

**EFFICIENCY OF PRODUCING FORAGE CROP ALFA ROMA AND CORN
(SILOSE) WITH WASTEWATER**

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Abstract

Water scarcity situation In order to form a fodder base for livestock in 2022, experimental work on growing crops with river water and wastewater was carried out on the lands of the "Muttaharkhoja" farm in the Bukhara district of the Bukhara region. Based on experience, an experimental system was selected, agrotechnical measures were carried out. According to agrotechnical measures, 16 kg of alfalfa and 20 kg of corn (for silage) were planted per hectare. Additional nutrients for crops grown with river water: Nitrogen – 100 kg/ha, Phosphorus – 150 kg/ha, Potassium – 75 kg/ha for alfalfa crops, mineral fertilizer for corn (silage) with the same amount of Nitrogen – 250 kg/ha, Phosphorus – 175 kg/ha, Potassium – 125 kg/ha, and in the case of tuka, N-735 kg/ha, P-875 kg/ha, K-207.5 kg/ha were given in pure form for alfalfa and corn crops. In both options, the same seasonal irrigation rate for alfalfa crop - 5308 m³/ha, irrigation number 12 times, irrigation system (by harvest) 3-3-2-2-1, for corn (silage) crop - 3585 m³/ha, irrigation number 6 times, irrigation scheme 2-4 amount of water was given. After the phenological observations are made, the result is determined only by the yield. According to the results, the alfalfa crop "Tashkent-3192" irrigated with sewage water had an additional productivity of 7.3 t/ha compared to river water. Compared to the version of "Uzbekistan - 400 BL" variety irrigated with sewage water, 21.8 t/ha less yield was achieved. So, in the case of water scarcity, it is possible to achieve better productivity and economy of river water when growing feed crops for livestock with wastewater.

Keywords: wastewater, farm, river water, alfalfa, corn (silage), limited field moisture capacity, fertilizer rate, nitrogen, phosphorus, potassium, control, yield.

Introduction

Effective use of wastewater plays an important role in the cultivation of high and quality crops in the world's agriculture as a result of today's global activities, in order to eliminate the problems of the reduction of the amount of fresh water and water shortage, to save and preserve drinking water, especially in water-scarce regions. "One of the global problems in the world is the volume of waste water discharge from 400 billion m³ to 5500 billion m³." [1]. In Israel, only 5000 m³/ha of water is used to irrigate crops. The use of such water-saving technologies in crops is of great scientific and practical importance. In our republic, for several years, re-use of lands that have fallen out of use due to the deterioration of irrigation and land reclamation, effective use of underground water reserves, and water-saving technologies have been

introduced. On the basis of these tasks, among other things, effective use of wastewater in saline land conditions in water-scarce areas, planting of fodder crops on unused land, creation of land for reserve use, development of optimal norms and terms of irrigation of agricultural crops with wastewater, cultivated scientific study of the effect on the yield, its quality and the level of soil fertility is of great scientific and practical importance.

Method

Experimental work on the topic of scientific research was conducted in 2022 at the Muttaharkhoja farm. Agricultural crops: alfalfa "Tashkent - 3192", corn (silage) "Uzbekistan - 400 BL" varieties were studied with wastewater irrigation in the range of 70-70, 70-80% relative to the field moisture capacity with limited soil moisture.

Table 1 Experience system

№	Options	Limited field moisture capacity in %	Fertilizer rate, kg/ha		
			N	P	K
Alfalfa crop					
1	(control) fertilizing alfalfa and watering with river water.	80%	100	150	75
2	(experiment) watering alfalfa with wastewater	80%	-	-	-
Corn (for silage) crop					
1	(control) fertilized corn and irrigated with river water.	70-80%	250	175	125
2	(experiment) irrigating corn with wastewater	70-80%	-	-	-

The conducted studies showed that the alluvial-meadow soils of the Bukhara region are prone to salinization, when the level of groundwater is 2.5-3.0 meters, the pre-soil moisture content of alfalfa ("Tashkent - 3192" variety) is 80% compared to ChDNS, irrigation with sewage water; Production test studies of corn (Uzbekistan - 400 BL" variety) in the season of 2022 due to the high and good yield of 70-80% irrigation with wastewater compared to the field moisture capacity with limited soil moisture " was carried out in the cultivated areas of the farm. The tested area is prone to salinity, the mechanical composition of the soil is medium sand, and the groundwater level is 2.0-2.5 meters. The total land area of the farm is 38.4 hectares, of which 12 hectares were allocated for the trial experiment. Initial agrotechnical activities were carried out to plant alfalfa "Tashkent - 3192" on 6 hectares, and "Uzbekistan - 400 BL" corn (for silage) on 6 hectares. In the production trial, all three crops were treated with irrigation technology. According to agrotechnical measures, 16 kg of alfalfa and 20 kg of corn (for silage) per hectare were planted (the distance between the rows is 60 cm). Crops: alfalfa was cultivated 5 times during the season, 2 times against weeds; corn was also cultivated 2 times (cultivation 1 when corn produced 2-3 leaves, cultivation 2 when corn produced 8-10 leaves), weeding was also carried out due to the increase of weeds. Irrigation procedures of crops were used in the years 2019-2021. Fertilizer rate was given to the crop in the control option under irrigation with river water. Nitrogen – 100 kg/ha, phosphorus – 150 kg/ha, potassium – 75 kg/ha for alfalfa crops,

mineral fertilizer for corn (for silage) is the same amount of nitrogen – 250 kg/ha, phosphorus – 175 kg/ha, potassium – 125 kg/ha, and in the case of alfalfa and for corn crop, N-735 kg/ha, P-875 kg/ha, K-207.5 kg/ha were given in pure form. The seasonal irrigation rate was given to crops in the same amount during the season to the experimental option and to the control options, i.e. alfalfa - 5308 m³/ha, irrigation scheme 3-3-2-2-1, the number of irrigations 12 times, 3585 m³/ha to the corn crop during the season, irrigation scheme 2-4, the number of irrigations was 6 times. In the control option, an additional amount of fertilizer was applied between irrigations.

Table 2 The number and rates of seasonal irrigation of agricultural crops cared for on the "Muttaharkhoja" farm, m³/ha

№	options	Number of waterings												seasonal irrigation rate, m ³ /ha
		1	2	3	4	5	6	7	8	10	11	12		
<i>Alfalfa crop "Tashkent – 3192"</i>														
1	Control	458	480	458	526	503	458	458	503	503	503	458	5308	
2	Experience	458	480	458	526	503	458	458	503	503	503	458	5308	
<i>Маккажўхори (силосга) экин "Ўзбекистон – 400 БЛ"</i>														
1	Control	679	686	641	686	458	435						3585	
2	Experience	679	686	641	686	458	435						3585	

Productivity decides the results of the agrotechnical event carried out in the experimental test field. At the end of the growing season, the yield of the agricultural crops grown in the experiment was measured by weighing ears from 1 m² of the four return plots. Crops in the control and experimental test plots were harvested on the Jatka T-40 combine, and Kemper Class Case (Belarus) combines were used to prepare corn as silage.

Table 3 Yield of agricultural crops cultivated on the "Muttaharkhoja" farm according to returns, ts/ha

№	Options	Varieties	returns				Average yield, ts/ha	additional crop, ts/ha
			1	2	3	4		
<i>Alfalfa crop</i>								
1	Control	"Tashkent - 3192"	87,6	87,0	87,5	87,1	87,3	-7.3
2	Experience		80,1	79,9	80,3	80,0	80	
<i>Corn (silage)</i>								
1	Control	"Uzbekistan - 400 BL"	610.2	611.5	610.8	610.5	610,7	-21.8
2	Experience		589.5	588.9	588.4	588.7	588,9	

At the "Muttaharkhoja" farm, alfalfa variety "Tashkent-3192" was irrigated 12 times with wastewater at a soil moisture level of 80%. in the control version of the same variety, the yield was 80 tons/ha when the seasonal irrigation rate was 5308 m³/ha. In the experimental variant, an additional yield of -7.3 ts/ha was achieved compared to the control variant. Corn (silage) variety "Uzbekistan - 400 BL" was irrigated 6 times in the order of 70-80% relative to the field moisture capacity with limited pre-soil moisture, and the seasonal irrigation rate in the experimental and control options was 3585 m³/h, and the average yield in the experimental option was 610.7 ts/ha, while in the control variant it was less than -21.8 ts/ha. (See Table 3)

Conclusion

The experimental test was carried out in 2022 at the "Muttaharkhoja" farm in the Bukhara district of the Bukhara region. According to the results of the experiment: in the cultivation of alfalfa variety "Tashkent-3192", 16 kg of alfalfa seeds were sown, and irrigated 12 times in the order of 80 % of the field moisture capacity with limited pre-soil moisture, seasonal irrigation rate - 5308 m³/ha, irrigation scheme 3-3-2-2-1. The number of harvests increased to 5 times, the yield was 87.3 t/ha or 7.3 t/ha more than the control. This is because in our experiment, no additional fertilizer was given, N₁₀₀ P₁₅₀ K₇₅ fertilizer and mainly 5308 m³/ha of river water was saved. In the cultivation of maize (silage) variety "Uzbekistan - 400 BL", 20 kg of seeds were sown and watered 6 times in order of 70-80% relative to the limited field moisture capacity. In both options, the seasonal irrigation rate is the same - 3585 m³/ha of water was given. Productivity - 611 t/ha, 21.8 t/ha higher productivity was achieved compared to the control. In the corn crop, no fertilizer rate was applied in the experimental option, resulting in a saving of N₂₅₀ P₁₇₅ K₁₂₅ fertilizer rate and 3585 m³/ha of river water.

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