WATER IRRIGATION RATES FOR COTTON VARIETIES AT DIFFERENT PHASES IN DIFFERENT LEVELS OF SALINITY IN AREA

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Annotation. *This article provides information on irrigation standards for cotton grown in our republic in fields with different levels of salinity.*

Key words: *yield, plant, cotton, sysot, irrigation, phase, moisture, light soil, sand, mixed sandy, sandy loam, heavy sandy loam soil, field length, field slope, fallow, reclamation, bed, furrow, push, pipes, equipment irrigation, hose, sprinkling, drip irrigation, subsurface irrigation, furrow irrigation, flexible siphon and pipes.*

At a meeting of President Shavkat Mirziyoyev on July 27, 2022, dedicated to the issues of caring for cotton and ensuring productivity in conditions of extremely high air temperatures, the month of "30 days of long harvest" was announced. Menstruation lasted from July 15 to August 15. During the month, special attention was paid to watering cotton varieties.

Water is very important during the cotton growing season. Therefore, if there is enough water, all phases of cotton proceed normally. If there is not enough water, it stops growing, bearing fruit, begins to wither and even dries up. Wilted cotton drops its stems and flowers. The water requirement of cotton crops depends on climatic conditions, soil moisture capacity, fertility, depth of infiltrating water,

salinity level, agricultural technology used and the biological characteristics of the cultivated cotton variety.

Irrigation rates (the amount of water used per irrigation) are determined taking into account the periods of cotton development. The irrigation rate is 500-600 m^3/ha before cotton flowering on light (sandy and sandy loam) soils, 700-800 m^3/ha during the flowering-budding phase and 600 m^3/ha before cotton flowering on medium sandy soils. 700 m^3, 800-900 m^3 during the bud flowering phase, 700 m^3 on heavy sandy soils with deep water infiltration before cotton flowering, 1000-1100 m^3 during the bud flowering period, fresh should be 700-800 m^3 in wet and partially saline soils, where seeping waters are located relatively close.

The timing of watering cotton can be determined by the external signs of the plant: before flowering, in the hottest time of the day (at 14-15 hours), if the leaves do not lose their elasticity, that is, their midrib does not crack when bent, if so, then it is necessary to water the field . The fact that most of the leaves are starting to turn black also means the cotton needs to be watered.

Before cotton blooms, the plant's need for watering is determined by the level of soil moisture. To do this, the soil is dug out from a depth of 15-20 cm, given a round shape by hand and thrown onto the ground from a height of 1.5-2 m. If the soil does not spread, it means there is enough moisture; if it spreads, it means you need to water it quickly.

Irrigation can be divided into three stages (see Fig. 1):

The first stage is the period before flowering.

The second stage is the period of flowering and fruiting.

The third stage is the maturation period.

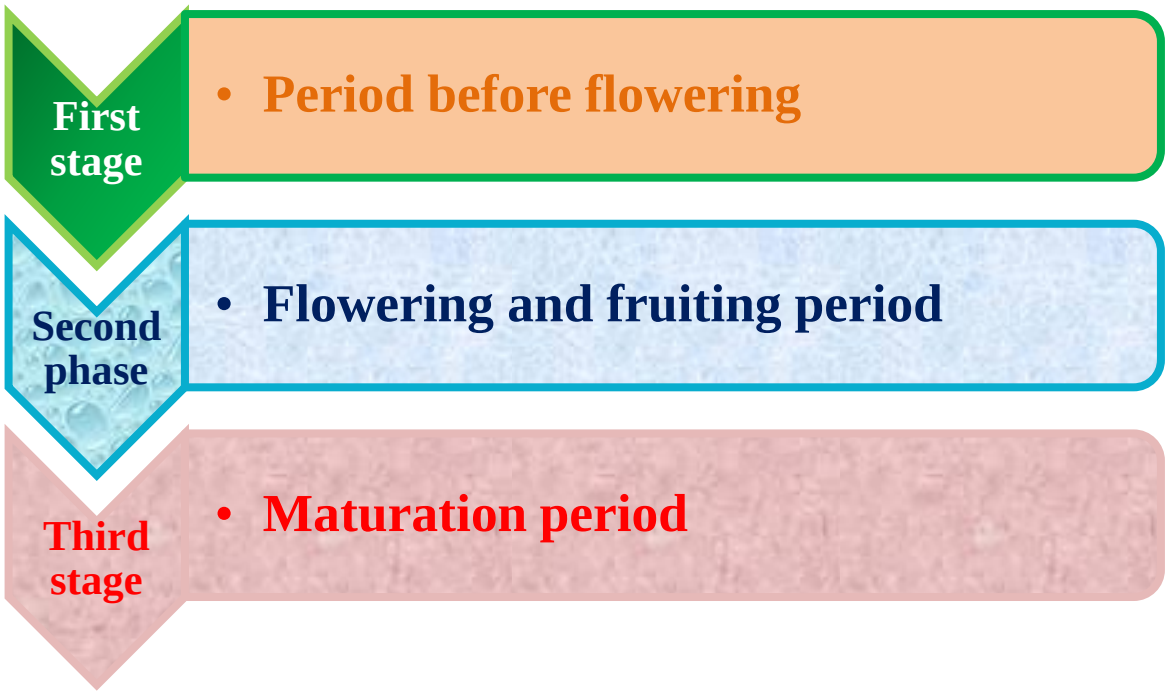

Figure 1. Three stages of cotton irrigation

It is convenient to determine the concentration of plant leaf juices when we quickly and easily determine the duration of watering. To do this, during the day (from 10:00 to 17:00), the third leaf of the plant is cut from the growing point, squeezed by hand, the juice is extracted and the plant is measured in the field for 15-20 minutes using a hand-held refractometer. Check the dry matter content.

Cotton is watered if the leaf juice contains 8-9% dry matter before flowering, 10-11% during flowering and 12-13% during ripening.

If the first flowers appear on 8-9 branches of the crop during the cotton flowering period, on 7 branches of the crop in late July and early August, and on 4-5 branches of the harvest at the end of August, this means that the cotton has not had time to receive water. Irrigation rates for cotton depend on the physical properties of the soil, the depth of infiltrating water, the timing of cotton development and other indicators.

In the pre-flowering phase of cotton, the duration of watering should be 12-14 hours on light soils, 16-18 hours on medium and heavy soils, and 24-30 hours during flowering and fruiting.

To control the irrigation rate in the field, it is necessary to determine the depth of moisture. 50-70 cm before flowering, 80-120 cm during flowering and fruiting and 40-60 cm in the ripening phase, depending on the depth of groundwater.

In order to carry out high-quality irrigation and reduce water consumption in this process, it is necessary to pay great attention to the length of the egates and the amount of water entering each furrow.

In general, the watering schedule for cotton must be set correctly, that is, relative to the limited field moisture capacity, the humidity in most cases is 65-70-65, 65-75-60, normal plant development. achieved. In this irrigation system, the cotton bushes are full-fledged, the length of the main stem is 90-100 cm, the distance between joints is 5-7 cm. Under such conditions, we see that the fruiting bodies of the plants are collected in large quantities. It keeps the pods on the bushes, which leads to a high yield of plant fiber. The volume of cotton irrigation (irrigation order) depends on soil type, groundwater level and climatic conditions. On soils with a layer of sand-gravel mixture, cotton is watered only 9-12 times, including 2-4 times before flowering, 5-6 times during the flowering and fruiting period, 1 time during the ripening period. Water 2 times. On heavy loamy soils with deep loam and sizot, water only 7-9 times, including 2 times before flowering, 4-6 times during the flowering period, 1 time during the ripening period.

Water the cotton plant 2-4 times, including 1 time before flowering, 2-3 times during the flowering and fruiting period, on fresh and partially saline lands and when groundwater reaches the surface (1-2 m deep), during the ripening period, it is recommended not to water.

On lands with deep groundwater, in the first two irrigations it is necessary to irrigate cotton fields with a distance of 60 cm between rows, and on lands with close groundwater – watering intermittently. It is important to irrigate cotton fields efficiently and save water. Areas with large and medium slopes must first be irrigated with a constant flow of water, and after the water reaches the other

end of the banks, the flow rate should be reduced by 2-3 times to prevent erosion process.

Irrigation of cotton fields at night is also of particular importance. If cotton fields are watered at night, the moisture will rise quickly and evenly, the plant will be able to drink enough water, and most importantly, the elements of the crop will not be scattered. In this case, irrigation with local fertilizers has a good effect.

By the decision of the President of Uzbekistan on February 24, the strategy for water resources management and development of the country's irrigation industry for 2021-2023 was approved. According to this, water shortages during the irrigation season in Uzbekistan are due to measures aimed at saving water, irrigating fields with drip irrigation or searching for careful and effective ways of water-saving measures, plans and their application in practice. .

Considering the above, given that water is of great importance during the growing season of cotton, it is necessary to regularly irrigate the fields. Therefore, if there is enough water, the life of cotton is normal. With a lack of water, it stops growing, bearing fruit, withers and even dries up. And the withered cotton drops its bolls and flowers. The water requirement of cotton crops depends on climatic conditions, soil moisture capacity, soil fertility, depth of infiltrating water, salinity level, agricultural technology used, and biological characteristics of the cotton variety being planted.

Irrigation rates (the amount of water used per irrigation) are determined taking into account the stages of cotton development. Irrigation rate 500-600 m^3/ha before cotton flowering, on light (sandy and sandy loam) soils, during flowering-budding 700-800 m^3/ha, on medium sandy soils before cotton flowering 600-700 m^3, 800 -900 m^3 during the bud flowering period, 700 m^3 on heavy sandy soils with deep water seepage before cotton flowering, 1000-1100 m^3 during the bud flowering period, fresh and partially saline soils with close seepage, should be 700-800 m^3 (see Table 1). Cotton transpiration (evaporation of water through leaves, this figure is 500-800) during the foliage phase uses 10-12 m^3/ha of water per day. As a result of an increase in the number of leaves and

their surface during development, the water consumption for transpiration per hectare increases during the day, including 30-35 m^3/ha; during the budding phase it increases to 80-120 m^3/ha during the flowering and fruiting period and 30-40 m^3/ha in the ripening phase is reduced to m^3/ha.

The duration of watering the cotton plant is determined by the external signs of the plant: before flowering, if the leaves do not lose flexibility during the hottest time of the day (at 14-15 hours), that is, if the midrib does not become numb and cracks when folded, you will have to water the field. The fact that most of the leaves have begun to darken is also a sign that the cotton has reached the water.

Table 1.

Irrigation rates by cotton development phases, m^3/ha

№	Soil types and depth of infiltration	Irrigation standards		
		Cotton growing phases		
		Period before flowering	Flowering-fruiting period	Maturation period
1	The soil is meadow, the level of infiltration water is 1 m.	500-600	700	-
2	Meadow soil, water level 2 m.	600-700	800	-
3	According to the mechanical structure, the soil is light to medium sandy loam-meadow, the level of infiltration water is 2-3.5 m.	600-700	800-900	600-700

4	The soils are mixed with sand, grit and some gravel.	500-600	700-800	500-600
5	According to the mechanical structure of the soil, they are classified as medium- and heavy-loamy; filtration waters lie deep.	700-800	1000-1100	600-700

Before cotton blooms, the plant's need for watering is also determined depending on the level of soil moisture. The soil, taken from a depth of 15-20 cm, is manually given a round shape, and if it does not crumble when thrown to the ground from a height of 1.5-2 m, this indicates sufficient moisture.

Determining the concentration of plant leaf sap is very useful for quickly and easily determining the duration of watering. To do this, during the day (from 10:00 to 17:00), cut off the third leaf from the growing point of the cotton wool, squeeze it with a hand press, separate the juice and after 15-20 minutes it is measured directly using a hand-held refractometer. Dry matter content is determined on the field itself (see Table 2).

For example, cotton is watered if before flowering the leaf juice contains 8-9% dry matter, during flowering - 10-11%, during ripening - 12-13%.

Table 2.

Recommended watering procedures

Field slope soil permeability	**Field slope soil permeability**	**At a distance between rows of 0.6 and 0.9 m, edge length, m. Water consumption,**	**At a distance between rows of 0.6 and 0.9 m, edge length, m. Water consumption,**

		sec/1, at row spacings of 0.6 and 0.9 m.		**sec/1, at row spacings of 0.6 and 0.9 m.**	
		0,6	0,9	0,6	0,9
Large 0.007 – 0.01	Strong	80-100		0,3-0,4	
On average 0.003 – 0.06.	-//-	60-70		0,4-0,6	
Total 0.003	-//-	50-60	100-150	0,7-0,8	1,2-1,5
Large 0.07-0.01	Average	110-120		0,2-0,3	
On average 0.003-0.06.	-//-	100-110		0,3-0,4	
Total 0.003	-//-	80-100	150-170	0,4-0,6	0,8-1,0
Large 0.07-0.01	Weak	120-150		0,1-0,2	
On average 0.003-0.06.	-//-	110-120		0,2-0,4	
Total 0.003	-//-	100-110	170-200	0,4-0,6	0,6-0,8

At the beginning of cotton flowering, the first flower appears on the 8-9th productive branch, at the end of July and early August - on the 7th productive branch, and at the end of August - on the 4-5th productive branch, cotton is not watered. Irrigation rates for cotton depend on the physical properties of the soil, the depth of infiltration, the stages of cotton development and other indicators.

In the period before cotton flowering, the duration of watering should be 12-14 hours on light soils, 16-18 hours on medium and heavy soils, and 24-30 hours during flowering and fruiting.

To carry out high-quality irrigation and save water in this process, it is necessary to pay great attention to the length of the egates and the amount of water entering each furrow.

In general, the irrigation regime for cotton should be set correctly, that is, the humidity relative to the limited field moisture capacity is in most cases 65-70-

65, 65-75-60, and normal plant development is achieved. In this case, the cotton bushes are full-bodied, the height of the main stem is 90-100 cm, the distance between the joints is 5-7 cm. In such conditions, the plants are distinguished by a large number of fruiting bodies. They keep the bolls full, allowing for high cotton yields. How many times cotton is watered (watering order) depends on soil type, groundwater level and climatic conditions. On soils with a layer of sand and gravel, cotton is watered only 9-12 times, including 2-4 times before flowering, 5-6 times during flowering and fruiting, 1-2 times. On heavy sandy soils with deep loams and heavy loamy soils, water only 7-9 times, including 2 times before flowering, 4-6 times during flowering and 1 time during ripening. Watering cotton 2-4 times, including 1 time before flowering, 2-3 times during flowering and fruiting, in areas where fresh and partially saline groundwater is on the surface (depth 1-2 m), as well as during maturation, it is recommended not to water.

In lands with deep groundwater, it is necessary to irrigate fields from a distance of 60 cm in the first two irrigations, and in lands where groundwater is close, it is necessary to irrigate fields at regular intervals. It is important to irrigate cotton fields efficiently and save water. Areas with large and moderate slopes should be irrigated first with a constant flow of water, and after the water reaches the other end of the banks, the flow should be reduced by 2-3 times to avoid erosion.

To control the irrigation rate in the field, it is necessary to determine the depth of moisture. Depending on the depth of groundwater, it is better to moisten 50-70 cm before flowering, 80-120 cm during flowering and fruiting, and 40-60 cm during the ripening phase.

Mechanization and automation of irrigation is carried out using siphon pipes, flexible pipes (hoses), portable semi-flexible and rigid pipes, portable irrigation systems.

To use siphon pipes, the water level in the ditches must be 10-15 cm above the field surface.

Flexible irrigation pipes made of nylon reclamation material have special drainage outlets in the range of 0.6-0.9 meters, which can be adapted to supply a certain amount of water to each egat. Such pipes should be laid along the edge of the field and used for irrigation. If the pipe is laid in this ditch, it will not move and the water will flow evenly. To prevent the pipe from becoming dirty and covered with dirt, it is necessary to install the pipe at its mouth, and put its holes at the edges. Such flexible pipes are recommended for use in areas with slight to moderate slopes made of reinforced concrete and closed irrigation fountains.

In formerly irrigated fields, water is pumped into flexible pipes using a small pressure pump. Rigid pipes also have drainage in the range of 0.6-0.9 meters.

Flexible and rigid pipes are best used primarily in cotton fields in the foothills. Aluminum pipes have a diameter of 150 mm and consist of short sections. Saving 20-30% of water is achieved when irrigating cotton using a scientifically based system, at an acceptable rate and using mechanization methods; cotton blossoming is accelerated by 5-7 days.

The introduction of scientific and technical innovations in irrigation is very important for Uzbekistan. DDA-100 M “Volzhanka”, which has shown its advantages in irrigation, is widely used in the national economy. But achievements in cotton growing are not significant. Along with sprinkler irrigation, drip irrigation is widely used in world cotton growing. The advantages of this method are that the total water consumption is 8-10 times less compared to the furrow method, while the number of irrigations increases several times. Mineral fertilizers can be given in solution simultaneously with water. The number of weeds is low and the number of treatments between rows is reduced.

The future is expected to reflect the introduction of underground irrigation, that is, by laying pipes underground.

List of used literature:

1. E.T. Shaikhov et al. Cotton growing. Textbook, Tashkent, “Labor”, 1990.

2. M. Muhammadjonov, A. Zokirov. Cotton agricultural technology, Tashkent, 1995.

3. A.I. Schleicher. Cotton industry, Tashkent, 1958.

4. Schleicher A. et al. Laboratory and practical classes on cotton growing, Tashkent, "Mekhnat", 1980.

5. Oripov R., Sanakulov A., Islamov I. Practical and laboratory classes in cotton growing. Tamannum, Tashkent, 2010.

6. Report of the cotton industry, Tashkent, "Mekhnat", 1990.

3. Team of authors. Intensive technology of cotton plant cultivation. Tashkent, 1990.

4. Oripov R. Course of lectures on cotton growing, Samarkand, 2005.

5. Oripov R., Ostonov S. Cotton growing (textbook), Samarkand, 2005.

6. R. Oripov. Course of lectures "Cotton". Samarkand. 2016.

7. Sulaimanov B., Teshaev Sh. "Cotton directory" Scientific and Technical Publishing House, 2016.

8. www.agro.uz4.https://agroinspeksiya.uz/