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GROWTH AND DEVELOPMENT OF SORGHUM IN SALINE SOIL CONDITIONS

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ABSTRACT

In saline soils, the damage of salt to the normal growth and development of sorghum is very strong. Therefore, it is important to timely wash away harmful salts and correctly determine the irrigation regime. When obtaining green mass from sorghum, it is not advisable to increase irrigation from 3 to 5 times without reason or reduce it from 5 to 3 times in conditions of water shortage. If conditions are created for the rise in the level of groundwater due to an unreasonable increase in the number of irrigations, then reducing the number of irrigations have a significant effect on the salinization rate of soils.

Keywords: saline, sorghum, salt, irrigation, soil, plant, growth, development, variant, control, biometrics, humidity, vegetation, experiment.

INTRODUCTION

In saline soils, the damage of salt to the normal growth and development of sorghum is very strong. Therefore, it is important to correctly determine the irrigation regime and timely leaching of harmful salts. Since, when these measures are properly implemented on existing soils, good conditions are created for the growth and development of the plant. This indicates the relevance of this topic. The study of the salt tolerance of the “Qorabosh” variety of sorghum (sorghum) grown in saline soils, the norms of salt leaching and single-year and seasonal irrigation of sorghum, and their scientific substantiation.

METHODS AND MATERILAS

In field experiments, the author used the “Methodology of conducting field experiments” (M.Kolos. 1979) developed by Dospekhov B.A. and the “Methodology of field experiments” developed by Sh.Nurmatov, K.Mirzajonov, A.Avliyakulov and others (1, 2, 3).

The field experiment was conducted in the following variants:

In variants 1-3, the soil salinity was not washed away. The sorghum was irrigated at 70-80-75% relative to the LFMC; 70-80-70%; 70-70-70%;

In variants 4-6, the soil salinity was washed away in November. The sorghum was irrigated at 70-80-75% relative to the LFMC; 70-80-70%; 70-70-70%;

In variants 7-9, the soil salinity was washed away in February. Sorghum was irrigated at 70-80-75%; 70-80-70%; 70-70-70% relative to the LFMC;

When sowing sorghum in rows, the norm was considered to be 14 kg/ha. The row spacing was 60 cm, the plant spacing was 10 cm. sowing gives good results.

To determine the agrochemical parameters of the soil of the experimental field, soil samples were taken in the spring from 5 points of the field using the envelope method, mixed from soil layers of 0-30 and 30-50 cm. The amount of total humus and humus in these samples was determined by I.M.Tyurin; nitrogen and phosphorus by I.M.Malseva, L.N.Grisenko; nitrate nitrogen by ionometric apparatus; mobile phosphorus by B.P.Machygin and exchangeable potassium by P.V.Protasov.

Before sowing, samples were taken from the arable and sub-arable layers of the soil in the 0-30 cm and 30-50 cm layers to determine the content of NRC, total and mobile forms, humus, and humus and submitted to the laboratory for analysis (2, 3, 4). The bulk density of the soil was determined at depths of 0-30 cm and 0-50 cm in every 10 cm layer according to the irrigation regime. Soil permeability indicators were determined using special cylinders in the spring and after harvesting.

RESULTS AND DISCUSSION

The first 30-35 days of sorghum grass growth are very slow and the rows are covered with weeds. Therefore, when the weeds are fully established, the rows are quickly worked and weeds are removed. During the growing season, sorghum grass is cultivated 2-3 times (5, 6, 7).

According to biometric calculations conducted on 1.06.19, in the control variant 1, where the soil was not washed with salt, the height of the sorghum grass was 9.6 cm. The number of leaves was 4.3. Also, in variants 2 and 3, where the soil was not washed with salt, the plant height and number of leaves were the same as in the control variant. In the experiment, the height of the sorghum was 13.8 cm. The number of leaves was 5.6 in options 4, 5, 6, washed in November, and the height of the plant was 12.3 cm, and the number of leaves was 5.1 in options 7, 8, 9, which were washed in February.

In the biometric calculations conducted for the second time on July 1, 2019, the height of the corn in the control variant, which was not washed with soil salinity, was 69.7 cm. the number of leaves was 10.3. Also, in the 2nd variant, where the soil salt was not washed, the plant height and the number of leaves were close to the

control variant. However, in option 3, the soil salinity was not washed and soil moisture before irrigation was 70-70-70% compared to LFMC, in the experimental option that was watered 3 times during the growing season, the height of sorghum was 57.6 cm and the number of leaves was 8.5. In this case, the height of the plant was 12.1 cm behind the control plant.

Table 1

Conducting biometric calculations in sorghum. 25.04.2019.

N	Options	Moisture ent before rigation lative to FMC, %	Phenological observation dates					
			01.06		**01.07**		**01.08**	
			Plant eight	Number leaves	Plant eight	Number leaves	Plant eight	Number leaves
1.	Soil salt not hed (control)	**70-80-75**	9,6	4,3	69,7	10,3	152,4	13,1
2.	Soil salt not hed	**70-80-70**	9,6	4,3	66,7	9,6	143,6	12,0
3.	Soil salt not hed	**70-70-70**	9,6	4,3	57,6	8,5	132,5	11,9
4.	Soil salt hed vember)	**70-80-75**	13,8	5,6	78,5	14,8	169,0	15,5
5.	Soil salt hed vember)	**70-80-70**	13,8	5,6	74,6	14,5	165,5	14,0
6.	Soil salt hed vember)	**70-70-70**	13,8	5,6	69,3	12,7	150,3	12,7
7.	Soil salt hed (February)	**70-80-75**	12,3	5,1	74,4	14,1	165,7	14,6
8.	Soil salt hed (February)	**70-80-70**	12,3	5,1	72,6	13,4	162,4	13,8
9.	Soil salt hed (February)	**70-70-70**	12,3	5,1	67,2	11,8	140,1	12,8

In the experiment, the soil salinity was washed in November and the soil moisture before irrigation was 70-80-70% compared to LFMC, and in the 4th option,

which was watered 5 times during the growing season, the height of the plant was 78.5 cm and the number of leaves was 14.8. The soil moisture before irrigation was 70-80-70 and 70-70-70% in 5, 6 variants, the height of the plant was 74.6-69.3 cm, and the number of leaves was 14.5-12.7, respectively. Here too, a difference was observed in sorghum due to the decrease in the number of vegetative irrigations from 5 to 3.

The soil salinity was washed in February and the soil moisture before irrigation compared to LFMC was 70-80-70%, in option 7, which was watered 5 times during the growing season, the height of the plant was 74.4 cm and the number of leaves was 14.1. The soil moisture before irrigation was 70-80-70 and 70-70-70% In 8, 9 variants, the height of the plant was 72.6-67.2 cm, and the number of leaves was 13.4-11.8, respectively. In these options, the difference in the height of corn was observed due to the decrease in the number of vegetative irrigations from 5 to 3.

In the biometric calculations conducted for the third time on 1.08.19, the height of the sorghum in control option 1, where the soil salt was not washed, was 152.4 cm. the number of leaves was 13.1. The plant height and number of leaves were close to the control option in option 2, which was watered 4 times during the growing season and had soil moisture of 70-80-70% before irrigation compared to LFMC without soil salinity washing. However, in the 3rd option, the soil salinity was not washed and the soil moisture before irrigation was 70-70-70% compared to LFMC, in the experimental option that was irrigated 3 times during the growing season, the height of the sorghum was 132.5 cm, and the number of leaves was 11.9.

The soil salinity was washed in November and the soil moisture before irrigation compared to LFMC was 70-80-70%, in the 4th variant, which was watered 5 times during the growing season, the height of the plant was 169.0 cm and the number of leaves was 15.5. The soil moisture before irrigation was 70-80-70 and 70-70-70% In 5, 6 options, the height of the plant was 165.5-150.3 cm, respectively. Here, too, a difference in sorghum was observed due to the decrease in the number of vegetative irrigations from 5 to 3.

In variant 7, where the soil was washed in February and the soil moisture content before irrigation was 70-80-70% compared to the LFMC, and irrigated 5 times during the vegetation period, the plant height was 165.7 cm and the number of leaves was 14.6. In variants 8, 9 in which the soil moisture content before irrigation was 70-80-70 and 70-70-70%, the plant height was 162.4-140.1 cm and the number of leaves was 13.8-12.8, respectively. In these variants, a difference in the height of

the corn was observed due to the decrease in the number of vegetative irrigations from 5 to 3.

In the results of the experiment in 2020-2021, no significant difference was observed in biometric calculations for taking into account the height of the plant. But the general law remained. In particular, in the control option 1, where the soil salt was not washed at the beginning of the vegetation, as well as in options 2, 3, the negative effect of salt in the soil on the growth and development of the plant was felt until the end of the vegetation, and it was clearly evident that the growth and development of the plant was lagging behind the options in which the soil salt was washed.

CONCLUSION

Based on these analyses, it can be concluded that it is not advisable to unnecessarily increase the irrigation of sorghum from 3 to 5 times, especially in the current water shortage conditions, just to get green mass, or to reduce irrigation from 5 to 3 times, especially in saline soils. In this case, if the level of groundwater is increased due to the unreasonable increase in the number of irrigations, then reducing the number of irrigations will have a significant impact on the rate of soil salinization.

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