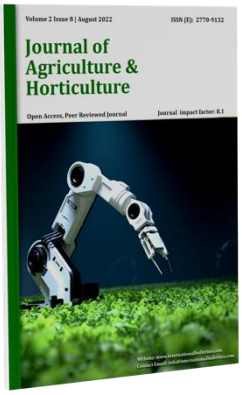


# THE SEASONAL IRRIGATION RATE OF SORGHUM IN SALINE SOIL CONDITIONS

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**Annotation**

Non-compliance with sorghum irrigation standards 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 Field Capacity before watering 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.

**Introduction**

**The relevance of the topic** : 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).**

**The purpose and task of the research:** It consists in studying the resistance of the "Qarabosh" variety of sorghum (sorghum) grown in saline lands to the effects of salt, the norms of salt washing and one-gallon and seasonal irrigation of sorghum, and their scientific justification.

**Object of the research:** The research was conducted at the farm "Bekzafarlik Khorvadoril" of Babur SFU in the direction of animal husbandry in Ak Oltyn District, Syrdarya Region. : The soil of the experimental area is gray-meadow .

The field experiment was conducted in 9 variants, 4 repetitions. The options are arranged in one tier. The length of the building is 50 m. Each option includes 8 rows, i.e. one return of the seeder (8 x 60 sm =4,8 m. 4,8 x 50 m=240 m2). The total area of each plot is 240 $m^2$, the estimated area is 120 $m^2$. Based on this, the total area of the experiment was 8,640 $m^2$, and the calculated area was 4,320 m2.

**EXPERIMENT METHOD**

In field experiments in agricultural crops, the author Dospekhov B.A. "Methodology of conducting field experiments" developed by M. Kolos. 1979y. and Nurmatov Sh. "Field Experiment Methodology" developed by and others. (Textbook. T.:2007-145 p.). used (2,3).

**The field experiment was conducted in the following options**

In options 1-3, the soil salt was not washed. Sorghum were watered at 70-80-75%; 70-80-70%; 70-70-70%;

In options 4-6, soil salinity was washed in November. Sorghum were irrigated at 70-80-75%; 70-80-70%; 70-70-70% compared to Field Capacity ;

In options 7-9, soil salinity was washed away in February. Sorghum were irrigated at 70-80-75%; 70-80-70%; 70-70-70% compared to Field Capacity ;

When sorghum is planted in rows, 12 kg/ha is the norm. The row spacing is 60 cm. The plant spacing is 10 cm. planting will give 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 0th and 30th 50 смlayers 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).30 см

The volume weight of the soil is determined according to the irrigation procedures in each layer at depths of 0-50 cm 10 см.

The water permeability of the soil was determined using special cylinders in the spring and after harvesting.

**RESEARCH RESULTS**

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-gallon and seasonal irrigation rates of sorghum. 2019**

| Option no | Rate of one-gallon and seasonal irrigations | | | | | |
|---|---|---|---|---|---|---|
| | 1-watering | 2nd irrigation | 3-watering | 4-watering | 5 - watering sh | Seasonal watering rate, m3/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 |

Sorghum 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 620 $m^3$/ha.and 964 m3/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 watering, 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 m3/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 m3/ha., sorghum was irrigated 4 times during the growing season, and finally, in the 6th option, the rate of irrigation per acre 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, 540-716 $m^3$/ha.during the sorghum vegetation period. irrigated in the norm. In the 8th variant of the experiment, the norm of each irrigation is 540-770 m3/ha. and finally, in the 9th option, sorghum was irrigated at the rate of 770-785 m3/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-gallon and seasonal irrigation rates of sorghum. 2020**

| Option no | Rate of one-gallon and seasonal irrigations 1-watering | 2nd irrigation | 3-watering | 4-watering | 5 - watering | Seasonal watering rate, m3/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 gal 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 Field Capacity , and 620-693 $m^3$/ha.in the options with 70% of Field Capacity . In 2020, the amount of precipitation was 52 mm or 21% higher than in 2019. As a result, the soil slightly improved its water balance due to natural moisture.

In 2020, in the control variant (variant 1), sorpgum was irrigated 5 times during the growing season, without soil salinization. The irrigation rate for each was in the range of 462-693 m3/ha.

In the 2nd-3rd version of the experiment, the rate of irrigation was set at 508-770 $m^3$/ha.per week, and during the growing season, sorghum was watered 3-4 times. In this case, the seasonal irrigation rate was 2816 $m^3$/ha.in the 1st option, 2293 $m^3$/ha.in the 2nd option, and finally, the seasonal irrigation rate was 2156 in the 3rd option. made m3/ha.

In the experimental options (options 4-6) in which soil salt was washed in November, that is, in the 4th option of the experiment, during the sorghum vegetation period, 507-678 $m^3$/ha, as in the above options. watered 5 times on average. In the 5th variant of the experiment, the rate of irrigation per acre was 510-693 $m^3$/ha., sorghum was irrigated 4 times during the growing season, and finally, in the 6th option, the rate of irrigation per acre was 693-776 $m^3$/ha., and it was irrigated 3 times. The seasonal irrigation rate was 2976 $m^3$/ha in the 4th option, 2436 $m^3$/ha in the 5th option, and 2161 $m^3$/ha in the 6th option.In 2021, there was no significant difference between the one-gallon and seasonal irrigation rates for maize. In particular, the amount of precipitation in 2021 was close to that of 2019.

**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 watering the plant, it is necessary to maintain 70-80-70% compared to Field Capacity, due to

soil moisture 540-770 $m^3$/ha.per watering 4 times is desirable. When irrigating sorghum in this manner, 462-504 $m^3$/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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