European Journal of Agricultural and Rural Education (EJARE)
Available Online at: https://www.scholarzest.com
Vol. 5 No. 08 August 2024
ISSN: 2660-5643

ASSESSMENT OF THE EFFICIENCY OF BIOPREPARE IN IRRIGATION WITH LOW MINERALIZATION DITCH WATER

S Isaev[1], O Murodov[2]
[1]National Research University Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIIAME) – Kary - Niyaziy ave., Tashkent, 100000, Uzbekistan
[2]Bukhara Institute of Natural Resources Management of the National Research University of TIIAME - 32, Gazli shokh ave., Bukhara, 105009, Uzbekistan
E-mail: murodovou@gmail.com

Article history:
Received: 11th June 2024
Accepted: 8th July 2024

Abstract:
This article describes the effects of repeated millet and sunflower crops grown under the conditions of alluvial, medium salinity, and medium sandy soils in the Bukhara oasis. These crops are grown with a water table depth of 2.0-2.5 meters and water mineralization of 2.5-3.0 g/l. The study focuses on determining the impact of Nanosilicon and Aminosid universal biopreparations on the growth and productivity of these crops when irrigated with low-mineralized ditch water.

Keywords: Ditch waters, Nanosilicon, Aminoside universal biopreparation, repeated crop, millet, sunflower, plant height, manure, basket, productivity.

INTRODUCTION. In the practice of irrigation agriculture worldwide (such as in the USA, China, India, Israel, and Egypt), using low-mineralized ditch water as an additional source for irrigating crops under conditions of water scarcity has proven to save river water and increase crop yields by 10-15%. Therefore, given the increasing water scarcity in our Republic, scientific research aimed at using low-mineralized ditch water in irrigated agriculture is considered urgent to mitigate its negative consequences.

As a result of many years of research, scientists have discovered that collector ditch water can have harmful effects on soil and plants when harvesting agricultural crops. However, many scientists have also proven that positive results can be achieved under certain conditions. The effectiveness of using mineralized ditch water is strongly influenced by factors such as the biological properties of the crop, resistance to salt, the water-physical properties of the soil, as well as the level of wellness, water mineralization, and salt content.

N.F. Bespalov [1] has shown that in years of low water supply, collector ditch water can be widely used for cotton irrigation and salt leaching. In this context, he recommends that the permissible level of water mineralization be 3-4 g/l in terms of dry residue for light and medium sandy soils, and up to 0.5 g/l in terms of chlorine ion. For heavy sandy soils, the recommended levels are 2.0-2.5 g/l for dry residue and up to 0.5 g/l for chlorine ion.

REVIEW OF THE LITERATURE ON THE RESEARCH TOPIC (ANALYSIS). According to the mechanical composition of the soils at the "Agrofayz Zynati" farm in Vobkent District, Bukhara Region, scientific research was conducted from 2020 to 2022 on the irrigation of repeated crops with ditch water. The soil is medium, meadow-alluvial, moderately saline, with the water table located at a depth of 2.0-2.5 meters and a mineralization level of 2.5-3.0 g/l. Field experiments were carried out on "Saratovskoe-853" millet varieties and "Dilbar" sunflower varieties under these soil conditions.

Our scientific research was conducted in the field, with laboratory research and phenological observations based on the methods outlined in the "Field Experiment Methods" (UzSRIC 2007) of the Scientific Research Institute of Cotton Breeding and Seed Cultivation.

RESULT AND DISSCUSSION:In the course of scientific research conducted from 2020 to 2022 on the cultivation of the repeated millet variety "Saratovskoe-853", soil moisture before irrigation was maintained at 70-75-65% compared to the limited soil moisture capacity. The recommended rate of mineral fertilizers—N150, P100, K60 kg/ha (according to the Bukhara Grain Science Research Institute)—was applied, and all plots were irrigated at a rate of 858 m³/ha as a pre-sowing measure. In the first treatment, which served as the control and was irrigated with ditch water, the number of irrigations was two, with 969-783 m³/ha of water used per irrigation, resulting in a seasonal irrigation rate of 1752 m³/ha.

In the second option, which was irrigated with ditch water and supplemented with a nanosilicon biopreparation, millet was irrigated twice with an irrigation rate of 826-625 m³/ha, resulting in a seasonal irrigation rate of 1451 m³/ha. In the third option, which was irrigated with ditch water and supplemented with the AMINOSID Universal Si biopreparation,

the irrigation rate was 845-641 m³/ha, and the seasonal irrigation rate was 1486 m³/ha. Compared to the control option, 301-266 m³/ha less water was used in the options where biopreparations were applied.
During the experiments on the cultivation of the "Dilbar" sunflower variety as a repeated crop in the experimental field, soil moisture before irrigation was maintained at 70-70-65% compared to the limited soil moisture capacity. Mineral fertilizers were applied at a rate of N200, P140, K100 kg/ha. In the control option 4, with two irrigations, the seasonal water consumption was determined to be 1755 m³/ha. In option 5, which used the nanosilicon biopreparation, seasonal water consumption was 1464 m³/ha, 291 m³/ha less than in the control (option 4). In option 6, treated with the AMINOSID Universal Si biopreparation, seasonal water consumption was 1511 m³/ha, 244 m³/ha less than in the control option 4. These treatments created favorable conditions for conserving water resources used for irrigation and for the normal growth and development of the plants.

CONCLUSIONS. In the meadow alluvial, medium salinity, medium sandy soils of the Bukhara region, the repeated millet variety "Saratovskoe-853" was fertilized at a rate of N150, P105, K75 kg/ha, with soil moisture before irrigation maintained at 70-75-65% compared to the limited soil moisture capacity. For treatments using nanosilicon and AMINOSID Universal Si biopreparations, the amount of chlorine in the soil was reduced compared to the control, with 0.004% in the 0-30 cm layer and up to 0.003% in the 0-100 cm layer. This led to reduced restoration needs and a grain yield of 29.0-30.7 c/ha, which was 3.2-4.9 c/ha higher than the control.
In the cultivation of sunflower as a repeated crop, with fertilization at a rate of N200, P140, K100 kg/ha and soil moisture maintained at 70-70-65% compared to the limited soil moisture capacity, the amount of chlorine ion in the soil in the 5th option using the nanosilicon biopreparation was 0.018% in the 0-30 cm layer and 0.016% in the 0-100 cm layer, lower compared to the control. In this option, the amount of dry residue was reduced to 0.392% in the 0-30 cm layer and 0.351% in the 0-100 cm layer, which is 0.71% and 0.72% less than the control, respectively. In option 6, where the AMINOSID Universal Si biopreparation was used with ditch water, the amount of chlorine ion was reduced by 0.002% in the 0-30 cm layer and 0.003% in the 0-100 cm layer compared to the control. The amount of dry residue decreased to 0.055-0.046% in the soil, 0.408% in the 0-30 cm layer and 0.377% in the 0-100 cm layer, compared to the control. This reduction is attributed to the accumulation of water-soluble salts in the active soil layer from irrigation with ditch water. The grain yield increased by 2.0-3.9 t/ha compared to the control.

REFERENCES

1. N.F. Bespalov "Use of mineralized water for irrigation and washing in Uzbekistan" Use of mineralized water in agriculture, Ashgabad, 1984.
2. Abdualimov Sh.Kh., Shamsitdinov F. Effect of new stimulators on leaf surface and productivity in hilly and stony lands of Namangan region.// Agrochemical protection and plant quarantine. -Tashkent, 2019. No. 5 -B. 39-42.
3. S.Kh. Isaev, B. Khaidarov, Collector-drainage water use for irrigation in dry years, European Research, in Coll. of articles XVI Int. Sci. and Pract. Conf. (Science and Education, Penza, 2018), pp. 114–117
4. Khamidov, M. K., Balla, D., Hamidov, A. M., & Juraev, U. A. (2020). Using collector-drainage water in saline and arid irrigation areas for adaptation to climate change. In IOP Conference Series: Earth and Environmental Science (Vol. 422, No. 1, p. 012121). IOP Publishing.
5. Isaev, S. X., et al. "Investigating irrigation system by using drainage water in the cultivation of repeated millet crop." BIO Web of Conferences. Vol. 103. EDP Sciences, 2024.