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The Role Of Salt-Tolerant Crops In The Proper Use Of Saline Soils

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Abstract

The article devoted to in solving this problem, the resistance to salinity, yield and product quality of agricultural crops (alfalfa, sunflower, white sorghum, sorghum, millet) grown on weak, moderate and strongly saline soils are studied and scientifically substantiated. In the effective use of saline soils, it is advisable to plant sunflower, white corn, beetroot, millet and other crops resistant to soil salinity. At the same time, it is important to plant domestic and imported crops such as millet, amaranth, and African sorghum as secondary crops in these soils.In these crops, even on saline lands, 400-500 ts / ha, and even in it it is possible to get a high yield and contribute to the raising of livestock in the Republic. Most importantly, thousands of hectares of land that have fallen out of agricultural use will be re-introduced into the farming system.This is one of the current issues of today.

Keywords: food crops, saline soils, sunflower, white corn, hay beets, alfalfa, sunflower, white sorghum, sorghum.

Introduction

During the visit of the President of the Republic of Uzbekistan to Syrdarya region in May 2017 and April 2018, the enterprise "Bek Cluster" was established, which is planned to grow 80,000 tons of food crops. Based on the above task, the cultivation of fodder crops in the saline soils of the Syrdarya region is an urgent issue.

Methods of experimentation

The field experiment was conducted on weak, medium, strongly saline soils of the farm "Beknazarlik chorvadorlar" in the territory of SFU "BOBUR" of Ak-Altyn district of Syrdarya region.The experiment was carried out against a background of three different soils (weak, medium, strongly saline) and through a system of planting alfalfa, sunflower, white corn, hay beets, corn.

The field experiment was set in 4 repetitions in 4 variants.The options were arranged in a single tier. The length of the ridge is 50 m. Each variant was obtained in 8 rows, ie at the expense of one visit of the drill (8x70 cm = 5.6 meters, 5.6x50 meters = 280 m2).The total area of each plot is 280 m2, the calculated area is 140 m2.Therefore, the total area of the experiment is 5600m2, and the calculated area is 2160 m2. (2,3,4.5).

As an object of experiment were takenCorn - “Qora bosh,”Alfa-alfa -“Tashkent-1”, millet “Xashaki-1”sorts planted, their resistance to saline exposure was studied.

The volumetric mass of the soil was determined by taking soil samples whose natural state was not disturbed.Soil water permeability by 6-hour tillage method developed by UzSRIC.Soil moisture is determined by the method of drying in a thermostat before and after each watering.The limited field moisture capacity was determined by filling the area with water (ROM method) at point 2 of the experimental field.The level of salinity of the soil in the experimental field is determined by the amount of seasonal salt accumulation (0-100 cm).The amount of water supplied to the field is calculated by the

Chipoletti (VCh-25) and the amount of wastewater Thomson (VT-90) water meter (2.3).

The date the crops were planted was recorded; -Grass rise is the beginning of germination; the time of the sprouting;-The time of onset and peak;-Flowering - the time of onset and the time of flowering;-Maturity - the time of onset and the time of full maturity are determined;

After harvesting under field conditions, 25 plants were taken from each raw, first wet mass and then dry mass were calculated.

In order to determine the agrochemical parameters of the experimental field soil, mixed soil samples were taken from 5 points of the field in the spring in the form of envelopes from 0-30 and 30-50 cm soil layers.From the samples taken, NRK, its general and mobile forms, humus, humus content were submitted to the laboratory for analysis.

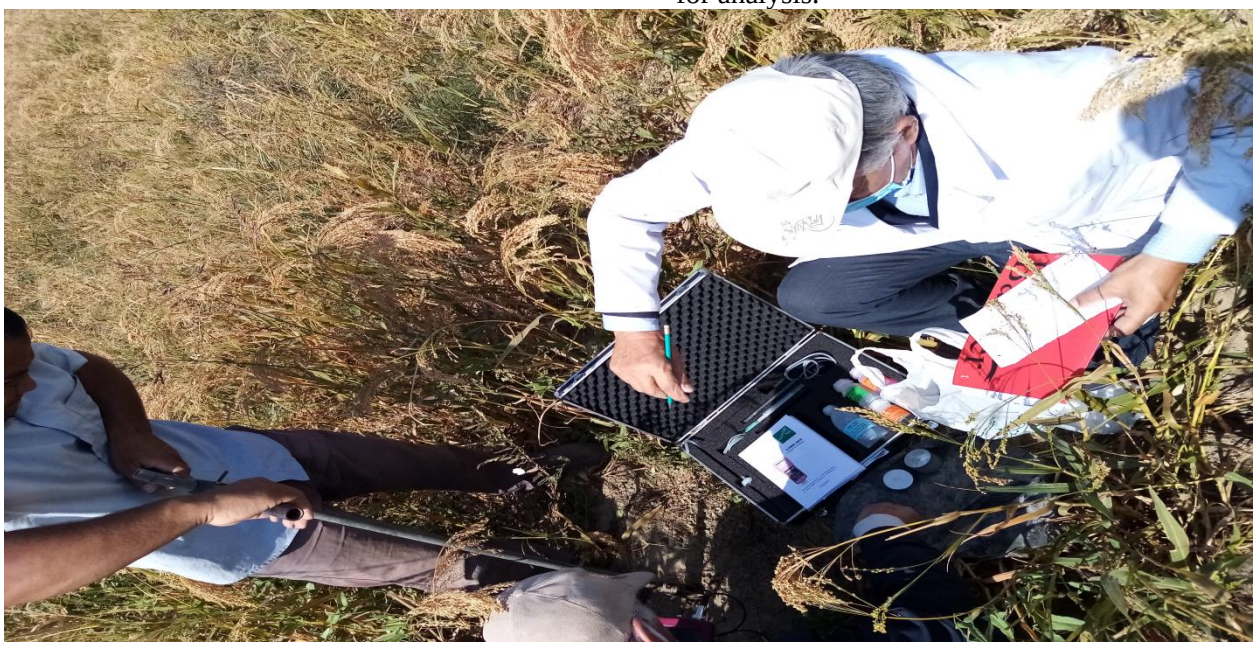

Figure 1.The process of taking a soil sample from a field for soil moisture and agrochemical analysis before conducting research. (Rapid analysis using laboratory instruments acquired during project implementation).

Rapid analysis of soil moisture and agrochemicals during the experiment was carried out using newly acquired laboratory equipment during the project implementation.(Figure 1).

Research results

Growing corn. Due to the natural conditions of the Syrdarya region, it is important to plant and care for all types of agricultural crops grown in the country, including white corn, alfalfa, millet and similar crops that are moderately resistant to soil salinity and are nutritious fodder for livestock.The growth of the population of the republic leads to an increase in demand for livestock products - milk, meat and others.Increasing livestock production cannot be achieved without developing its food base in the first place.

Corn is planted when the soil temperature is 12–14s in a layer of 0–10 cm.The sowing rate was calculated based on the absolute weight of the seed.As a result, 15-20 kg of seeds are consumed per hectare.Corn is planted in narrow and wide rows.In the selection and preparation of land for the experiment, the typicality of the soil, its salinity was washed away, the area was provided with sufficient ditches, and other ecological reclamation conditions were studied.

Corn was experimentally planted in a 45x15-1 scheme.This should be 33,333 p m per hectare.Based on the recommended seedling thickness (500,000–600,000 bushes per ha) for corn silage, the number of seedlings per 1 p.m., and then the number of seedlings per hectare, was calculated.Then if there were 18 bushes of corn at 1.p.m., there would be 599,000 or 600,000 plants at 33333p.m. or 1ha.Under saline soils, 600,000 bushes per hectare of white corn grown for silage will need to be provided.

Early sowing of white corn was recommended in saline soils of Syrdarya region.At the expense of planting in the early period was achieved full seedling formation.Because of the early planting, it was

possible to get seedlings at a time when the salt has not yet moved to the soil surface.Therefore, in the saline soils of the region, the optimal time for sowing white corn was April 5-15.At this time the soil was moist enough, and the seeds were sown in a flat.

Young seedlings of multi-crop corn are sensitive and sensitive to soil compaction.Therefore, as soon as the corn sprouted and the plant rows appeared, cultivation began between the rows.

Intermediate tillage was started with full seedling formation in saline soil conditions.Oats were cultivated 2 times between rows during growth and development.In the first cultivation, the row spacing was loosened to a depth of 6-8 cm, and then to a depth of 12-14 cm.In the first cultivation, 70 kg of nitrogen per hectare and 30 kg of phosphorus and 25 kg of potassium fertilizer were applied.In the second intercropping, 50 kg of nitrogen and 20 kg of phosphorus and 25 kg of potassium fertilizers were applied per hectare.70% of phosphorus fertilizer and 50% of potassium fertilizer were given after washing the soil brine, before chisel-cultivating the field.Before the second harvest of corn were cultivated with 50 kg of nitrogen and 25 kg of phosphorus fertilizers per hectare.Thus, during the vegetation period of corn, 200 kg of nitrogen, 150 kg of phosphorus and 100 kg of potassium fertilizers were given (Fig. 2).

Figure 2. Corn grown in saline soils.

Irrigation: The optimal norm for corn was determined based on soil moisture.Corn was irrigated 5 times during the growing season at the rate of two crops.In the care of the second crop of oats and to ensure its re-emergence, it was irrigated twice at 1000 m3 per hectare.At this rate of irrigation, the soil moisture does not fall below 70-75% of the ChDNS until the corn sprouts. (5,6).During the growing season, the first watering is started when the plant produces 5-6 leaves.In the first and second irrigation, the watering rate is increased by 20-25%, due to the fact that the corn grass is still young and the salts in the soil are more likely to destroy the plant grass.Hence, the irrigation rate for each irrigation was set at 1000-1100 m3 / ha.Corn was harvested 2 times.Watered 2 times between harvests. Irrigation rate was determined based on ChDNS and was 1000-1100m3 / ha (Figure 3).

Figure 3. The process of observation in white corn grown in saline soils.

Weed management: Weed control was done 2 times during the vegetation period of the corn.In the second and third cultivation, an additional knife (razor) was attached to the cultivator and the sprouted weeds were cut at a distance of 6-8 cm from the row where the corn was planted.

Calculation of the green mass of corn and the yield of dry silage.

(The 2nd harvest is given in the account, 2019-2020y). New

№	Rotations	Yield in 2019, ts / ha		Yield in 2020, ts / ha	
		green mass	dry mass	green	dry
		in the section of weakly saline soils			
1	1-rotation	675,3	180,5	611,9	172,0
2	2-rotation	660,7	173,1	614,0	173,4
3	3-rotation	687,3	160,8	603,3	156,0
4	4-rotation	655,4	155,1	588,7	145,4
	Average:	**669,6**	**169,6**	**604,5**	**161,7**
		in cross section of moderately saline soils			
1	1-rotation	575	125,5	517,1	105,4
2	2-rotation	590	132,4	509,6	103,1
3	3-rotation	572	121,5	511,4	101,5
4	4-rotation	585	126,6	515,0	
	Average:	**580,7**	**126,5**	**513,1**	**104,3**

1-graph. The green mass of corn and the yield of dry silage.

In the conditions of weakly saline soils of Syrdarya region, the plant reached a height of 164-171 cm (in the first harvest) and a silage yield of 604.5 ts / ha was obtained at the rate of 2 harvests (Figure 1).

Technology of alfalfa cultivation: Alfa-alfa was planted in SUB-48 and other models.The distance between the rows was 70 cm, the distance between the ribbons was 6-8 cm and the distance between the plants was 3-4 cm.Planting in this way is called narrow row sowing in agricultural practice.The sowing rate is 15 kg / ha per hectare.Suitable seedlings for saline soils if the number of sprouted grasses of alfalfa is 40 per 1 m2 (under moderately saline soils) and 60 (under weakly saline soils).Then from one bush can be formed 2-3 to 30-40 and even 200 bushes. (D.Yormatova. Botany. 2000 y). The sowing rate was also determined based on this requirement (Figure 4).

Figure 4. Growth and development of alfalfa in weakly saline soils.

The agromeliorative importance of alfalfa in saline soils is very important.Therefore, the study of alfalfa cultivation technology in saline soils is of great importance today.This is because the heating of the soil surface is reduced by covering the soil surface with the biomass of alfalfa(7,8).As the heating of the soil surface decreases, the evaporation of water from the soil decreases.Reducing evaporation from the soil surface reduces the rise of groundwater.This is important in preventing soil salinization.As a result, the evaporation of moisture from the bed is reduced and salt accumulation does not occur.

Second, alfalfa improves the structure, water-physical properties of the soil, and as a result, the movement of water in the soil becomes more active, penetrates deeper and makes the soil saline(10,11).The roots of alfalfa penetrate very deep (3-4 m and deeper) and evaporate groundwater (10-15 thousand m3 / ha), which leads to a decrease in groundwater level.After alfalfa, water consumption for crops grown on lands with increased soil fertility is significantly reduced (15-20%).In the first year after plowing, there is an opportunity to get a rich harvest from the next crop without washing the soil with salt.

Irrigation:To obtain high yields from alfalfa, soil moisture was required to be 70–85% relative to ChDNS.Although flat seedlings were formed after alfalfa planting, the young seedlings were very resistant to the effects of salt.With this in mind, it was irrigated twice at a rate of 600-700 m3 / ha before stem formation or accumulation of alfa alfa.After the alfa alfa bushes had taken hold, they were watered 1.0-2.0 times between crops (depending on soil conditions).

It should be noted that the young alfalfa seedlings were very weak and resistant to soil salinity.Growth and development of early seedlings in moderately saline soils was 75% relative to ChDNS when 65-70% or 27-29 of the seedlings sprouted at 1 p.m., while soil moisture was 70% relative to ChDNS-50% or - Only 20 survived (Figure 5).

Figure 5. Side-by-side placement of alfalfa and corn in the options.

In the case of weakly saline soils, this figure was as follows, depending on soil moisture.Thus, seedling growth and development is maintained at 35-80% of soil moisture relative to ChDNS, 35-40 of germinated seedlings at 1 p m or almost 95-100% of germinated grass, while soil moisture falls to 70% of ChDNS 32-35 one was preserved.It can be seen from this indicator that during the germination of young grasses of alfalfa, the soil moisture should not be less than 75-80% and the soil salinity should be neutralized.During the subsequent period of growth and development, the grasses behaved and were able to overcome the salinity of the soil (9,10.16).

In the second year, after alfalfa seedlings behaved, their resistance to soil salinity increased.Growth and development of primary seedlings in moderately saline soils When soil moisture is 75% relative to ChDNS, the stems of the second year at 1 p m remain 80-85% or 90-96, when soil moisture is 70% relative to ChDNS-50% or- only 75 survived.

In the case of weakly saline soils, this figure was as follows, depending on soil moisture.Thus, when the growth and

development of seedlings is 75% of soil moisture relative to ChDNS, 130-150 second-year stems or almost 95-100% of second-year stems are preserved at 1 p m, while 105-115 are preserved when soil moisture falls to 70% relative to ChDNS.It can be seen from this figure that for alfalfa in the second year of growth it is desirable that the soil moisture was not less than 75%.During the subsequent growth and development of the second-year alfalfa, the grasses behaved and were able to overcome the salinity of the soil.Due to this demand, care of alfalfa grasses in saline soils was required.

The green mass of alfalfa and the yield of hay. (2019-2020y)

№	Rotations	2019 year.		2020 year	
		greenmass	drymass	greenmass	drymass
.	In weakly saline soils.				
1.	1-harvest	121,2	16,6	168,5	19,7
2.	2-harvest	126,0	17,6	163,7	17,7
3.	3-harvest			145,0	15,1
	The total:ts/ha.	**247,2**	**34, 2**	**477,2**	**52,5**
	Average	**123,6**	**17,1**	**159,0**	**17,5**
	In moderately saline soils				
1	1-harvest	91,7	10,3	117,2	14,2
2	2-harvest	90,5	11,1	114,4	12,4
3	3-harvest			87,1	10,1
	The total:	**182,2**	**21,4**	**318,7**	**36,7**
	Average:	**91,2**	**10,7**	**106,2**	**12,2**

2-graph. Green mass of alfalfa, ts / ha and hay yield, ts / ha 2019-2020 y.

In the study, alfalfa grown on the basis of proper agrotechnical requirements grew well, it was possible to obtain more green mass and alfalfa hay.In the first year of alfalfa saline soils, 32-35 ts / ha of alfalfa was harvested at the rate of 2 harvests.Obtaining 52.0-60.5 ts / ha of alfalfa hay in the 3rd crop from second-year and well-cared alfalfa was considered a good result in these soil conditions (Figure 2).

Weed management:Weeds are removed by hand 1 time during the vegetation period of the alfalfa, after the grass has taken hold.

Conclusion

In conclusion, in the conditions of saline soils of Syrdarya region, taking into account the salinization of soils with chlorinated salts, it was considered expedient to carry out deep reclamation measures to reduce the impact of soil salt, and then plant crops.During the vegetation of alfalfa, the next irrigation was carried out at a soil moisture content of at least 70-75% relative to the ChDNS.The interval between waterings was 16–18 days.

Millit cultivation technology: Millet is one of the oldest crops on the planet, dating back to about 2700 BC.Millet does not choose soil, is drought tolerant, grows well even in saline soils, has a short vegetation, can harvest up to 4-5 times a year in hot regions.

In the republic, sowing of millet after winter wheat gave good results.Tariq quickly covers the ground with its green grass to prevent excess moisture from evaporating from the soil.This feature prevents the soil from overheating and consequently slows the rise of salt to the soil surface by reducing water consumption.Millet is watered 2-3 times during the growing season. The plant is resistant to drought for a long time.

Planting: Initially, the remaining husks of straw and wheat were cleaned.The field was then lightly irrigated (at a rate of 500m3 / ha).As the soil matures, it is chiseled to a depth of 14-16 cm and planted with millet.The sowing rate is 14 kg / ha.However, the sowing rate was increased to 20 kg / ha, taking into account the replanting.Millet was planted in narrow rows at a depth of 4-5 cm using a seed drill. (It should be noted that the sowing rate on irrigated lands is set at 24-30 kg / ha, or 3-4 million seeds per hectare). It is known that millet grew a little slow at the beginning of the growing season and then began to grow

rapidly.The optimum temperature for millet is 20-30s.It does not require much water from sprouting to sprouting.

Millet is a very drought tolerant crop and is grown in very arid soil climates.The plant grows slowly in the early stages of the growing season.In the study, millet entered the accumulation phase 15–20 days after emergence (Fig. 6).

Figure 6. General view of the field planted with millet.

The first grass sprouted on the 8th day of the millet planted after the grain in the saline soils of the Syrdarya region.From 4-5 days after the formation of grasses, the appearance of the 3rd leaf was observed.In this phase the plant grows very slowly.Millet entered the accumulation phase 15-20 days after germination.10–12 days after the onset of the accumulation phase, it entered the tube or tube removal phase.During this time, a period of rapid growth of the aboveground and underground parts of the plant was observed.After 20-25 days, the plant enters the broom rise phase.Flowering began 2–6 days after rise of the broom.During this developmental phase, the growth of the stem and root system in the plant stops.The flowering phase lasted 7-16 days and finally the final phase was considered to be the ripening of the millet, the ripening period on the plant lasted 15-20 days.Re-planted millet ripened in 55–60 days.

Re-planted (after grain) and well-maintained millet fields have the potential to yield 392.5-400.5 ts / ha of green mass and 56.2-61.7 ts / ha of dry hay.This indicator was considered a good result in the conditions of saline soils of Syrdarya region.At the same time, there is an opportunity to create nutritious fodder for livestock in farms and cluster farms.Most importantly, once the millet crop is harvested in a short time, there will be enough time to plant the grain the following year and take good care of it until winter.

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