УДК: 633.41+631.6

IRRIGATION OF COTTON BY SUB-IRRIGATION METHOD

Тухташев Б.Б
ТашГАУ

Annotation: *In recent years, Uzbekistan has experienced a certain deficit of irrigation water, which can largely be compensated by utilizing return, drainage, and underground waters. In the second and third variants, irrigation amounted to 900 m³/ha, while during cotton ripening it was 800 m³/ha. In these studied cases, the total irrigation norm was 2400 m³/ha. Cotton yield in the first variant was 31.0 c/ha, in the second variant 29.8 c/ha, and in the third variant 28.7 c/ha.*

Keywords: *sub-irrigation, irrigation, cotton, variant, soil, vegetation, drainage.*

Аннотация: *Зовур-коллектор сувларини олдини тўсиб ундан субирригация мақсадида суғориш долзарб. Ғўзани 1-3 суғориш эгатдан, 2-суғориш субирригация усулида амалга оширилганда 29,8 ц/га. ва ниҳоят учинчи вариантда 1 сув эгатдан 2-3 суғоришлар субирригация усулида ўтқазилганда 28,7 ц/га пахта ҳосили олинди.*

Калит сўзлар:*субирригация,суғориш.ғўза,вариан,тупроқ,вегетация, зовур.*

Аннотация: *В последние годы в Узбекистане вызвло определенный дефицит в поливной воде, восполнить который в значительной мере можно за счет привлечения на орошение возвратных, дренажных и подземных вод. Поливная на втором и третей варианте составил по 900м3/га, при созревание хлопчатника оно составил 800 м3/га.В этих случах нами изучаемых вариантах оросительная норма составил 2400 м3/га. Урожайность хлопчатника на первом варианте составил-31,0 ц/га,во втором варианте-29,8 ц/га,на третом варианте-28,7 ц/га.*

Ключевые слова:*субиригация,орошения, хлопчатник. вариант, почва, вегетаци, дренаж.*

Relevance of the Topic: It is known that in many countries of the world with arid climates and insufficient surface water resources, underground water is widely used for irrigating agricultural crops.

In recent years, Uzbekistan has faced a certain deficit of irrigation water, which can largely be compensated by utilizing return, drainage, and underground waters. The search for additional sources of irrigation, with the continuous expansion of irrigated areas, represents an important task.

When a water intake dam is created, the level of drainage water rises, and with good soil capillarity, water moves through capillary flows, moistening the calculated soil layer.

In light and medium-textured soils, it noticeably advances, moistening the required layer. Irrigation in years with limited water supply by this method has been termed sub-irrigation.

In sub-irrigation, the mineralization of drainage water should not exceed 1.5–3.0 g/l. With high mineralization of drainage water, cotton irrigation is alternated with fresh

water. Sub-irrigation of cotton and alternating it with fresh water significantly reduces the number and rate of irrigations, as well as prevents the loss of mineral fertilizers, including nitrogen. Irrigation of cotton during the vegetation period by this method considerably saves fresh water in years with limited water supply (1,3).

Conditions of the Experiment:

This study was conducted at the training farm of Tashkent State Agrarian University (TashGAU) in the Middle Chirchik district of Tashkent region. The object of research was the zoned medium-fiber cotton variety Namangan-77. The soil is hydromorphic, with groundwater occurring at a depth of 1.5–2.0 m. Water measurements were carried out using a Cippolette weir (50 cm).

Scheme of the Field Experiment:

Irrigation Methods	Irrigation Norm
Variant 1 (Control)	moisture deficit in the 0–70 cm soil layer
Variant 2 1–3 furrow irrigation with fresh water, 2 – sub-irrigation;	moisture deficit in the 0–70 cm soil layer
Variant 3 1 furrow irrigation with fresh water, 2–3 sub-irrigation;	moisture deficit in the 0–70 cm soil layer

Research Results:

In the first variant (control), cotton irrigation was carried out according to the method adopted in the farm. In this case, pre-irrigation soil moisture was not taken into account. In the second and third variants, vegetative irrigations were conducted based on the moisture deficit in the active soil layer, ranging from 70–80–60% of field capacity. In all experimental variants, irrigation was not carried out before cotton flowering; during the flowering–fruit formation stage, 2 irrigations were applied, and during the ripening stage, 1 irrigation was conducted.

To study soil moisture before and after each irrigation, soil samples were taken at every 10 cm depth. During the vegetation period, cotton was irrigated 3 times in each experimental variant. In the first variant (control), irrigation was performed with fresh water using the furrow method. In the second variant, the first and third irrigations were carried out with fresh water using the furrow method, while the second irrigation was performed with drainage water using the sub-irrigation method (2,3). In the third variant, the first irrigation was carried out with fresh water through furrows, while the second and third irrigations were conducted using the sub-irrigation method.

Taking into account pre-irrigation soil moisture, in the second and third variants the irrigation norm was 700 m^3/ha, while in the control variant irrigation was carried out without considering pre-irrigation soil moisture, amounting to 800 m^3/ha.

In the first variant (control), where cotton was irrigated with fresh water through furrows, the yield of cotton was 31.0 c/ha. In the second variant, where the first and third irrigations were carried out with fresh water using the furrow method, and the second irrigation was performed with drainage water by the sub-irrigation method, the cotton yield was 29.8 c/ha. In the third variant, where the first irrigation was conducted with fresh water through furrows, and the second and third irrigations were carried out using the sub-irrigation method, the yield obtained was 28.7 c/ha.

The data obtained confirm that under conditions of irrigation water deficit in dry years, the use of drainage and underground waters—taking into account their mineralization—can save fresh water. The missing amount of irrigation water can be replenished from the collector-drainage network. In the second variant, the second irrigation of cotton was carried out from the collector-drainage network using the sub-irrigation method. In the third variant, according to the experimental scheme, the second and third irrigations of cotton were carried out from the collector-drainage network using the sub-irrigation method. Under these conditions, the mineralization of collector-drainage water should not exceed 1–3 g/l; otherwise, it leads to secondary soil salinization.

Based on this, in the second variant during the cotton vegetation period, 900 m³/ha of fresh water was saved, and in the third variant 1700 m³/ha of fresh water was saved. It can be noted that when irrigated with fresh water, cotton yields in variants 1 and 2–3 were higher by 2.2–2.3 c/ha, but at the same time, from each hectare, 900–1700 m³/ha of irrigation water was saved.

REFERENCES:

1.Isaev S., Suvonov B. “Efficient irrigation regimes for cotton and study of its total water consumption.” Proceedings of the International Scientific-Practical Conference of UzPITI. Tashkent, 2006, pp. 31–33.

2.Shamsiev A., Bezbarodov G.A., Esanbekov Yu. “Water-saving irrigation technology for cotton and winter wheat.” Proceedings of the International Scientific-Practical Conference of UzPITI. Tashkent, 2006, pp. 315–317.

3.Tukhtashev B., Mirzaev Sh., Jamuratov B. “Irrigation of cotton by sub-irrigation method under hydromorphic soil conditions.” Issues of rational use of water and land resources in the agrarian sector and effective application of innovative technologies to improve soil fertility. Proceedings of the Republican Scientific-Practical Conference. Gulistan, 2011, pp. 24–25.