Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8

EFFECT OF FEEDING PROCEDURE IN DRIP IRRIGATION OF COTTON ON PLANT GROWTH AND PRODUCTIVITY

Juraev A. K. 1
1 Doctor of Agricultural Sciences of the Department of Irrigation and Melioration of Bukhara State Technical University

Kudratov M. R. 2
2 Phd. Doctoral Student of the Department of Irrigation and Melioration of Bukhara State Technical University

Abstract
The article investigates the influence of different feeding methods on the growth and productivity of the Bukhara-8 variety of cotton under drip irrigation, conducted in the conditions of alluvial soils within the long-irrigated meadows of the Bukhara region. The nutrient composition of the normally fed variant is detailed as follows: N-200; P2O5-150; K2O-100.

Keywords: Cotton, experimental system, drip irrigation, feeding procedure, cotton growth, cotton yield.

Introduction

The rational use of available water resources worldwide, water conservation, and the widespread implementation of innovative water-saving irrigation technologies are of great importance. Only 2.0% of the Earth's water resources are fresh water reserves, of which 79% are permanent glaciers, 20% are groundwater, and only 1.0% are lakes and river waters making them extremely scarce for human needs. In cotton cultivation, the use of biostimulants, application of liquid fertilizers in drip irrigation, and the use of water-soluble mineral fertilizers not only help save resources but also serve as critical tasks in increasing crop yield and improving quality. In cotton-producing countries around the world, scientific research is being conducted to ensure uniform moisture distribution in the active soil layers where plant root systems develop by applying advanced water- and resource-saving technologies such as drip, sprinkler, and subsurface irrigation. These methods help prevent excessive filtration, reduce runoff losses, and minimize physical evaporation, thereby promoting the efficient use of water and other resources during seasonal irrigation.

Improving and implementing new modern innovative water-saving technologies to obtain high and quality yields from crops is a key priority globally, especially in the context of climate change. It is essential to develop and widely apply advanced irrigation methods under these changing environmental conditions. In recent years, due to the increasing water scarcity in the Republic, the implementation of water-saving irrigation technologies within the framework of developing an "organic agriculture" system and ensuring stable and high yields from agricultural crops on saline soils has become increasingly relevant. In our Republic, out of a total of 4.3 million hectares of

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

irrigated land, nearly 2 million hectares more than 40% are saline to varying degrees. In Bukhara region, for example, nearly 86% of the 275.5 thousand hectares of irrigated land is affected by salinity. Therefore, in order to mitigate the negative impacts of water scarcity on saline lands and ensure stable and high yields from agricultural fields, it is crucial to implement water-saving irrigation technologies and carry out scientific research aimed at developing scientifically-based irrigation and fertilization regimes.

Research Materials and Methods

Based on the urgent issues mentioned above, field experiments were conducted from 2020 to 2022 to study the fertilization regimes for drip irrigation of the cotton variety "Bukhara-8" in the alluvial meadow soils of Bukhara region, which have been traditionally irrigated. The soil of the experimental site is alluvial meadow soil with a medium sandy-loam mechanical composition.

The experiment included a total of 6 variants, each repeated 3 times. Variant 1 was accepted as the control and was furrow irrigated. Before irrigation, the soil moisture was maintained at 70-75-65% of the field capacity. The fertilization of cotton in the control variant was applied at rates of N-250; P_2O_5-180; K_2O-100 kg/ha. In the other variants, fertilization rates were as follows: Variant 2: N-125; P_2O_5-100; K_2O-60 Variant 3: N-150; P_2O_5-125; K_2O-60 Variant 4: N-175; P_2O_5-150; K_2O-90 Variant 5: N-200; P_2O_5-150; K_2O-100 Variant 6: N-250; P_2O_5-175; K_2O-125 In all drip-irrigated variants, before irrigation, soil moisture was maintained at 75-80-65% of the field capacity.

Analysis and Results

Experiments conducted to study the effect of fertilization regimes based on drip irrigation technology on the growth, development, and yield of cotton, as well as on the technical indicators of fiber quality, determined the actual plant density before harvest. During the experiments, the actual plant density was measured in the cotton fields before harvesting, and the data obtained from observations are presented in Table 1. According to the table data, across all variants and repetitions, the plant density ranged from 94.1 to 99.1 thousand plants per hectare over the years. In the furrow-irrigated variant where nutrients were applied at rates of N-250; P-180; K-100 kg/ha, the actual plant density was 94.1 thousand plants per hectare.

In the drip-irrigated fertilization regime with nutrient application at N-200; P-150; K-100 kg/ha and pre-irrigation soil moisture maintained at 75-80-65% of the field capacity (Variant 5), the actual plant density reached 99.6 thousand plants per hectare. This was 5.5-5.6 thousand plants per hectare higher than the control variant.

Table 1 Actual seedling thickness in experimental field of cotton feeding procedure based on drip irrigation technology

Options	Repetitions			Average
	I	II	III	
1	94,0	94,0	94,1	94,1
2	98,0	98,2	98,2	98,1
3	98,3	98,1	98,2	98,2
4	98,5	98,6	98,8	98,6
5	99,5	99,7	99,7	99,6
6	99,5	99,4	99,3	99,4

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

When analyzing the cotton yield obtained from the scientific research field, it was found that in the control variant (Variant 1), where furrow irrigation was applied with pre-irrigation soil moisture at 70-75-65% of the field capacity and fertilization rates of N-250; P-180; K-100 kg/ha, the average cotton yield was 37.6 centners per hectare.

In contrast, in Variants 2 and 3, where drip irrigation was applied with pre-irrigation soil moisture maintained at 75-80-65% of the field capacity and fertilization rates of N-125; P-100; K-60 kg/ha and N-150; P-125; K-60 kg/ha respectively, the cotton yield was higher, reaching 42.9 to 43.5 centners per hectare. This yield was 5.3 to 5.8 centners per hectare greater than the control variant.

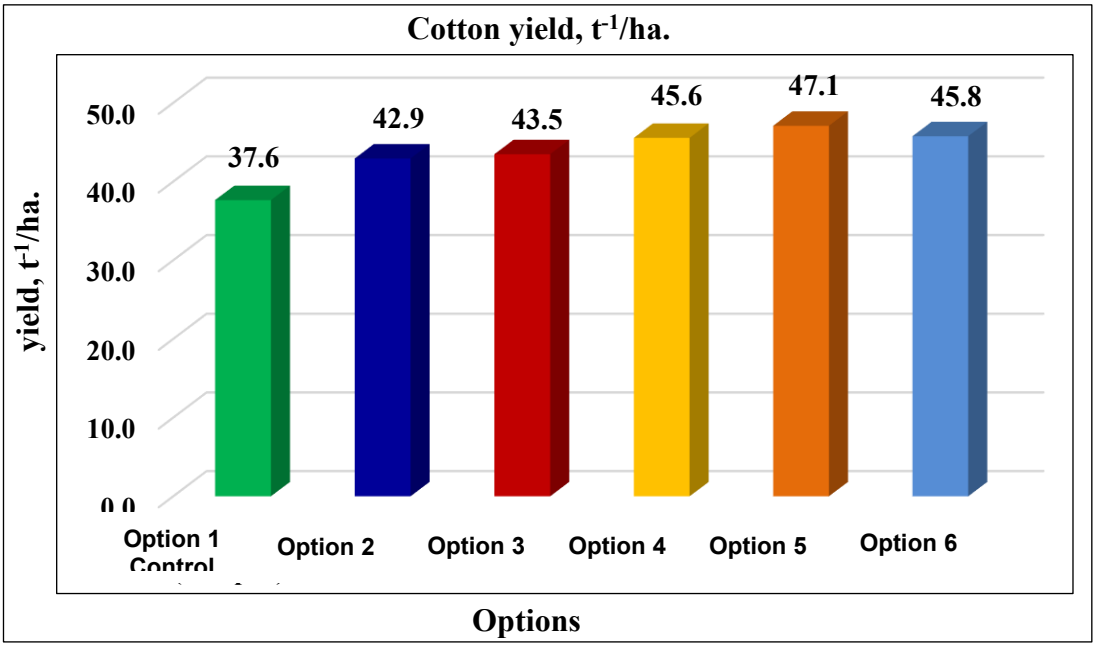

Figure 1. Effect of feeding procedure on cotton yield in drip irrigation technology.

In the experiments, cotton yield in Variant 5, where drip irrigation was applied with pre-irrigation soil moisture maintained at 75-80-65% of the field capacity and fertilization rates of N-200; P-150; K-100 kg/ha, reached 47.1 centners per hectare. This yield was 9.4 centners per hectare higher compared to the control variant.

Similarly, in Variant 4, where drip irrigation was used with fertilization rates of N-175; P-150; K-90 kg/ha, the cotton yield was 45.6 centners per hectare, which is 8.1 centners per hectare higher than the control variant.

Conclusion

Based on the above data, it can be concluded that the field experiments conducted to study the fertilization regimes for drip irrigation of the Bukhara-8 cotton variety in the alluvial meadow soils of Bukhara region showed that the best fertilization regime under drip irrigation was observed in Variant 5. In this variant, fertilization was applied at rates of N-200; P_2O_5-150; K_2O-100 kg/ha. Under these conditions, the actual plant density reached 99.6 thousand plants per hectare, which is 5.5–5.6 thousand plants per hectare higher than the control variant. The cotton yield in this variant was 47.1 centners per hectare, exceeding the control variant by 9.4 centners per hectare.

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

References

1. Decree No. PF-6024 of July 10, 2020 "On approval of the Concept of Water Management Development in the Republic of Uzbekistan for 2020-2030"
2. Resolution of the President of the Republic of Uzbekistan No. PP-144 dated March 1, 2022 “On measures to further improve the introduction of water-saving technologies in agriculture”
3. Mirzajonov K.M., Nurmatov Sh.N., Zokirova S.Kh. Factors for high yield // Journal "Patachilik va donchilik". Tashkent, 2001. Issue 1, pp. 8-12.
4. Khamidov M.Kh., Shukurlaev K.I., Begmatov I.A., Mamataliev A.B. “Water use in agriculture.// Tashkent. 2014. p. 68.
5. Khamidov M. i dr. Особенности орошениа селско хозяйственных культур в низовях Амудари -// Tashkent. "Science", 1992. p-164.
6. Nerozin S.A., Stulina G.V. Опыт применения капельного орошения хлопчатника в централной азии. тезисов докладов респ. конференции посвященной 70-летию SANIIRI. Tashkent, 1995, p. 47.
7. Avliyakulov M.A., Durdiev N.H., Avazova M., Asrakulov A. Optimal irrigation period and duration of cotton // Collection of materials of the international scientific and practical conference "Current problems and prospects for development of agricultural crop genetics, selection, seed production and agrotechnologies". PSUEAITI-Tashkent, 2018. pp. 395-399.

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8