

DETERMINATION OF IRRIGATION PROCEDURES IN GROWING CORN (SILAGE) WITH WASTEWATER

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Abstract:

2 years of scientific-practical research work was carried out in the development of the irrigation regime (norm) of the corn (silage) crop of Bukhara city wastewater, and the results were highlighted. If the soil moisture before irrigation is 70-70% relative to the marginal field moisture capacity, seasonal irrigation in meadow-alluvial soils is 2723 m³/ha in the first year, the number of irrigations is 4 times, and in the second year, the seasonal irrigation norm is 4044 m³/ha, the number of irrigations is 5 times. soil moisture before irrigation was 70-80% relative to the marginal field moisture capacity. In the first stagnant year, the seasonal irrigation norm was 2814 m³/ha, the number of irrigations was 5 times, in the second year, the seasonal irrigation norm was 4071 m³/ha, the number of irrigations was 6 times.

Keywords: wastewater, volume mass, specific mass, irrigation regime (norm), seasonal irrigation, productivity, corn (silage).

A universal law was created by Academician W.R. Williams, which is defined as follows: - Living conditions of plants include: light, heat, air, water and nutrients. Light, heat, air are cosmic (universe) factors and relatively controlled by man. Water and nutrients enter the plant through the soil and are nurtured by human labor and knowledge. In order to obtain a high and quality harvest from agricultural crops, it is necessary to provide them with constant water and nutrients during the entire period of operation. In our conditions, alfalfa, corn (silage) and winter wheat also have to be supplied with water and nutrients. 12-14 thousand m³ of water is used for cultivation of 1 hectare of land in the territory of Uzbekistan for the cultivation of high quality crops from agricultural crops. [8, p. 18;]



Sodium, magnesium, potassium, sulfate and chlorine salts are widespread in many regions of our republic. 86% of the regions of Bukhara region have varying degrees of salinity. We can identify chlorine, sulfate, carbonate, and sodium salts in the soil. The source of water in the region is delivered from the Amudarya through machine channels. In one year, 4232.4 million m³ of water is taken from the border of Amudarya. The seepage water coming out of the field is 2121 million m³ per year and is sent out through the collector - ditches. The water coming out of the enterprises-organizations and the population goes directly to the re-treatment facility. After these wastewaters are completely cleaned, they go to big lakes through collector-drain systems, and from the lake to the rivers again. Currently, the treatment plant receives 1250 m³ of all waste water from the city of Bukhara per hour. In 1 day, this indicator is on average 25-30 thousand m³, although the composition of wastewater contains harmful substances as well as a number of useful substances.

Method. Water for irrigation in a water-scarce area is worth gold. During the year, billions of cubic meters of water are discharged from the treatment plant into lakes and rivers. The water treatment plant in the city of Bukhara receives only water from meeting the needs of the national economy. Due to the absence of industrial enterprises and production organizations in the city, wastewater does not contain harmful chemical elements and harmful toxins. In 2020-2021, scientific research was carried out in saline meadow-alluvial soils belonging to "Zarmanaq" MFY, Bukhara district. "Uzbekistan - 400 BR" variety of corn (silage) was selected from agricultural crop types as fodder for livestock in the experimental area. The average annual groundwater level of the region is 2.0-2.5 m/ha. According to the task set before us, 4 options were selected for our field work: Before watering corn (silage), the marginal field moisture capacity of the soil was determined as follows:

- | | |
|-------------------|--------------------|
| 1) control 70-70% | 3) control 70-80%; |
| 2) 70-70% | 4) 70-80%; |

The irrigation rate is calculated based on the formula of S.N.Rijov by volume mass as follows.

$$M = (W_n - W_m) * 100d * h + k \text{ m}^3/\text{ha}$$

where, M is the seasonal irrigation rate, m³/ha; W_n - field moisture capacity in relation to soil weight (%), W_m - pre-water soil moisture (%), d - volume weight of soil (g/cm³), h - calculated layer value (m), k - water used for evaporation during irrigation (m³ /ha, 10% of moisture deficit) [3, 32-45-p].



When developing the irrigation norm, the active layer of the soil 0-60 cm from the germination of corn (silage) to the release of the sultan (ear), then 0-100 cm (mainly the root layer) is taken into account during the entire operation period. Experiments were repeated 4 times. Plots with a length of 60 meters, a width of 2.40 m (4 rows of 60 cm), and a total area of 144 m² were created. The area of the control option is 144 m².

Table 1

Information on the irrigation method based on Limit field moisture capacity in the corn (silage) field.

Options	Indicators	Years	Number of waterings						Total irrigation rate and irrigation scheme:
			1	2	3	4	5	6	
Irrigation of corn with fertilizer at 70-70% relative to Limit field moisture capacity. (control option)	moisture before watering, (%)	2020	72	69	70	69			
		2021	71	70	68	70	72		
	watering period, (date)	2020	3.V	28.V	20.VI	14.VII			2-2
		2021	25.IV	21.V	15.VI	10.VII	3.VIII		3-2
	watering interval, (day)	2020	0	25	23	24	24		
		2021	0	26	25	25	18		
	irrigation rate (m ³ /ha)	2020	640	702	679	702			2723
		2021	800	811	865	811	757		4044
Irrigation of corn with fertilizer and wastewater when it is 70-80% relative to Limit field moisture capacity. (control option)	moisture before watering, (%)	2020	72	69	75	80	80		
		2021	73	77	70	70	80	80	
	watering period, (date)	2020	3.V	21.V	8.VI	27.VI	14.VII		2-3
		2021	25.IV	15.V	4.VI	23.VI	12.VII	1.VIII	3-3
	watering interval, (day)	2020	0	18	17	19	17		
		2021	0	20	19	18	19	20	
	irrigation rate (m ³ /ha)	2020	640	702	566	453	453		2814
		2021	745	622	811	811	541	541	4071

According to the experience, this is the land that has been developed for the first time, and before that, agricultural work was not carried out here. Water consumption calculation All variants are equipped with 900 Thompson water meters installed at the head of the line 25 cm. In the first year of seasonal irrigation, soil moisture before irrigation is 70-70% compared to the marginal field moisture capacity, in the options of irrigation with wastewater and irrigation with wastewater with fertilizer, 2723 m³/ha, the average irrigation rate is 681 m³/ha, and the irrigation scheme is 2-2 irrigations. number 4 times; In the second year, irrigation was 4044 m³/ha, the average irrigation rate was 809 m³/ha, the number of irrigations was 5 times, the irrigation scheme was 3-2, before irrigation soil moisture was 70-80% relative to the marginal field moisture capacity, irrigation with wastewater and in options for irrigation with fertilizing wastewater, the seasonal irrigation rate is 2814 m³/ha in the first year, the average irrigation rate is 563 m³/ha, and the irrigation scheme is 2-



3 irrigations 5 times; In the second year, irrigation was 4071 m³/ha, the average irrigation rate was 679 m³/ha, the number of irrigations was 6 times, the irrigation scheme was 3-3.) that the differences in the marginal field moisture capacity of soil moisture before irrigation increased over the years. Fertilizers in the wastewater changed soil fertility, bulk density, density, and porosity.

Due to the use of wastewater for irrigation, there was no over-feeding of the soil and there was no need for chemical-local fertilizers. Target yield of corn (silage) was achieved. During the experiment, land reclamation conditions were also studied. Underground seepage waters were monitored every decade and their contents were analyzed. The experimental area was re-examined and it was observed that the amount of humus in the soil increased. From the results of the experiment, we can determine that the purposeful and effective use of wastewater leads to the economy of additional water.

To sum up, the purposeful and effective use of water resources in periods of water scarcity is one of the main demands of today. According to the results of the experiment, river water was saved by irrigation according to the regime when corn was irrigated with wastewater. Instead of throwing 25-30,000 m³ of water into landfills in 1 day, we can achieve better results by using it effectively.

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