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One Time And Seasonal Irrigation Norms Of Sorghum In Saline Soil Conditions

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ABSTRACT
Non-compliance with sorghum irrigation norms remains an urgent issue for its cultivation in conditions of medium salinity soils. In order to obtain green mass in sorghum in medium saline gray-meadow soils of Syrdarya region, it is desirable to water 4 times at the rate of 540-770 m^3/ha in each irrigation, keeping 70-80-70% compared to LFMC before irrigation the plant during the growing season is appropriate. When irrigating sorghum in this manner, 462-504 m^3/ha of water is saved from each hectare of sorghum field. This is an important factor in saving water, and is the highest measure to protect against secondary salinity in the conditions of saline soils.
Keywords.

INTRODUCTION

In the last 20-25 years, for various reasons, very large arable areas are being re-salted and are leaving the farming system. The reasons for this are the lack of timely reclamation measures on existing lands, including poor functioning of ditch-collector systems, failure to wash saline lands in time, permissible deficiencies in irrigation and irrigation systems, improper use of water resources for irrigation of agricultural crops in conditions of saline soils, single-gallon and seasonal irrigation. We are not mistaken when we say that the norms are unreasonably exceeded, and in the conditions of these soils, not choosing salt-resistant crop types, etc (7).

METHODS AND MATERIALS

In field experiments in agricultural crops, the author Dospekhov B.A. "Methodology of conducting field experiments" developed by M.Kolos. and Nurmatov Sh. " Methodology of Field Experiment" developed by and others used (2, 3).

The field experiment was conducted in the following options

In options 1-3, the soil salt was not washed. Sorghums were watered at 70-80-75%; 70-80-70%; 70-70-70%;
In options 4-6, soil salinity was washed in November. Sorghums were irrigated at 70-80-75%; 70-80-70%; 70-70-70% compared to LFMC;
In options 7-9, soil salinity was washed away in February. Sorghums were irrigated at 70-80-75%; 70-80-70%; 70-70-70% compared to LFMC;
When sorghum is planted in rows, 14 kg/ha is the norm. The row spacing is 60 cm. The plant spacing is 10 cm planting gives good results.

The agrochemical and water properties of the soil are studied in the experimental field.

In order to determine the agrochemical parameters of the soil of the experimental field, mixed soil samples were taken from 0-30 and 30-50 cm soil layers by envelope method from 5 points of the field. The total amount of humus and humus in these samples I.M.Tyurin; nitrogen and phosphorus I.M.Maltseva, L.N.Gritsenko; in a nitrate nitrogen-ionometric instrument; mobile phosphorus is determined by the methods of B.P.Machigin and exchangeable potassium by P.V.Protasov.
Samples were taken in the 0^{th} and 30^{th} 50^{th} cm layers of the plowed and under-plowed soil to determine the amount of NRK, general and mobile forms, humus, humus and sent to the laboratory for analysis (2, 3, 4).
The volume weight of the soil is determined according to the irrigation procedures in each layer at depths of 0, 10-50 cm. The water permeability of the soil was determined using special cylinders in the spring and after harvesting.

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RESULTS AND DISCUSSION

As a biological species, sorghum is a drought-resistant plant based on its water requirements, but it is also a water-loving plant. From the physiological point of view, the plant's resistance to drought is related to its rich root system and the cells of the leaf mouth, which are very complex and surrounded by a light wax membrane. Strong root system of sorghum allows to absorb the necessary soil moisture even from the deep layers of the soil. This feature of the plant makes it a reason to call it a high level drought resistant plant (1, 4, 7, 8, 9).

The water demand of sorghum was not uniform during the growing season: the period of greatest water demand of the plant covered the period 10 days before broom emergence and 10 days after broom emergence. This development period is 25-30 days of the plant or 20-25% of the total vegetation period. During this period, the plant absorbs 45-50% of its total water consumption. In general, the most active period of sorghum in relation to water is during the period of broom release-flowering. consumes 65-70% of water (9).

Taking into account the above, the correct determination of its irrigation regime is important among agrotechnical measures. Based on this, the 1st irrigation of sorghum is in the tillering phase or 22-24 days after grass emergence, the 2nd irrigation is in the tuber or tuber phase, the 3rd irrigation is in the fertilization or broom phase, the 4th irrigation is in flowering and the 5th irrigation giving the grain at wax and full maturity is important for obtaining a higher yield (7).

Table 1

One-time and seasonal irrigation rates of sorghum. 2019

Option №	Rate of one-time and seasonal irrigations					
	1st irrigation	2nd irrigation	3th irrigation	4th irrigation	5th irrigation	Seasonal irrigation rate, m^3/ha.
1	2	3	4	5	6	7
1	749	540	540	616	616	3061
2	770	540	516	770	-	2596
3	770	770	770	-	-	2310
4	723	498	498	616	616	2951
5	749	540	540	770	-	2599
6	749	639	639	-	-	2027
7	716	540	570	634	634	3094
8	756	554	540	770	-	2620
9	785	770	785	-	-	2340

Sorghums were irrigated from 3 to 5 times during the growing season according to the experimental options. According to the options, the irrigation rate was between 540 m^3/ha and 749 m^3/ha. When determining the irrigation rate during the vegetation period, the thickness of the calculation layer and the amount of moisture in it were taken into account. When setting the next irrigation, it was based on the demand of sorghum for water.

Thus, in 2019, in the control option (option 1) where the soil salt was not washed, sorghum was irrigated 5 times during the growing season. The daily irrigation rate was in the range of 540-749 m^3/ha (Table 1).

Also, in the 2nd and 3rd variants of the experiment, the rate of irrigation each time was 540-770 m^3/ha, and during the growing season, sorghum was irrigated 3-4 times, respectively. In this case, the seasonal irrigation rate was 3061 m^3/ha in the 1st option, 2596 m^3/ha in the 2nd option, and 2510 m^3/ha in the 3rd option.

In experimental options (options 4-6) in which the soil salt was washed in November, that is, in the 4th option of the experiment, 498-723 m^3/ha during the sorghum vegetation period, as in the above options. watered in moderation. In the 5th variant of the experiment, the rate of irrigation per acre was 540-770 m^3/ha, sorghum was irrigated 4 times during the growing season, and finally, in the 6th option, the rate of irrigation per hectare was 639-749 m^3/ha and it was irrigated 3 times. In these options, the seasonal irrigation rate was 2951 m^3/ha in the 4th option, 2599 m^3/ha in the 5th option, and 2027 m^3/ha in the 6th option.

According to the experimental system, the soil salinity was washed in February in accordance with the above (variants 7, 8-9), that is, in the 7th variant of the experiment, irrigated in the norm 540-716 m^3/ha during the

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sorghum vegetation period. In the 8th variant of the experiment, the norm of each irrigation is 540-770 m^3/ha. and finally, in the 9th option, sorghum was irrigated at the rate of 770-785 m^3/ha. The seasonal irrigation rate was 3094 m^3/ha in the 7th option, 2620 m^3/ha in the 8th option, and 2340 m^3/ha in the 9th option.

Table 2

One-time and seasonal irrigation rates of sorghum. 2020

Option No	Rate of one-time and seasonal irrigations					
	1st irrigation	2nd irrigation	3th irrigation	4th irrigation	5th irrigation	Seasonal irrigation rate, m^3/ha.
1	2	3	4	5	6	7
1	693	462	500	540	616	2818
2	693	508	462	693	-	2293
3	693	693	770	-	-	2156
4	678	507	540	616	620	2976
5	693	510	540	693	-	2436
6	693	693	776	-	-	2161
7	675	462	462	616	618	2849
8	693	500	500	770	-	2463
9	730	730	735	-	-	2195

In 2020, depending on the time of planting sorghum, irrigation of vegetation started 5-6 days late.
The rate of irrigation per time was in the range of 462-770 m^3/ha according to the options. In this case, the soil moisture before the next irrigation was 500-540 m^3/ha in the options with 80% of LFMC, and 620-693 m^3/ha in the options with 70% of LFMC. This year, the seasonal irrigation rate was in the range of 2195-2976 m^3/ha according to options (Table 2).
In 2021, the difference between the next irrigations was 3-4 days compared to 2020. In particular, in options where soil salt is washed in November (options 4, 5, 6), the 1st irrigation rate is 690-780 m^3/ha, the 2nd irrigation is 510-650 m^3/ha, the 3rd irrigation is 510-650 m^3/ha, 4th irrigation 620-770m^3/ha and 5th irrigation 620 m^3/ha established the norm.
In options washed with saline soil in February (options 7, 8, 9), the 1st irrigation rate is 730-790 m^3/ha, the 2nd irrigation is 570-790 m^3/ha, the 3rd irrigation is 570-790 m^3/ha, 4th irrigation 650-780 m^3/ha and 5th irrigation 640 m^3/ha established the norm.

Table 3

One-time and seasonal irrigation rates of sorghum. 2021

Option No	Rate of one-time and seasonal irrigations					
	1st irrigation	2nd irrigation	3th irrigation	4th irrigation	5th irrigation	Seasonal irrigation rate, m^3/ha.
1	2	3	4	5	6	7
1	755	560	570	620	600	3105
2	750	570	580	660	-	2560
3	780	780	780	-	-	2340
4	690	510	510	620	620	2950
5	770	560	560	770	-	2660
6	780	650	650	-	-	2080
7	730	570	570	650	640	3160
8	750	550	540	780	-	2620
9	790	790	790	-	-	2370

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It should be noted that before the next irrigation, the irrigation rate in the variants with 80% relative to LFMC in relation to LFMC changed by 560-650 m^3/ha, while in the variants with 70% relative to LFMC, it was 730-790 m^3/ha has changed. Seasonal irrigation rate of sorghum increased from 2370 m^3/ha to 2950m^3/ha in the years of experiment.

CONCLUSION

In conclusion, it should be noted that at the time when the water reserves in the Republic are decreasing year by year, in the conditions of the moderately saline gray-meadow soils of the Syrdarya region, in order to obtain green mass in sorghum during the growing season, before irrigation the plant, it is necessary to maintain 70-80-70% compared to LFMC, due to soil moisture 540-770 m^3/ha per irrigation 4 times is desirable. When irrigating sorghum in this manner, 462-540 m^3/ha of water is saved from each hectare of sorghum field. First, it is an important factor in saving water in these conditions where water is scarce, and secondly, it is the highest measure to protect the soil from secondary salinity in the conditions of saline soils.

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