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YIELD OF SWEET CORN AS A SECOND CROP UNDER THE CONDITIONS OF KHOREZM REGION

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Abstract

This article presents the data obtained on the effect of different irrigation methods and irrigation regimes at different pre-irrigation soil moisture levels on the yield of sweet corn grown as a second crop after winter wheat under the conditions of the Khorezm region.

Keywords: Khorezm region, saline soils, drip irrigation, sprinkler irrigation, sweet corn, yield.

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Introduction

Today, sprinkler irrigation of sweet corn is one of the widely used methods in modern agriculture, especially in regions where water scarcity is observed. This method maintains soil moisture at a stable level and provides higher yields compared with traditional irrigation methods. Therefore, developed agricultural countries pay great attention to the study and improvement of sprinkler irrigation methods. Considering that global climate change, including the shortage of water resources, is expected to become more serious in the near future, it is important to conduct research on the application of water-saving technologies and the development of optimal irrigation methods and regimes for different soil and climatic conditions.

In the Republic of Uzbekistan, special attention is being paid to the modernization and rapid development of agriculture, saving water and energy resources, applying innovative resource-saving agrotechnologies, ensuring sustainable production, further strengthening food security, and expanding the production of environmentally friendly products. As a result of diversifying agricultural production, introducing modern and highly efficient technologies, and strengthening the material and technical base of farms, more than 10 million tons of grain are currently produced in the Republic.

In particular, within the framework of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020–2030, special attention is paid to “...maintaining and increasing soil fertility by introducing effective practices for the use of water and water resources based on soil and climatic conditions.”

The principles of theoretical mechanics and mathematical relationships were used in the development of the sprinkler irrigation design. The use of the developed sprinkler system improves the uniformity of rainfall distribution across the irrigated area. This sprinkler operates due to the reactive forces created by raindrops discharged from the sprinkler openings installed at the ends of the

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sprinkler wings. A nearly rectangular irrigation trajectory is achieved through the use of gears in the design of a unit operating on the principle of a planetary mechanism [44; p. 7].

In recent years, this irrigation method has become widespread and effective. Thus, in Russia in 1965, the share of sprinkler irrigation did not exceed 7% of all irrigation methods. Currently, more than 50% of irrigated lands are irrigated using sprinkler irrigation [22; p. 184, 27; p. 352]. In their scientific studies on water-saving irrigation technologies, A. Arifjanov, L. Samiev, D. Abduraimova, and X. Jalilova considered that wind and evaporation affect the efficiency of sprinkler irrigation systems [19; pp. 32–42].

Research Methods

During the field experiments, the agrophysical and agrochemical properties of the soil, as well as phenological observations of the plants, were studied using the methodological guidelines “Methods for Conducting Field Experiments” of the Uzbek Research Institute of Plant Protection and the methodological manual “Methods of Agrophysical, Agrochemical and Microbiological Studies in Irrigated Cotton-Growing Areas.”

The obtained data were subjected to variation and statistical analysis based on B.A. Dospekhov’s methodology “Methodology of Field Experiment.”

Research Results

During the experiment, the effects of irrigation methods and fertilizer rates on the growth and development of sweet corn and its yield were determined.

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Table 1 Growth, Development and Yield of Sweet Corn (2025)

Var	Sowing date	Emergence , days	Plant height, cm	Number of leaves, pcs.	Leaf length, cm	Leaf width, cm	Number of leaves, pcs.	Height of ear formation cm	Plant density, thousand plants	Yield, c/ha
Furrow conventional irrigation										
1	25.06	8-10	187	12	69	6.1	10	151	60-65	71
2	25.06	8-10	213	10	71	6.2	11	156	60-65	75
3	25.06	8-10	191	10	76	6.3	10	158	60-65	80
4	25.06	8-10	223	12	77	6.4	11	157	60-65	74
5	25.06	8-10	198	12	70	6.6	11	166	60-65	79
6	25.06	8-10	227	14	81	6.7	12	170	60-65	86
Sprinkler irrigation										
7	25.06	8-10	185	11	70	6.8	9	147	60-65	70
8	25.06	8-10	217	13	74	6.5	10	150	60-65	74
9	25.06	8-10	189	9	69	6.7	9	155	60-65	79
10	25.06	8-10	220	14	72	6.5	12	155	60-65	72
11	25.06	8-10	192	12	74	6.7	12	157	60-65	71
12	25.06	8-10	224	10	76	6.9	13	161	60-65	84
Drip irrigation										
13	25.06	8-10	199	11	72	7.1	13	153	60-65	74
14	25.06	8-10	224	14	76	7.2	14	159	60-65	78
15	25.06	8-10	218	15	73	7.2	12	161	60-65	81
16	25.06	8-10	237	13	79	7.3	13	158	60-65	77
17	25.06	8-10	238	14	74	7.1	14	160	60-65	86
18	25.06	8-10	244	13	88	7.9	15	165	60-65	97

The analysis of the obtained results showed that, under the irrigation regimes of **65–65–60% of FC (field capacity)**, the yield of sweet corn in the furrow-irrigated treatment was **71 c/ha**, while the yield under sprinkler irrigation was **70 c/ha**, and under drip irrigation it was **74 c/ha**.

The highest results in the experimental field were obtained under the **75–75–70% of FC** irrigation regime. In the furrow-irrigated treatment, the yield reached **86 c/ha**, while under sprinkler irrigation it was **84 c/ha**. Under drip irrigation, when the pre-irrigation soil moisture was maintained at **75–75–70% of FC**, the yield reached **97 c/ha**.

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The yield indicators for all treatments of the experiment can be seen in the data presented in **Table 3.22**.

Conclusion

Under the production conditions of the farm where sweet corn was grown as a second crop, a significant decrease in water infiltration capacity was observed. Under the farm-adopted irrigation regime of **65–65–60% of FC**, water infiltration in treatments 1 and 2 was **0.17–0.16 mm/min**, while in treatment 6 of the experiment it was **0.17 mm/min**. The amount of water infiltrated over 6 hours was **608 m³/ha**.

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