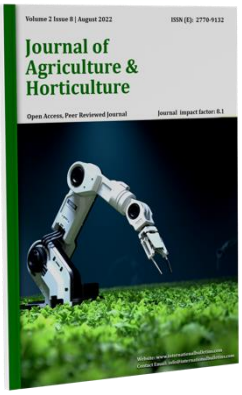

THE EFFECT OF REPEATED IRRIGATION OF CROPS WITH RAINWATER ON SOIL BULK DENSITY

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Abstract: This article presents data on the volume mass of the soil after the application of Nanosilicon and AMINOSID Universal Si biopreparations, which were planted as a repeated crop in the Bukhara oasis grassland, which is alluvial, moderately saline, medium-sandy in terms of mechanical composition, with a groundwater level of 2.0-2.5 meters, and a mineralization of 2.5-3.0 g/l.

Keywords: groundwater, mineralization, biopreparation, Nanosilicon, AMINOSID Universal Si, agrochemical description of the soil, soil bulk density, water permeability.

Introduction. In the practice of irrigation agriculture worldwide (in the USA, China, India, Israel), scientifi cally-based irrigation methods are employed under conditions of water scarcity. By using low-mineralized collector- drainage and wastewater as an additional water source, river water can be conserved, and crop yields can be increased by 10-15%. In this context, given the increasing water scarcity in our Republic, scientifi c research focused on mitigating its negative eff ects is considered urgent. This includes using well water in irrigated agriculture by either adjusting its mineralization to match river water or reducing it through the addition of a biosolvent compound.

Methods. Field experiments were conducted as a repeated crop from 2020 to 2022 on the lands of the “Agrofayz Zynati” farm in the Kungirot region, Vobkent district, Bukhara region. The soil in this area is meadow alluvial with a water table of 2.0–2.5 meters, a mineralization level of 2.5–3.0 g/l, and medium sandy texture. The experiments aimed to determine the eff ects of irrigation on the growth, development, and productivity of the plants, as well as on land reclamation, by establishing a scientifi cally-based irrigation procedure for the “Saratovskoe-853” and “Dilbar” varieties of sunfl ower using low-mineralized drainage water.

Results and Discussion. During the research, in 2020-2022, after winter wheat was followed by the cultivation of tarik and sunflower as a repeated crop, in the experimental field, in the first variant of the experiments, i.e., in the field where tarik crops were irrigated with rainwater, the bulk density of the soil in the 0-30 cm layer was 1.28 g/cm3, in the 0-50 cm-1.30 g/cm3, and in the 0-70 cm-1.33 g/cm3. In variant 2, where the crop was irrigated with rainwater and treated with the Nanosilicon biopreparation, the soil bulk density was 1.26 g/cm3 in the 0-30 cm layer, 1.28 g/cm3 in the 0-50 cm layer, and 1.30 g/cm3 in the 0-70 cm layer. It can be seen that the soil bulk density was 0.02-0.03 g/cm3 less dense than in the control variant in the 0-50 cm and 0-70 cm layers. It was also found that in variant 3, which was irrigated with sewage water and used the AMINOSID Universal Si biopreparation, the soil bulk density in the 0-30 cm layer was 1.27 g/cm3, in the 0-50 cm layer 1.29 g/cm3, and in the

0-70 cm layer 1.30 g/cm3, and the soil bulk density in the 0-50 cm and 0-70 cm layers was 0.01-0.03 g/cm3 less than in the control variant, i.e., irrigated with sewage water.

In addition, in the control and variant 4 of the studies conducted on irrigating the 30-50-30 cm layer of crops, when irrigated with rainwater, the bulk density of the soil in the 0-30 cm layer was 1.27 g/cm3, in the 0-50 cm layer it was 1.29 g/cm3, and in the 0-70 cm layer it was 1.32 g/cm3. In variant 5 of the study, when irrigated with saline water and treated with Nanosilicon biopreparation, the bulk density of the soil was 1.25 g/cm3 in the 0-30 cm layer, 1.27 g/cm3 in the 0-50 cm layer, and 1.29 g/cm3 in the 0-70 cm layer. It was found that the bulk density of the soil was 0.02 g/cm3 less dense than in the control variant 6 in the 0-50 cm and 0-70 cm layers. In variant 9, where millet crops were irrigated with sewage water and the AMINOSID Universal Si biopreparation was used, the soil bulk density was 1.26 g/cm3 in the 0-30 cm layer, 1.28 g/cm3 in the 0-50 cm layer, and 1.30 g/cm3 in the 0-70 cm layer. It was found that the soil bulk density of the 0-50 cm and 0-70 cm layers was 0.01-0.02 g/cm3 less than in the control variant, i.e., irrigated with sewage water.

Table 1

Volumetric mass of soil, g/cm3

Soil layer, cm	Soil volume mass, g/cm3						
	At the beginning of the period of action	At the end of the validity period					
		Millet 50-70-50 см			Millet 30-50-30 см		
		B-1	-2	-3	-4	-5	B-6
0-30	1,26	1,28	,26	,27	,27	,25	1,26
0-40	1,27	1,29	,27	,28	,28	,26	1,27
0-50	1,27	1,30	,28	,29	,29	,27	1,28
0-70	1,30	1,33	,30	,31	,32	,29	1,30
0-100	1,33	1,37	,35	,36	,36	,33	1,35

Conclusions. In the research field, as a result of repeated cultivation of winter wheat followed by rye and sunflower crops irrigated with sewage water and treated with Nanosilicon and AMINOSID Universal Si biopreparations, plant growth and development improved, biomass accumulation was increased, and as a result of good root system development, a greater amount of biomass was left in the soil compared to the control option, a decrease in soil bulk density was observed, and subsequently, as a result of the decomposition of these root residues, an increase in the amount of humus in the soil was also observed.

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