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EVALUATION OF THE EFFECTIVENESS OF PHYTOMELIORATIVE MEASURES ON STRONGLY SALINE SOILS

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Annotation
The article presents the results of experiments on the cultivation of phytomeliorant plants in 2009-2011 in order to rationally use water resources in the Bukhara oasis with increasing water shortages, the introduction of water-saving technologies in irrigation and saline washing.

Keywords: water-saving technologies, salt regime, irrigation standards, phytomeliorant plants, white sorghum, dry residue

Аннотация: в статье представлены результаты опытов по выращиванию фитомелиорантных растений в 2020-2021 гг. с целью рационального использования водных ресурсов в Бухарском оазисе при нарастающем дефиците воды, внедрении водосберегающих технологий при орошении и промывке солей.

Ключевые слова: водосберегающие технологии, солевой режим, нормы орошения, фитомелиоранты, сорго белое, сухой остаток.

Introduction

The problem of global climate change is on the agenda of mankind, which includes not only the average annual temperature rise on the planet, but also changes in the entire geosystem, rising global oceans, melting ice and permanent glaciers, increasing uneven rainfall, changing river flow patterns and climate instability. other changes.

Observations of the temperature dynamics regime in Uzbekistan over the past 50 years have shown that the maximum temperature growth rate was 0.22 degrees per year, and the minimum -0.36 degrees. On this basis, after 20 years, the average annual temperature in the northern part

of the Republic will increase by 2-3 degrees, and in the southern part - by 1 degree. Climate change will result in 10-15% evaporation of water from water surfaces, 10-20% more water consumption due to increased plant transpiration and irrigation standards, and an average 18% increase in non-renewable water consumption. This will undoubtedly complicate the further growth of agricultural production.

This dissertation is dedicated to the rational use of water resources in the context of growing water shortages, the introduction of water-saving technologies in irrigation and saline leaching, optimization of soil water, salt, nutrients and other regimes through phytomeliorative measures to improve the reclamation of saline lands. “Strategy of actions on five priority directions of development of the Republic of Uzbekistan for 2017-2021” approved by the Decree of the President of the Republic of Uzbekistan No. PF-4947 dated February 7, 2017 and approved by the Decree No. PF-6024 of July 10, 2020. Development Concept for 2020-2030 ” to a certain extent.

In 2009-2011, the effect of white corn and moss cultivation as a phytomeliorant on soil water and salt regimes was studied in the experimental fields. In order to study the dynamics of the movement of salts in 2009-2011, the soil 0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90, 90-100 cm samples were taken and the amounts of salts (CL1, SO4, HCO3, dry residue) that adversely affect plant growth and development were analyzed under laboratory conditions.

After the autumn wheat harvest in 2009, field crops were harvested and irrigated to moisten the soil (1100-1150 m3 / ha). As soon as the soil matured, the field was prepared for planting and phytomeliorant plants were planted. After planting the phytomeliorative crops, general soil samples were taken from the field, and the amount of salts in the soil was determined before and after each irrigation, and at the end of the growing season, after the phytomeliorants had been harvested. When we analyzed the change in the amount of salts in the soil, at the beginning of the growing season, the chlorine content in the 0-30 cm layer was 0.015%, and in the 0-100 cm layer it was 0.012%. Increased to 0.045%, while in the 0-100 cm layer it was 0.040%. In variant 2, where white oats were grown, at the end of the growing season, the amount of chloride ions in the soil was 0.033% in the 0-30 cm layer and 0.029% in the 0-100 cm layer, 0.011-0.012% less than in the control variant. Also, in variant 3, where the mosh crop was planted, the amount of chloride ions in the soil increased by 0.020-0.21% compared to the original amount and amounted to 0.036 and 0.032%. This indicates that the harvested area was 0.008-0.009% less than the control-uncultivated field.

When analyzing changes in the amount of hydrocarbon HCO3 in the soil in scientific studies, it was observed that in the fields planted with phytomeliorant plants, its content increased by up to 50% per vegetation. In experiments conducted in 2009-2011, the amount of HCO3 in the drive (0-30 cm) layer of soil before planting of phytomeliorant plants was 0.044%, while in the 0-100 cm layer it was 0.037%. Towards the end of the growing season, i.e. after harvesting the phytomeliorant plants, the HCO3 content in the control variant was 0.103% in the driving (0-30 cm) layer and 0.085% in the 0-100 cm layer. Also, in variant 2, where white oats were grown, the HCO3 content in the 0-30 cm and 0-100 cm layers was 0.077 and 0.058%, respectively, which was 0.026-0.027% lower than in the control variant. In variant 3, the

amount of hydrocarbons in the soil increased by 0.034-0.029% compared to the initial result and amounted to 0.082-0.070%.

In order to determine the effect of phytomeliorant plants on the amount of dry residue in the soil during the study, the results of the study were first analyzed.

$$N = 10000*lg*[\ S_i/S_{adm}\ ]^{\alpha}\ \ (м^3/ha).$$

In this formula, a is the free salt transfer coefficient, Si, Sadm is the salinity of the soil before saline leaching and the allowable amount, in% of weight.

In the field where scientific research was conducted in 2009-2011, saline washing was carried out in autumn and winter. During the experimental field, the highest saline leaching standards in the experimental field were observed in plowed and uncultivated control, ie in Option 1, in this variant the seasonal saline leaching rate averaged 5383 m3/ha in 3 years and 3 saline leaching operations were carried out during the season. .

In Experiment 2, where white corn (sorghum) was planted as a phytomeliorant, the saline leaching rate was 2380 m3/ha and 3003 m3/ha less water was used than in the control option. In this variant, saline washing was performed 1 time. In the 3rd variant, the seasonal saline leaching rate was 3403 m3/ha, which was 1980 m3/ha less than in the control variant, while in the 2nd variant, white oats were used 1023 m3/ha more. In the field, which was grown as a phytomeliorant, saline washing was carried out twice during the season.

During the study, saline washing activities lasted from the third decade of December to the last decade of January, with an interval between irrigations of 14–18 days.

On the basis of research conducted in Bukhara region on the application of phytomeliorative measures to ensure an optimal land reclamation regime, reduce water consumption in soil salinization, increase the productivity of irrigated lands, the following conclusions can be made:

According to the analysis of the effect of water-saving phytomeliorant plants on the salt regime of the soil, the chlorine ion content in the soil was initially 0.015% in the driving layer, 0.012% in the 0-100 cm layer, but by the end of the growing season, formed. These values were 0.033 and 0.029% when white corn was planted as a phytomeliorant crop, 0.036 and 0.032% when moss was planted, and 0.008-0.012% less chlorine ion was collected than the control field. The coefficient of seasonal salt accumulation was 2.3 in the field planted with white corn, 2.6 in the field planted with moss and 3.3 in the field not plowed.

According to the results of the experiment, the following can be concluded: The maximum saline leaching rate in the experimental field in the plowed control variant was 5383 m3/ha. In the 2nd variant planted with white oats as a phytomeliorant, the seasonal saline leaching rate was 2380 m3/ha, and in the 3rd variant planted with moss, the saline leaching rate was 3403 m3/ha, which is 37-56% or 1980-3003 m3/ha compared to the control variant. less water was used.

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