soils, and in the conditions of gray-barren soils in Kyziriq district of Surkhandarè region.) efficiency of the system was studied. The results of the 10-year test-experiment conducted on the cotton TS show that, according to the biological characteristics of the variety, water saving during irrigation is on average 40-45 percent, labor productivity is reduced by 12-15 percent, and productivity is increased by 5-8 ts/ha on average.

The purpose and objectives of this research work, selected in the conditions of barren meadow soils of Surkhandarya region, are aimed at solving the above-mentioned important issues.

3 Materials and methods

Field experiments were conducted at the Surkhandarya Scientific Experimental Station of PSUEAITI. The study of scientifically based cotton irrigation procedure was carried out based on the following experimental system, in the area where the research was carried out, the irrigated meadow is covered with barren, salinity-prone soils, the seepage water level is around 1.5-2.5 meters, and the mineralization is 1-3 g/l. Field experiment 10 options are carried out in 3 returns, the length of the field is 100 m, the width is 0.90 m, the number of rows is 8, of which 4 are accounting rows, the rest are protective rows, the area of one option is 8x0.90x100=720 m2, the total area is 2160 made m^2.

In the experimental field, cotton varieties Bukhara-102, Sultan, Istiqlal-14, "SP-1601" and Surkhan-106 were planted and studied in comparison with drip irrigation (TS) and drip irrigation. In this, cotton cultivars were irrigated in different order according to soil moisture limited field moisture capacity (ChDNS). In particular, the irrigated area of egatlab taken as a control was irrigated at 70-70-60 percent, and the experimental options where TS was applied were irrigated in two different orders, 65-70-65 and 70-75-65 percent, compared to ChDNS. All observations, measurements and analyzes in the research were adopted at PSUEAITI (formerly UzPITI) "Metodika polevyx opytov s khlopchatnikom v usloviyax oroshenia", "Methods of conducting field experiments" UzPITI, T., 2007. conducted on the basis of methodological manuals, seasonal agrotechnical activities were carried out based on the activities adopted in the experimental farm.

Fig. 1. Scheme of construction and division of sectors of the drip irrigation system

It is known that Uzbekistan's land resources suitable for irrigated agriculture are more than water resources. Therefore, the only way to solve this imbalance is to establish proper and rational use of irrigation water based on the introduction of improved irrigation methods and techniques. In the rational use of water in crop irrigation, it is very important to correctly determine the amount of water consumption and the optimal rate of seasonal irrigation. Many scientists conducted research on this issue and gave their suggestions for calculation.

L.P. Rozov (1956) proposes the following equation for determining the potential irrigation rate:

$$M=P–m+K \tag{1}$$

Here: П- soil layer is the capacity of the field nma; m- water reserve in the aquifer before irrigation; K- water evaporation consumption during irrigation.

In the practice of scientific research and water management calculations, a number of methods are used to determine the seasonal water consumption norms in water use. A.N. Kostyakov (1951) gives the amount of water used by the plant, the yield index and the coefficient of water demand in the equation:

$$E=Y\cdot ey \text{ m}^3/\text{ha} \tag{2}$$

Here: Y- Productivity required for the crop (ts/ha); ey- water demand coefficient (m^3 of water per 1 t of crop);

To determine the indicator of the seasonal irrigation rate, it gives an equation in tune:

$$M=E–P_o\text{-}\Delta W+E_o \tag{3}$$

Here: M- seasonal irrigation rate, m^3/ha; E- total water consumption, transpiration; P_o- seasonal rainfall; E_o- shine from the soil surface; ΔW- use of soil moisture.

$$\Delta W = W_o - W + K \quad (4)$$

Here: W_o- moisture reserve at the beginning of the period of operation; W- moisture reserve at the end of the period of operation; K- ground water is the amount of water that can rise to the active layer of the soil through capillaries in a nearby area.

Later, the author proposes to determine the irrigation rate according to the wet capacity of the field:

$$M = (Wn - Wm) \cdot 100 \cdot d \cdot h + K \quad (5)$$

Here: Wn- field moisture capacity of the soil, percent; Wm- soil moisture before watering, percent; D- volumetric mass of soil, g/cm^3; H- calculation layer, cm; K- water evaporated during irrigation, m^3/ha

Detailed information on the rate of water consumption of the cotton plant and indicators of seasonal irrigation rates are given in the works of S.N.Ryzhov, V.M.Legostaev and V.E.Eryomenko (1948, 1951, 1967). They calculate the seasonal irrigation rate according to the following equation:

$$M = M_{ph} + P - \Delta W - V \quad (6)$$

Here: M_{ph}- physiological water consumption rate, m^3/ha; P- seasonal soil surface radiance m^3/ha; ΔW- seasonal rainfall; V- the amount of water used from the soil moisture reserve m^3/ha.

M.P. Mednis (1973) offers to calculate the seasonal irrigation rates according to the following equation, comparing the results of many years of research:

$$E = U \cdot K_o \, K_p \quad (7)$$

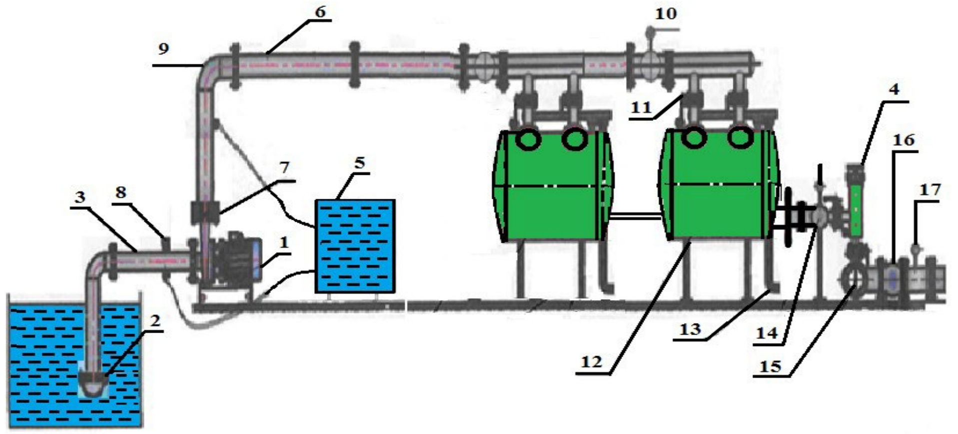
Here: E- total water consumption (seasonal irrigation rate); U - required yield for this crop (ts/ha); K_o- optimal coefficient of water demand (when the groundwater is deep, the rate of irrigation is 900-1100 m^3/ha and 700-900 m^3/ha when the groundwater is close); K_p- a determining factor that takes into account the actual irrigation rate, the irrigation technique used, the leveling of the area, the water permeability of the soil and other organizational issues.

In our research, S.N. Ryzhov's equation was used to calculate the rates of cotton irrigation:

$$M = (Wdns - Whn) \cdot 100 \cdot \gamma \cdot h + K \quad (8)$$

Here: Wdns- field moisture capacity of the soil, percent; Whn- soil moisture before watering, percent; γ- volumetric mass of soil, g/cm^3; h- the mathematical layer, cm; K- water evaporated during irrigation, m^3/ha (10-15 percent)

Drip irrigation is one of the promising ways of economical and efficient use of water, increasing the productivity of agricultural crops, mixing mineral fertilizers, growth regulators (stimulators) with water. In our republic, the drip irrigation system has been tested in various natural and climatic conditions, experimental production and production sites. In our country, water has been valued as a source of life since ancient times, water is considered sacred and used sparingly. In fact, today it is impossible to imagine agricultural production without water. Therefore, effective and targeted, economical use of water is even more relevant in the current market economy. Because the cultivation of cotton, grain and other products, which are the main part of agricultural production, is closely related to water supply. Drip irrigation system is an irrigation system designed to supply the required amount of water to the root layer of the plant, compared to other irrigation methods, irrigation water is evenly distributed across the field based on the needs of the crop and water is supplied to the plant evenly. Excess moisture does not occur in the soil. As a result of excess moisture in the soil when watering Egatlab, it has a negative effect on the development of the plant. In drip irrigation, it is possible to maintain the humidity of the root layer of the crop at the same level.



1. Pump. 2. Return valve. 3. Suction pipe. 4. Mechanical filter. 5. Container of mineral fertilizer solution. 6. Network from the pump. 7. Return valve. 8. Funnel. 9. Driver pipe. 10. Manometer. 11. Zatvor Du 100 (jumrak). 12. Sand filter. 13. Mud washing pipe. 14. Distribution pipe. 15. Collecting pipe. 16. Water meter (vodomer). 17. Manometer.

Fig. 2. General scheme of the drip irrigation system

Until now, the method of drip irrigation was used mainly in closed areas, mainly in tiplits. Today, as a result of the signing of a number of decisions on the implementation of the drip irrigation system in large areas, especially for the irrigation of cotton, as well as the introduction of subsidies, the areas of drip irrigation are expanding.

In this irrigation method, the efficiency of the irrigation method increases due to the fact that mineral fertilizers are delivered dissolved in the soil together with water using a special fertilizing device.

4 Results and discussion

Field experiments were conducted in the fields of Surkhandarya ITS of the Scientific Research Institute of Cotton Selection, Seeding and Cultivation. Surkhandarya region is located in the southernmost part of Uzbekistan and is surrounded by mountains on three sides. It is bordered by Zarafshan ridge mountains from the north, Kuhitang from the west, and Bobotog from the east. Amudarya flows through the south of the province. Termiz District, where the research facility is located, is located at 310 meters above sea level, and is considered one of the hot harem regions. The average annual air temperature varies from +16.2 0C to +18.0 0C, and in some years it reaches 19.2 0C. The average temperature during the growing season is around +25.5 +26.7 0C, in the summer months it reaches +29.0 +33.0 0C, the average daily temperature is +36.0 +38.0 C, the absolute highest temperature + 46.9 +48 0C, the lowest is +20.0 0C. Dry days can reach up to 90 days. The total effective temperature is +3052 0C. The total positive temperature during the year is 6100 0C [Babushkin, 1957, 1968]. Duration of warm days is 266-272 days. Annual rainfall is 127-160 mm, 30-40 mm during the growing season. The air is extremely dry, with an average annual relative humidity of 30-40 percent. There are days when relative humidity drops to 8-12 percent, and in winter it rises to 62-66 percent. During the year, there are more than 200 days with relative humidity below 30 percent. In this region, the number of days suitable for cultivating crops in the field is 290-305, and due to the extreme heat of the dry air, the intensive evaporation process is many days.

A dry hot southwesterly wind characteristic of this region is called "Afghan wind", garmsel blows continuously with great force for 2-3 days. This situation reaches 35-37 days a year. Besides, dry winds blow for a long time.

In the south of the oasis, the lowest temperature does not fall below +20C in winter. The inactive period for the development of plants is rarely observed in winter and does not exceed 10-15 days. The annual number of days with average temperatures is as follows: 216 days above +90C, 321 days above +50C, 44 days below 50C, 7-8 days below 00C. The average daily minimum temperature is +20C. In the desert region, the first autumn frosts fall on November 2-24, and the last spring frosts end on March 2-17.

It should be noted that the increase in air temperature has a negative effect on the growth and development of agricultural crops, especially cotton, which is often blown by the hot garmsel (Afghan wind) in July and August.

It has been observed that the decrease in relative humidity of the air causes rapid drying of the top layer of the soil, and in some years it causes the elements of the cotton crop to drop.

At the Surkhandarya research and experimental station, in the control variants irrigated with cotton, 6 irrigations were carried out during the period of operation, the one-time irrigation rate was 1100-1335 m3/ha, and the seasonal irrigation rate was 7290 m3/ha. In the object of this study, the soil moisture before irrigation of cotton in TS was 8 times in 65-70-65 percent options, and 11 times in 70-75-60 percent. According to average options, the rate of one-time irrigation was 400-600 m3/ha, the interval between irrigations was 6-16 days, the duration of TS was from 6.0 hours to 10.5 hours, depending on the rate of irrigation. The seasonal TS norm before irrigation was 4815 m3/ha in options with 70-75-60 percent soil moisture, and 4635 m3/ha in options with 65-70-65 percent. All the factors studied in the research, including the selection of cotton varieties and its irrigation with drip irrigation technology, had different effects on the growth and development of the plant. In the experiment, in order to study the effect of different irrigation methods on the growth and development of cotton, phenological observations were made on 50 identified plants in June, July, August, and early September in each option and returns.

Tolerance of cotton varieties to high temperature (harmsel). It is known that every summer in the southern regions of the Republic, the air temperature rises to a high level, and by this time, the hot Garmsel wind blows and causes great damage to agricultural crops.

Along with determination of water consumption during drip irrigation of regionalized, promising and new varieties of cotton in areas covered with barren meadow soils of Surkhandarya region, observations were also made on the effect of high air temperature and harsh wind on the plant, which negatively affects cotton in the summer months. In cotton care, high agrotechnical measures were used together with the application of TS. As a result, it was achieved that the soil moisture was maintained at a physiologically acceptable level in the root layer, the formation of generative organs in cotton varieties accelerated, and more preservation of crop elements was observed. In order to further reduce the effect of high temperature and heat and to prevent the increase of sucking insects, retardant (entogeny) was applied 3 times in order to control the development (ratio) of vegetative and generative organs of cotton. Also, chemical treatment (suspension) was given to the plant through leaves at the rate of 15 g/ha in the budding phase of cotton vegetation, 45 g/ha in flowering and 90 g/ha in the ripening-opening of bolls.

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Table 1. Total water content of cotton field

№	Indicators	Compared to ChDNS in irrigation, 70-70-60 percent	In drip irrigation In relation to ChDNS, 65-70-65 percent					In drip irrigation Regarding ChDNS, 70-75-65 percent)				
		Bukhara-102 (control)	Bukhara-102 (control)	Istiqlol-14	Sulton	Сурхон - 106	SP-1607	Bukhara-102 (control)	Istiqlol-14	Sulton	Surkhan - 106	SP-1607
3	Amount of soil moisture used, m^3/ha	893	1026	1026	1026	1026	1026	941	941	941	941	941
4	The amount of atmospheric precipitation during the period of operation, m^3/ha (Multiannual average)	330	330	330	330	330	330	330	330	330	330	330
5	Irrigation rate, gross m^3/ha	6930	4090	4090	4090	4090	4090	4285	4285	4285	4285	4285
6	The amount of water rising from the syzot waters to the root layer, m^3/ha	1200	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7	Total water consumption, m^3/ha	9353	6446	6446	6446	6446	6446	6556	6556	6556	6556	6556
8	Cotton yield ts/ha	40,1	42,8	43,2	44,7	44,3	36,0	43,8	44,5	45,1	42,8	36,2
9	Total water consumption for 1 ts harvest, m^3	233,2	150,6	149,2	144,2	145,5	179,0	149,7	147,3	145,4	153,2	181,1
10	Seasonal amount of water used to produce 1 ts of cotton, m^3	172,8	95,6	94,7	91,5	92,3	113,6	97,8	96,3	95,0	100,1	118,4

This year, due to the extremely high temperature and hot winds that occurred in June-July, it was found that combs, red flowers, buds and small cysts were shed. In the field experiment, it was noted that 56 percent of the total formed yield elements were shed when irrigated in the Bukhara-102 (control) variety, and 46 percent of the formed yield elements were shed in this variety, 39 percent in the Istiqlal-14 variety, and 46 percent in the Sultan variety. In thin-fiber varieties Surkhan-106 and SP-1607, the spillage of yield elements is much less and did not exceed 11% on average.

As a result of the use of TS in the maintenance of cotton varieties on barren grassland soils, a significant reduction in the loss of yield elements under the influence of garmsel was achieved (10-17% in medium-fiber varieties, 43% in thin-fiber varieties).

In TS, the number of pods at the end of September 1 of the season compared to the control (11.6 pieces) was 2.3 pieces in the Bukhara-102 variety, 6.2 pieces in the Istiklal-14 variety, 2.0 pieces in the Sultan variety, and 10.4 pieces in the Surkhan-106 variety. units, it was observed that 13.3 units were more preserved in SP-1607. It was also noted that the opening of pods was 0.6-5.9 grains higher in medium-fiber varieties and 0.4-1.9 grains in fine-fiber varieties compared to the control.

Productivity was 31.1 t/ha in the control with regular irrigation, 36.3 t/ha in the Bukhara-102 variety, 42.8 t/ha in the Istiklal-14 variety, 42.2 t/ha in the Sultan variety, 38 in the Surkhan-106 variety. 4 ts/ha, in SP-1607 variety it was 41.4 ts/ha. As a result, a higher yield of 6.3-11.7 t/ha of medium-fiber varieties and 7.3-10.3 t/ha of thin-fiber varieties was achieved compared to the control used in production.

5 Conclusion

The following conclusions were reached as a result of the scientific research conducted on the development of effective agrotechnologies in the care of cotton varieties with a new regionalized and promising root system suitable for drip irrigation, resistant to deficiency and germs in the conditions of the barren meadow soils of Surkhandarya region.

It was found that the use of drip irrigation (DS) system in the maintenance of zoned, new and promising varieties of cotton is an effective agrotechnical measure. As a result, it was observed that this method evenly moistens the soil along the edge, has a positive effect on the growth and development of plants.

For the southern region of the republic, the root system is suitable for TS, it is resistant to high air temperature, hot (hot) winds, it has the characteristic of low water demand compared to the varieties planted in the main areas, hydromorphic, barren meadow with underground water at a height of 1.5 - 2.0 m Istiklal-14 variety of cotton with medium fiber was selected as a plastic variety, which gives a stable high yield under the soil conditions. According to the results of the analysis of the data obtained in the researches, drip irrigation of cotton was evaluated as an effective, water-saving, high-yielding, innovative and promising method for commercialization, and this method is recommended for use in barren grassland soils of the Republic.

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