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EFFECTS OF IMPLEMENTATION OF WATER-SAVING IRRIGATION TECHNOLOGIES IN COTTON GROWING ON SOIL SALINITY REGIME

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Abstract
This article discusses the impact of water-saving technologies on soil salinity during the cultivation of the "Bukhara-8" variety in the conditions of the Bukhara region. During the experiments, it can be seen that the amount of salts in the soil is relatively low and a favorable environment is created for the growth of the plant in the case of watering cotton by laying a black polyethylene film on the soil.

Keywords: Bukhara-8 variety of cotton, hydrogel granule, black polyethylene film, amount of salts, chlorine ion, dry residue. Soil moisture before watering.

Introduction

Today, in the context of global climate change, water resources, their increasing scarcity, and the expansion of salinization, desertification, and degradation of irrigated lands, a number of scientific research works are being conducted abroad and in our country on the use of water-saving irrigation technologies in the cultivation of cotton and winter wheat on saline soils, and agrotechnologies for the cultivation of winter grain crops. In order to reduce the negative consequences of water scarcity in the conditions of saline soils of the Bukhara region, it is possible to increase the efficiency of water-saving irrigation technologies, improve the reclamation condition of saline soils, and regulate the water-physical properties of the soil and the salt regime, thereby creating the opportunity to obtain stable and high yields from agricultural crops.

Materials and methods of research

Scientific research was conducted on the impact of water-saving technologies on the level of soil salinity in the cultivation of the cotton variety “Bukhara-8” in the conditions of the Bukhara region. In the 1st variant of the scientific research, the technology of traditional surface irrigation of cotton was introduced, and irrigation was carried out at a soil moisture content of 70-75-65% relative to the maximum allowable soil moisture content. Also, in the 2nd variant of the experiments, drip irrigation technology was introduced, and irrigation was carried out at a soil moisture content of

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75-80-65% relative to the maximum allowable soil moisture content. In the 3rd variant of the experiments, where the soil moisture before irrigation was 70-75-65% relative to the maximum allowable moisture content, irrigation was carried out at a level of 70-75-65% of the soil moisture content, while in the 4th variant of the studies, irrigation was carried out by mixing hydrogel granules into the soil. Studies on the introduction of water-saving technologies in the cultivation of the Bukhara-8 variety of gooseberry were carried out on soils with a medium loamy and moderately saline mechanical composition. Studies on the introduction of water-saving technologies in the cultivation of the Bukhara-8 variety of gooseberry were carried out in 2021-2023.

Analysis and results

During the experiments, at the beginning of the growing season, before planting cotton, the amount of chlorine ion in the plow layer (0-40 cm) was equal to 0.009%, in the sub-plot (40-70 cm) layer, this indicator was 0.010% and in the 1-meter layer, it was 0.010%. By the end of the actual growing season, the amount of chlorine ion in the control, i.e., variant 1 of the experiments, was 0.032% in the plowed (0-40 cm) layer, 0.027% in the under-ploughed layer, and 0.028% in the 1-meter layer. In option 2, the amount of chlorine ion in the soil was equal to 0.026% in the driving layer, 0.030% in the sub-driving layer, and 0.028% in the 1-meter layer. Compared to the control option, the amount of chlorine ion accumulated in the driving layer was 0.006% less, but it was found that it increased to 0.003% in the sub-driving layer.

By the end of the experiments, in option 1, where cotton was irrigated in the traditional way, the amount of chlorine ions in the soil was 0.032% in the driving layer (0-40 cm) and 0.028% in the 1-meter layer, while in option 2 of the experiments, the amount of chlorine ions in the soil was 0.026% in the driving layer and 1 meter layer It was 0.028%. Also, in cotton cultivation, in the 3rd option, where a black film was laid on the ground and watered, by the end of the growing season, the amount of chlorine ion in the soil was 0.026% in the driving layer (0-40 cm), and 0.025% in the 1-meter layer. It turned out that compared to the control option, less chlorine ion was accumulated in the 3rd option by 0.006% and in the 4th option by 0.003%. In the 4th variant of the experiment, that is, in the field where cotton was irrigated by mixing the hydrogel crystal into the soil, the amount of chlorine ion in the soil was 0.029% in plowing and 1-meter layers.

When studying the effect of water-saving irrigation technologies on the amount of dry salt in the soil in the cultivation of cotton, the amount of dry residue in the soil was equal to 0.165% in the plowed (0-40 cm) layer, 0.176% in the under-ploughed (40-70 cm) layer, and 0.170% in the 1-meter layer. By the end of the growing season, the amount of dry residue in the soil was equal to 0.422% in the plowed layer (0-40 cm) in the control, i.e. conventionally irrigated option 1, in the sub-ploughed layer it was 0.373% and in the 1-meter layer it was 0.383%. (Figure 1).

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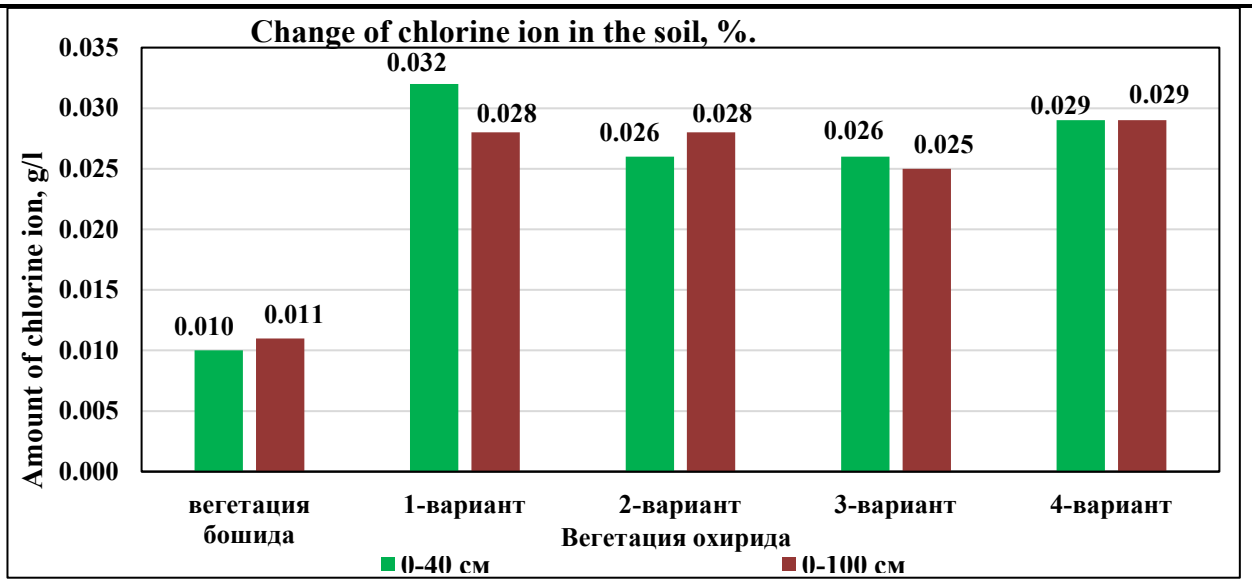

Figure 1. Effects of water-saving irrigation technologies on soil chloride ion content.

Also, in option 2, where drip irrigation technology is introduced in cotton cultivation, the amount of dry residue in the soil is 0.365% in the plowed layer (0-40 cm), 0.388% in the under-ploughed layer and 0.377% in the 1-meter layer, compared to the control option, it is 0.057% in the plowed layer and 1-meter layers It can be seen that it is 0.015% higher in the driving layer, while it is reduced to 0.005%. In the course of scientific research, in cotton cultivation, in the 3rd option, in which a black polyethylene film was laid on the ground and watered, the amount of dry residue in the soil was 0.362% in the plowed layer (0-40 cm), 0.354% in the under-ploughed layer, and 0.355% in the 1-meter layer, corresponding to the control option. 0.060; 0.019; It was found that 0.028% was collected less. In option 4, in which hydrogel granules were mixed into the soil and watered, the amount of dry residue in the soil at the end of the growing season was 0.392% in the driving (0-40 cm) layer of the soil, 0.378% in the sub-driving layer and 0.381% in the 1-meter layer, compared to the control option, it was 0.030 in the driving layer and under it can be seen that 0.002% less is accumulated in the layer.

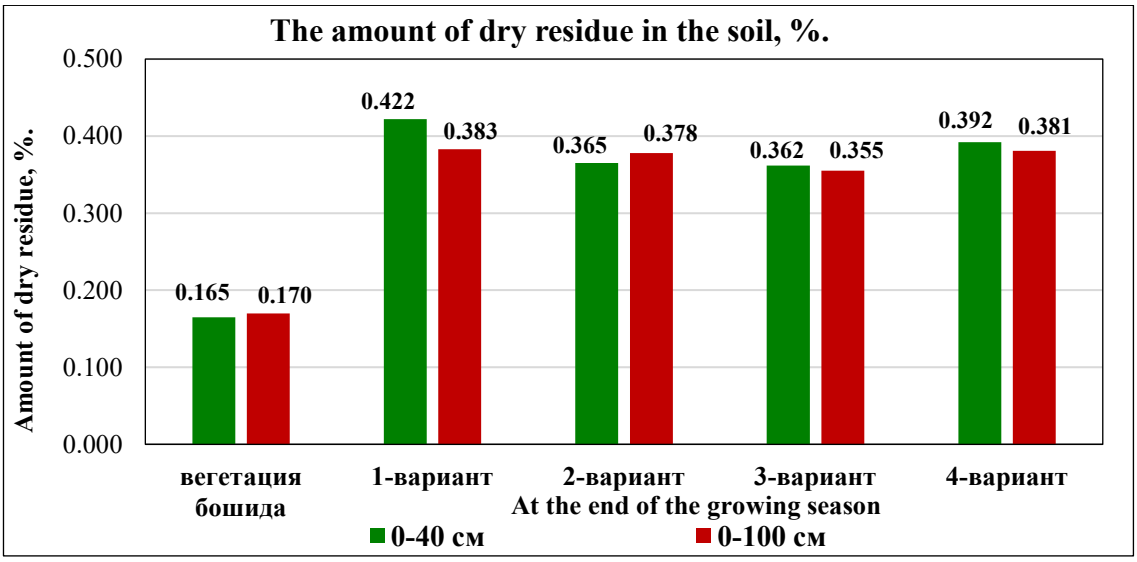

Figure 2. The effect of water-saving irrigation technologies on the amount of dry residue in the soil.

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In the course of scientific research, in the 3rd option, in which black polyethylene film was laid on the ground and irrigated during scientific research, the amount of dry residue in the soil was 0.362% in the plowed layer (0-40 cm), 0.354% in the under-ploughed layer, and 0.355% in the 1-meter layer, corresponding to the control option. 0.060; 0.019; It was found that 0.028% was collected less. In option 4, in which hydrogel granules were mixed into the soil and watered, the amount of dry residue in the soil at the end of the growing season was 0.392% in the driving (0-40 cm) layer of the soil, 0.378% in the sub-driving layer and 0.381% in the 1-meter layer, compared to the control option, it was 0.030 in the driving layer and under it was found that 0.002% less was collected in the layer.

Conclusions

By the end of the growing season, the amount of chlorine ions in the soil in the plowed layer (0-40 cm) was 0.026%, in the 1-meter layer, and the amount of dry residue, respectively. 0.362% in the (0-40 cm) layer, and 0.355% in the 1-meter layer, respectively, chlorine ion is 0.006%, and 0.060 in terms of dry residue; 0.028% was collected less. In the conditions of moderately saline soils of the Bukhara region, compared to the traditional method of irrigation, the growth of the plant and the intensity of salt accumulation in the soil were less intensive in the conditions of irrigation with a film on the soil.

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