

CHANGE OF WATER RESERVE IN SOILS OF AREAS SUBJECTED TO IRRIGATION EROSION

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Annotation: This article presents data on the changes in soil moisture storage during the vegetation period of cotton in areas prone to irrigation erosion under the conditions of typical sierozem soils of the Tashkent region, when it is irrigated through conventional furrows with a small slope (0.25°) and perpendicular to the slope.

Keywords: soil, irrigation erosion, irrigation, furrow, slope, transverse (perpendicular), growing season.

Introduction

In world cotton farming, it has been found that the effective use of irrigation to protect the soil from erosion and the preservation of the fertile soil layer increases the cotton yield by 8-10 centners per hectare. In this regard, intensive methods of agricultural production, research on improving modern agrotechnologies for the effective use of land and water resources in the context of water scarcity and the deterioration of the meliorative state of lands in the process of irrigation erosion are relevant. According to K.M. Mirzajonov and Sh.N. Nurmatov in 1994, irrigation erosion affects the formation of productive elements of gray soils. In particular, as the degree of soil leaching increases, the amount and reserves of humus and nutrients decrease, the pH index increases, and the mechanical structure becomes heavier. If the average annual soil layer washed away during irrigation of cultivated areas is 1 cm, and the bulk density of this layer is 1.0-1.2 g/cm³, it was found that 100-120 tons of soil particles are washed away from one hectare of land. Analysis of the washed-out product showed that 800-1000 kg of humus (humus), 80-100 kg of nitrogen, the same amount of phosphorus, 100-120 kg of potassium and other macro and microelements are washed away from one hectare of land. In our studies to determine the effect of irrigation through sloped and shallow-slope ditches on soil erosion processes, the main reason for soil erosion is the uniform supply of water to the ditch and the reduction of the water velocity in the ditch by changing the ditch configuration, and the development of a ditch irrigation system on a scientific basis, as a result of which mineral fertilizers are applied according to the level of soil supply, thereby ensuring their effective use.

The Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020–2030 sets out as one of the important tasks "...improving the reclamation condition of irrigated lands, rational and economical use of water resources and, on this basis, achieving sustainability of agricultural production." In this regard, scientific research on saving irrigation water by providing adequate water in irrigation of lands subject to irrigation erosion, preventing mineral fertilizers applied to crops from being washed out with soil particles and flowing into the drain, reducing erosion processes, keeping the environment clean, and preventing the washing out of

the fertile soil layer are of great importance in our republic. According to H.M. Makhsudov and L.A. Gafurova, the areas of the Republic with slopes up to 10 degrees make up 77.3%. These areas consist of plains and deserts in river oases and do not pose a threat to water erosion. Areas with slopes up to 1-30 degrees make up 7.6%, and these areas are areas subject to irrigation erosion. The areas with a slope slope of up to 100% are 6.5%, and a moderate to severe risk of water erosion is expected in these areas. In the above-mentioned areas, alluvial soils are plowed and cultivated, therefore, in order to prevent the risk of water erosion, it is recommended to apply soil protection and measures to increase the productivity of eroded soils. There are irrigation, wind, mountain, water and cliff erosion types of soil erosion.

Among the listed types of erosion, the ones that cause serious damage to agriculture are wind and irrigation erosion, but mountain and mudflow erosion also cause severe damage at times.

Research materials and methods.

Field experiments were conducted to reduce water consumption and soil erosion processes in cotton irrigation under production conditions, maintain soil fertility, and increase the efficiency of producing high-quality cotton. In the experiment, water consumption per plot, erosion processes, agrophysical and agrochemical analyses were carried out based on the methodological instructions "Methods of conducting field experiments" (UzPITI, 2007). Agrochemical analyses of soil and plants were carried out based on the methodological instructions "Methods of agrochemical, agrophysical and microbiological studies in irrigated areas" (Tashkent, 1967), observations and calculations on cotton were carried out based on the methodological instructions "Methods of field and vegetation experiments with cotton" (SoyuzNIKHI, 1973; 1981), and mathematical and statistical processing of data obtained from field experiments was carried out using the Microsoft Excel program, in addition, the methodological instructions were carried out based on the methodological instructions with changes to the classification by M.S. Kuznitsov, K.M. Mirzazhonov, Sh.N. Nigmatov.

In the experiment, the medium-fiber sultan variety of cotton was planted, and 6 options were placed in one layer in 3 repetitions, each option consisted of 8 rows, the middle 4 rows were calculated, and the two on the edge were protective rows.

During the research on "Determining the effect of cotton cross-slope and small-slope irrigation on soil leaching processes", in option 1, the slope level of the experimental area was 2.50 degrees, in option 2, the slope was taken at 0.00 degrees, in option 3, the slope was taken at 0.250 degrees, similarly in 4- in option 0.500 egat was obtained in the position transverse to the slope, in option 5 the egat was obtained in the position transverse to the slope at 0.750 and finally in option 6 in the position transverse to the slope At 1.00, it was removed and watered.

Analysis and results.

In the soil of the experimental field, at the beginning of the operation period, it was found that the water reserve was on average 16.6% in the 0-50 cm layer, 17.0% in the 0-70 cm layer, 17.5% in the 0-100 cm layer, and 18.5% in the 0-200 cm layer. At the end of the operation period, the moisture reserve in the soil was 10.3% in the 0-50 cm layer on average, 11.2% in the 0-70 cm layer, 12.4% in the 0-100 cm layer, 14.5% in the 0-200 cm layer in the 0-50 cm layer in the 2nd option, which was irrigated through the horizontal (at 0.0°) egates. 10.8%, in the 0-70 cm layer 11.6%, in the 0-100 cm layer 12.6%, in the 0-200 cm layer 15.2% in the 3rd option, irrigated through horizontal egates (0.250) 11.9% in the 0-50 cm layer, 12.8% in the 0-70 cm layer, 0-100 cm in layer 14.0%, 15.9% in the 0-200 cm layer, in the 4th option, irrigated through horizontal egates (0.500), 11.3% in the 0-50 cm layer, 12.0% in the 0-70 cm layer, 13.2% in the 0-100 cm layer, 15.4% in the 0-200 cm layer, 12.5% in the 0-50 cm layer, 12.9% in the 0-70 cm layer, 13.7% in the 0-100 cm layer, 15.2% in the 0-200 cm layer in the 5th option irrigated through the horizontal egates (0.750) in the 6th option 0-50 cm irrigated through the transverse egates (1.00) in layer 12.7%, 13.2% in the 0-70 cm layer, 14.0% in the 0-100 cm layer, and 15.8% in the 0-200 cm layer were determined.

Conclusion:

It was found that the water reserve at the end of the implementation period was 2.5% less in the 0-50 cm layer, 2.2% in the 0-70 cm layer, 2.0% in the 0-100 cm layer, and 1.7% in the 0-200 cm layer compared to Option 1, which was irrigated through traditional ditches (Control) (at 2.5°), and Option 3, which was irrigated through ditches with a slope of 0.25°. It was found that irrigation through ditches with a slope of 0.25° was the most optimal.

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