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APPROPRIATE IRRIGATION PROCEDURES AND CULTIVATION AGROTECHNOLOGY OF SOYA AND SUNBACKAR VARIETS PLANTED AS REPRODUCTIVE CROPS

Eshonkulov Jamoliddin Saporboy ugli[1], *Kamilov Bakhtiyor Sultanovich*[2], *Shamsiyev Akmal Sadirdinovich*[3], *Nasirov Bakhtiyor Salakhiddinovich*[4], *Sheraliyev Khamidulla*[5], *Ziyatov Musulman Panjievich*[6]

[1]Tashkent State Agrarian University Level 1 basic doctoral student

[2]Research Institute of Cotton Breeding, Seed Production and Agrotechnology, Senior Research Fellow

[3,5]Tashkent State Agrarian University, Ph.D. professor

[4]Tashkent State Agrarian University, Ph.D. docent

[6]Scientific Research Institute of Cotton Breeding, Seed Production and Cultivation Agrotechnologies Ph.D

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ABSTRACT

This article is part of the practical project MV-A-QX-2018-204 in the experimental fields of the Research Institute of Cotton Breeding, Seed Production and Agrotechnology, ie in the conditions of typical irrigated gray Tashkent and Kashkadarya region legumes (Orzu, Arleta).), data on the timing of sowing, germination, growth, development of varieties of oilseed sunflower (Jahongir, Navruz), the optimal timing of irrigation to obtain high and quality grain products, irrigation procedures, development of irrigation standards and effective care agrotechnology.

1. Relevance of the topic

Today, the demand for soybeans is growing in order to meet the demand of the world population for protein foods. Of particular importance is the richness of soy protein, the presence in the protein of all the amino acids that are useful for humans. According to the Bureau of Food and Agriculture (BFAP), today the average soybean yield has increased to 2.7 tons per hectare, and by 2020, soybean production will reach 1.62 million tons. World soybean production is expected to increase by 2.2% annually to 371.3 million tons by 2030. Due to the positive biological properties of soybeans in the country, in the process of creating and improving agrotechnology for growing soybeans as a secondary crop, there is a shortage of irrigation water, which requires additional high grain yields and increased profitability.

The Resolution of the President of the Republic of Uzbekistan dated March 14, 2017 No PK-2832 "On measures to increase the sowing of soybeans and soybeans in the Republic in 2017-2021" provides for 92,266 hectares of land under the main crop and 40,557 hectares as secondary crops.

Soybeans are the fourth largest crop in the world after wheat, rice and corn. While the gross grain harvest is 220.64 million tons, Brazil, the United States and Argentina are the leading exporters of soybeans, while the buyer countries are our neighbors, China, Korea and other Asian countries. In 2018, a total of 11,000 hectares were cultivated in the country as a main crop and 19,150 hectares as a secondary crop.

In the following years, the area of shade will increase, and in 2021, soybeans will be planted on 17,300 hectares of the main area and 20,000 hectares as a secondary crop.

The scientific substantiation of such topical issues as full satisfaction of the population's demand for food products, including vegetable oil, maintenance of soil fertility along with the provision of nutritious fodder for livestock, effective use of water limits allocated to the regions was relevant in agriculture.

According to the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated February 10, 2018 No 105 "On measures to further increase the volume of soybean production in the country" for the 2018 harvest in the Republic of 18.5 thousand hectares of soybean fields. At the same time, in the regions of the country, 114 shades were planted on the main area and 120 shades on the secondary area. In most cases, low yields (16 quintals) were obtained from the shade due to low productivity, heavy water supply and separation of irrigated (reserve) areas. In order to ensure the implementation of this decision, a group of scientists and specialists were sent to Krosnadar region of Brazil and Russia to develop agrotechnology of soybean cultivation and provide seed stock suitable for the climatic conditions of the republic.

In Uzbekistan, 2929.6 thousand hectares of the total irrigated area of 3265.2 thousand hectares were cultivated this agricultural year. It is planned to sow secondary crops on 918.3 thousand hectares of the vacated area of 1107.1 thousand hectares of cereals in the country, and sunflowers have been planted on more than 20 thousand hectares.

One of the main problems in the care of secondary crops is the limited availability of water resources. Therefore, life itself requires finding new ways to use available water resources for irrigation, as well as the creation of science-based water-saving agro-technologies, research on improving existing ones.

At a time of increasing water scarcity in recent years, the full use of land and water resources, 2-3 times higher yields per hectare of irrigated area, including the cultivation of legumes and oilseeds as a secondary crop after grain crops, is one of the most pressing issues today.

The degree to which the problem has been studied

D.Yormatova, H.N.Atabaeva, I.A.Israilov, K.Mirzajonov, I.Anarboev, A.Ruziev, N.Urazmatov, F on the cultivation of soybeans and sunflower from oilseeds in the main and secondary periods and its biology and agro-technologies of cultivation .Namozov, U.Ne'matov, N.Khalilov, X.Raxmonov, R.Siddikov, I.E.Ernazarov, P.Gorelov, M.Lukov, A.Duysenov, V.Baranov I.Panjiev, M.Mannopova, M. Sattorov, A.Iminov and abroad P.Vavilov, B.Vinogradov, A.Babich studied and carried out scientific work. In-depth research has been conducted to determine the norms of mineral fertilizers in the care of these crops, the improvement of elements of soybean and corn cultivation, soybean and sunflower cultivation, the dynamics of dependence of grain quality on agro-technological measures.

However, insufficient scientific research has been carried out to develop optimal irrigation regimes and determine the water consumption of plants in the repeated cultivation of soybean and sunflower varieties, which are popular not only in our country but also around the world in the conditions of water scarcity.

2. The purpose of the study

Development of optimal irrigation regimes and water consumption to ensure rapid growth, development and high grain yields of soybean and sunflower varieties from oilseeds grown in the winter wheat field in the conditions of typical irrigated gray soils of Tashkent region and Kashkadarya region.

Research tasks.

Based on the purpose of the study, the following tasks were set.

- A generalized study of shade and sunflower plants by stages of growth and development;
- Assessment of changes in agrochemical and agrophysical and hydro-physical parameters of soils in the care of shade and sunflower;
- Determining the optimal irrigation regime for replanted shade and sunflower, as well as the effective depth of soil moisture before irrigation;
- The effect of different irrigation regimes on soybean and sunflower varieties on grain weight, dry mass accumulation, water consumption for the cultivation of 1 quintal, the balance of water in the field;
-study of the effect of different irrigation regimes on the development of the root system of the plant;

- To study the effect of irrigation regime on the yield and grain quality of replanted soybeans and sunflowers;
- To determine the cost-effectiveness of the care of replanted soybeans and sunflower using water-saving agro-measures.

Publication of results:

The results of the experiment were published as scientific articles in the proceedings of international conferences held at Samarkand State University and Karakul Research Institute, as well as in the popular scientific journal "Bulletin of Agrarian Science of Uzbekistan." It was also aired in the media on the Republican TV channel "Dunyo Doyogoy", "Yashil Sayyora" and "Agrotourizm" on the channel "Uzbekistan", on the program "Ziyo".

3. Research method:

The research was conducted in the fields of the Akkavak experimental plot of the Tashkent region of the Research Institute of Cotton Selection, Seed Production and Agrotechnology and at the farm "Rajabov Nurali Kenja ogli" in the territory of MMTP named after S. Murodov, Mirishkor district, Kashkadarya region. Experimental sites In the conditions of typical irrigated gray soils of Tashkent region, heavy sands with a mechanical composition, automorphic with deep groundwater (> 15 m) and medium sand with a groundwater level of 2.0-2.5 meters in the conditions of hydromorphic loamy soils of Kashkadarya region , was carried out under the conditions of the old irrigated soils.

Prospective varieties of soybean and sunflower crops were planted in the experiments. The “Dream” variety, which was adopted as a shadow control, was studied in comparison with the “Arleta” variety. Sunflower was studied by comparing the variety "Jahongir" with the variety "Navruz". In the care of soybean and sunflower crops, irrigation was carried out in the order of 65-65-60% and 75-75-65% relative to the limited field moisture capacity (ChDNS) of moisture in the calculated layers of soil. At the same time, the crops were irrigated in the order of 0-50 cm and 0-70 cm layers of soil. The experiment consisted of 10 variants, placed in a three-fold, three-tier rendomization method. In Kashkadarya region, the experiment was carried out in the fields of the farm "Rajabov Nurali Kenja ogli" in the territory of MMTP named after S. Murodov of Mirishkor district in a homogeneous system consisting of 10 variants and 3 kaytars.

All observational measurements and analyzes in the research are carried out in accordance with the guidelines adopted by PSUEAITI "Methods of field experiments with cotton" (1981), "Methods of conducting field experiments" (2007) and GOST 3274, 0-72, GOST 3274, 5-72 , Performed in full compliance with the requirements of GOST 2182. Statistical analysis of data on productivity was carried out on the basis of BA Dospekhov's "Methodology of field experiment" (1979; 1985).

4. Research results:

Volumetric mass and porosity of soil. In field experiments, different irrigation regimes for shade have been shown to have an effect on soil bulk density, porosity, formation of yield elements, and increased productivity. After harvesting the winter wheat in the experimental field, the soil was plowed to a depth of 30 cm, leveled and planted. In the experiment, after planting soybean and sunflower varieties, at the beginning of the application period, soil samples were taken by envelope method from 5 points of the field, and the volumetric mass of the soil, porosity (N.A. Kachinsky method) was determined. At the end of the application period, the volumetric mass, specific gravity and porosity of the soil were determined from all variants every 10 cm layer to 0-100 cm layer. The results obtained are presented in Table 1.

Table 1 *Volumetric mass and porosity of soil, g / cm3%*
(In the conditions of typical irrigated gray soils of Tashkent region)

Soil layer, sm	**At the beginning of the validity period**		**According to irrigation procedures at the end of the period of validity**			
			Compared to ChDNS 65-65-60%		**Compared to ChDNS 75-75-65%**	
	Volumetric mass	**Porosity**	**Volumetric mass**	**Porosity**	**Volumetric mass**	**Porosity**
0-10	1,25	53,3	1,38	48,8	1,39	48,5
10-20	1,27	52,9	1,39	48,5	1,40	48,1
20-30	1,27	52,9	1,39	48,5	1,39	48,5
30-40	1,28	52,5	1,40	48,1	1,40	48,1
40-50	1,30	51,8	1,38	49,2	1,39	48,5
50-60	1,31	51,4	1,39	48,5	1,41	47,7
60-70	1,30	51,8	1,38	48,8	1,40	48,1
70-80	1,32	51,1	1,39	48,5	1,41	47,7
80-90	1,34	50,4	1,40	48,1	1,41	47,7
90-100	1,34	50,4	1,41	47,7	1,42	47,4
Average						
0-30	1,27	52,7	1,38	48,8	1,40	48,5
0-50	1,29	52,9	1,39	48,5	1,41	47,7
0-70	1,30	51,8	1,39	48,5	1,41	47,7
0-100	1,30	51,8	1,40	48,1	1,42	47,4

From the data obtained, it can be seen that at the beginning of the shade application period, the volume weight and porosity of the soil were 1.27 g / cm3 in the 0-30 cm driving layer of the soil, 52.7% and 1.29 g / cm3 in the 0-50 cm driving layer, 1, In the 29% and lower 0-70 cm, 0-100 cm layers, the average was 1.30 g / cm3 and the porosity was 51.8%, respectively. By the end of the growing season, the volume weight and porosity of the soil in the options specified in the irrigation regime 65-65-60% is 1.38-1.39 g / cm3 in the subsoil of 0-30 cm and 0-50 cm in the subsoil, 48.5-48 , 8% and the bottom 0-70 cm, 0-100 cm 1.39-1.40 g / cm3 and the porosity was also 48.1-48.5%, respectively. Irrigation regime is 75-75-65% in the specified options, the volume weight and porosity of the soil is 1.40-1.41 g / cm3 in the subsoil of 0-

30 cm and 0-50 cm in the subsoil, 47.7-48.5% and lower 0-70 cm, 0-100 cm 1.41-1.42 g / cm3 and the porosity was 47.4-47.7%, respectively.

In the experiments, as a result of increasing the number of irrigations, seasonal irrigation norms and the number of irrigations, it was observed that the volume mass increased significantly in the variants set at 75-75-65%, and the porosity of the soil decreased with increasing soil volume.

The most important factor in improving the culture of plant care is the study of the agrophysical properties of the experimental field in the conditions of fertile soils of Kashkadarya region, the soil moisture retention, water absorption capacity, volume weight is inextricably linked with soil mechanical composition.

A good knowledge of the water-physical properties of the soil, first of all, plays an important role in improving the culture of the soil and the culture of farming. The water permeability, porosity, moisture capacity, air temperature regime, etc. of the soil depend on its mechanical composition.

The agrophysical properties of the soil were also affected by agro-technical processes in the field, where legumes and oilseeds were grown on the grain-free areas, as well as soybeans and sunflowers.

The results of agrophysical observations in the soil studied in the general base at the beginning of the application period show that the volume mass of the field in the 0-30 cm layer is 1.28 g cm 3, in 30-50 cm - 1.33 g cm 3, and in 0-50 cm - 1.30 g cm 3.

By the end of the application period, the smallest change in soil mass between variants was observed in variants 1, 2, 6 and 7, and 1.33 and 1.34 g / cm3 at 0-30 cm, 1.34 and 1 at 0-50 cm, 35 g / cm3. Significant changes in volumetric mass were observed in variants 4, 5, 9, and 10 of the experiment, and were 1.36 and 1.38 g / cm3, respectively. In variants 3–8 of the experiment, the change in volume mass took an intermediate position.

Table 2

Volumetric mass of soil, g / cm3 (2019)

Variations	**Layers, cm**							
	0-10	**10-20**	**20-30**	**30-40**	**40-50**	**0-30 average**	**30-50 average**	**0-50 average**
At the beginning of the validity period								
General. on the floor	1,26	1,28	1,29	1,32	1,35	1,28	1,33	1,30
Porosity	53,3	52,5	52,2	51,1	50,0	52,5	50,7	51,8

	Options									
	1 and 6 options		2 and 7 options		3 and 8 options		4 and 9 options		5 and 10 options	
At the end of the validity period										
Layers cm	Dimensional mass	Porosity	Dimensional mass	Porosity	Dimensional mass	Porosity	Dimensional mass	Porosity	Dimensional mass	Porosity
0-10	1,32	49.2	1,32	49.2	1.33	50.7	1.36	49.6	1.38	48.8
10-20	1.33	50.7	1.34	50.4	1.34	50.4	1.35	50.0	1.36	49.6
20-30	1.34	50.4	1.35	50.0	1.36	49.6	1.36	49.6	1.36	49.6
30-40	1.35	50.0	1.36	49.6	1.37	49.2	1.38	48.8	1.39	48.5
40-50	1.36	49.6	1.37	49.2	1.36	49.6	1.37	49.2	1.36	49.6
50-60	1.37	49.2	1.36	49.6	1.37	49.2	1.38	48.8	1.37	49.2
60-70	1.38	48.8	1.38	48.8	1.39	48.5	1.38	48.8	1.37	49.2
70-80	1.39	48.5	1.39	48.5	1.39	48.5	1.38	48.8	1.40	48.1
80-90	1.40	48.1	1.39	48.5	1.39	48.5	1.40	48.1	1.39	48.5
90-100	1.41	47.1	1.41	47.1	1.40	48.1	1.41	47.1	1.41	47.1
Average										
0-30	1.33	50.7	1.33	50.7	1.34	50.4	1.35	50.0	1.36	49.6
0-50	1.34	50.4	1.34	50.4	1.35	50.0	1.36	49.6	1.37	49.2
0-70	1.35	50.0	1.35	50.0	1.36	49.6	1.37	49.2	1.37	49.2
0-100	1.36	49.6	1.37	49.2	1.37	49.2	1.38	48.8	1.38	48.8

In field experiments, the timing and rate of irrigation of replanted shade and sunflower were determined by soil moisture. Prior to each irrigation, samples were taken from every 0–10 cm layer of soil to a depth of 0–100 cm, and moisture was determined using the thermostat scale method. The water consumption for each irrigation was measured and calculated using a Chipoletti-50 and the amount of water supplied to each field using a 900-degree Thomson water meter.

During the application period, pre-soil moisture in all irrigation methods of shade and sunflower plants was carried out by moistening the calculated layer of soil in the order of 65-65-60% and 75-75-65% relative to ChDNS, and 50 and 70 cm layers.

Table 3 *Irrigation timing, order, given water norms and soil moisture of shade and sunflower plant (Typical gray soil 2019)*

Options	Indicators	Number of irrigations				Irrigation and general water consumption, m3 / ha	Control nis-batan-+
		1	2	3	4		
1 and 6	Irrigation period	02.08	15.08	02.09	18.09	1-2-1	
	Water interval, day		13	18	16		
	Water supplied, m3	548,1	592	561	831	2532	0,0
	Soil moisture,%	73,4	73,8	73,3	65		
	* HShK,%	9,2	9,1	9,2	11,5		
2 and 7	Irrigation period	07.08	25.08	08.09		1-1-1	
	Water interval, day		18	13			
	Water supplied, m3	579	579,1	516		1674	-858
	Soil moisture,%	63,3	64,2	58,4			
	HShK,%	11,3	11,4	12,7			
3 and 8	Irrigation period	06.08	22.08	05.09	21.09	1-2-1	
	Water interval, day		16	16	16		
	Water supplied, m3	372	386,1	378	594	1731	-593
	Soil moisture,%	76,6	76	74,4	63,7		
	HShK,%	11,3	11,3	12,7	11,3		
4 and 9	Irrigation period	05.08	20.08	4.09		1-1-1	
	Water interval, days		22	15			
	Water supplied, m3	711	790	676		2177	-355
	Soil moisture,%	64,6	65	58,4			
	HShK,%	9,3	9,3	2,7	11,7		
5 and 10	Irrigation period	02.08	15.08	02.09	18.09	1-2-1	
	Water interval, day		13	18	16		
	Water supplied, m3	540	582,1	582,1	821.6	2525	-7
	Soil moisture,%	76	74,3	74,3	63,3		
	HShK,%	9,2	9,2	9,3	11,4		

Note:

*** -HSHK,% - concentration of cell sap**

In the conditions of Kashkadarya region, the fields sown with winter wheat, grown in the Experimental field, were irrigated on the basis of the established moisture content of soybeans and sunflowers. During the implementation period, the number of irrigations in each option and the total amount of water supplied varied significantly. Humidity before irrigation was maintained at around + - 2% of the set.

Information on irrigation periods, irrigation intervals, amount of water supplied, soil moisture are given in Table 3.5.2.

The amount of moisture in the soil was determined before each irrigation and irrigation was carried out based on the lack of moisture in the 0-50 and 0-70 cm layers of soil.

Each plant species has different requirements for soil moisture, and on this basis, the conditions of growth and development vary. Varieties of soybean and sunflower cultivated in the experiment were grown in 1-2 variants with 1-1-0 system 2 times, in 3-4 variants irrigated on the basis of 65-65-60% soil moisture with 0-50 cm and 5-6 3 times with a 1-1-1 system on the basis of a calculated layer of 0-70 cm in variants, 1-2 times when irrigated with a calculated layer of 0-50 cm in 7-8 variants, the soil moisture level before irrigation is kept in the range of 75-75-65% 4 times with 1 system, watered 4 times with 1-2-1 system in 9-10 variants irrigated at the same soil moisture, but on the basis of the calculated layer of 0-70 cm.

Table 4

Irrigation periods, order of shade and sunflower, given water norms and soil moisture (Taqisimon soils,)

Var	**Indicators**	**Number of irrigations**				**Irrigation and general water, m3 / ha**	**Control nis-batan- +**
		1	2	3	4		
1 and 6	Irrigation period	07.08	07.09			0-1-1	
	Water interval, day		34				
	Water supplied, m3	1560	1520	-		3080	0,0
	Soil moisture,%	74,4	74,8				
	* HShK,%	13,4	12,8				
2 and 7	Irrigation period	15.08	31.08	20.09		1-1-1	
	Water interval, day		16	21			
	Water supplied, m3	691	656	735		2082	-998
	Soil moisture,%	63,1	63,6	60,3			
	HShK,%	11,3	11,4	12,7			
3 and 8	Irrigation period	13.08	29.08	18.09		1-1-1	
	Water interval, day		16	20			

	Water supplied, m3	750	712	807		2269	-811
	Soil moisture,%	63,2	63,3	61,8			
	HShK,%	11,3	11,3	12,7			
4 and 9	Irrigation period	09.08	23.08	02.09	20.09	1-2-1	
	Water interval, days		14	14	18		
	Water supplied, m3	640	632	669	785	2726	-354
	Soil moisture,%	74,4	74,8	74,4	65,4		
	HShK,%	9,3	9,3	2,7	11,7		
5 and 10	Irrigation period	07.08	20.08	07.09	22.09	1-2-1	
	Water interval, day		13	17	15		
	Water supplied, m3	658	662	679	837	2856	-224
	Soil moisture,%	73,4	73,8	73,6	66,0		
	HShK,%	9,2	9,2	9,3	11,4		

Note:

*** -HSHK,% - concentration of cell sap**

In the conditions of fertile soils of Kashkadarya region, seasonal irrigation of soybean and sunflower plants is carried out according to the experimental system, based on methodological guidelines. In this case, the water consumption (control) for each irrigation is 1560-1520 m3 / ha in options 1 and 6, 661-735 m3 / ha in options 2 and 7, 750-807 m3 / ha in options 3 and 8, 640-785 m3 / ha in options 4 and 9. and 658-837 m3 / ha in options 5 and 10. According to the options, 3080 per hectare of irrigation water provided during the season in accordance with the general procedure; 2081; 2269; 2726 and 2856 cubic meters. The days between irrigations are 30 according to the above; 16-20; 15-21; It was 14-18 and 15-17.

Based on data from soil moisture irrigation, it should be noted that the small increase in the number of irrigations resulted in a total irrigation water consumption of 224 cubic meters to 999 cubic meters per hectare less than the control option (options 1 and 6). irrigation norms had a positive effect on the amount of moisture in the reserve or did not necessitate the use of moisture in the reserve.

In Tashkent region, when the dynamics of germination of soybean and sunflower seeds of repeated crops was observed, the full germination of seeds 10 days after sowing of soybean variety "Dream" (28.07.2019) was 98%, while the variety "Arleta" germinated 99% during this period. The peak flowering period of the shade was 95.5 and 100% by August 7, respectively. The full germination of sunflower on July 31 was 99% in Jahongir and 100% in

Navruz. The beginning of the flowering period of sunflower varieties was on August 27 and 29, respectively.

In the Tashkent region, the growth period of sunflower varieties at the Akkavak experimental farm was 84-93 days, and they were among the middle-ripening varieties. As a result of scientific research, in the Navruz variety of sunflower, before the irrigation of 65-65-60% of ChDNS, 0-50 cm early ripening in the calculated layer of soil was 84 days.

In Kashkadarya region, when the dynamics of germination of soybean and sunflower seeds of repeated crops was observed, 14 days after sowing of Orzu variety of soybean, full germination of seeds (29.07) was 97.3%, while Atletta variety germinated 99.9% during this period. The beginning of the flowering period was on August 14, and was 95.5 and 100%, respectively. The full germination of oilseeds on July 23 was 96.3% in Jahongir and 100.9% in Navruz. The beginning of the flowering period of sunflower varieties coincided with the 28th and 24th of August, respectively.

When analyzing the height of the plant stem in typical irrigated gray soils of Tashkent region, the maximum height of the main stem was 4 variants, before the formation of the 1st pod, before flowering, ripening and harvesting. 9; 30; 77 and 81, cm. The lowest height was observed in variant 5 of the experiment and was 11.4, respectively; 25.4; 62.5, 70.7 cm. The growth and development conditions in variants 2, 3, 4 of the experiment were intermediate.

When the emergence of fruiting branches of the plant was observed, the fact that irrigation was carried out at different rates and duration showed a specific effect on the number of fruiting branches and the spacing of the joints. The largest number of crop branches was observed in variant 1 of the experimental method of irrigation production and was 6.1 before harvest, while the largest number of crop branches was irrigated with 65-65-60% moisture content in the 50cm layer of soil. was observed in the variant and amounted to 2.2 units before harvest. In other variants, the number of harvest branches took an intermediate position.

Table 5 *Stem height of soybean varieties (Tashkent region)*

Options.	**Varieties**	**It's wet humidity relative to ChDNS, %**	**Layer, cm**	**Stem height, cm**				**Harvest branches, d**	
				4 chinbarg	**1-dukkak-gap, see**	**Flowering-ripening**	**Before the harvest**	**01.09.**	**01.10.**
1	Dream	И/ч	0-70	11,9	16,0	77	81,1	5,6	6,1
2	Arleta	65-65-60	0-50	11,9	15,0	73,7	75,7	2,1	2,2
3	Arleta	65-65-60	0-70	11,8	14,2	64,6	71,8	1,2	2.1

4	Arleta	75-75-65	0-50	11,6	13,1	66,4	71,5	1,8	2,1
5	Arleta	75-75-65	0-70	11,4	12,4	62,5	70,7	1,9	2,1

In the study of irrigation regimes, growth, development processes of replanted sunflower, it was found that when irrigated by the method of crop production at the lowest height (control option 1), 33.7 as of the first day of August, September and October; 130.7 and 154.4 cm, number of leaves 4.1; 12.8; The formation of the first baskets on the plant, which amounted to 16.5 pieces, coincided with the 24th of August.

According to the results of biometric observations, in the calculated layer with the highest height of sunflower 0-50 cm, the limited field moisture capacity of the soil is 65.65-60% in the above analysis 36.2 when irrigated; 150.4 and 171.8 cm, number of leaves 5.2; 20.8; Reaching 21.4 pieces, the formation of the first baskets coincided with the 25th of August. In other variants, these figures occupied an intermediate position.

Table 6 *Growth and development conditions of replanted sunflower*

OPT.	**Varieties**	**Irrigation moisture,%**	**Height of sunflower, cm**			**Number of leaves, number, pcs**			**The diameter of the basket, sm 1.10.2019**
			1.08	1.09	1.10	1.08	1.09	1.10	
6	Jahongir	I/ch	33,7	130,7	154,4	4,1	12,8	16,5	21,6
7	Navruz	65-65-60, 50 sm	36,2	150,4	171,8	5,2	20,8	21,4	24,5
8	Navruz	65-65-60, 70 sm	33,7	142,1	165,6	4.9	18,2	19,4	23,6
9	Navruz	75-75-65, 50 sm	34,1	142,7	165,5	4,4	17,3	18,1	22,5
10	Navruz	75-75-65, 70 sm	34,6	141,5	166,8	5,1	17,6	18,8	22.4

In the conditions of Kashkadarya, when the emergence of crop branches was observed, the fact that irrigation was carried out at different rates and at different times had a specific effect on the number of harvest branches and the spacing of joints. The largest number of crop branches was observed in variant 1 of the experimental method of irrigation production and was 4.7 units before harvest, while the lowest number of crop branches was observed in variant 4 and 1.7 units before harvest. In other variants, the number of fruiting branches took an intermediate position.

Table 7

Stem height of shade varieties (Taqirsimon soil, 2019)

Options.	Varieties	It's wet humidity relative to ChDNS, %	Layer, cm	Stem height, cm				Harvest branches, d	
				4 chin barg	1-dukkak-gap, sm	Flowering-ripening	Before the harvest	01.09.	01.10.
1	Dream	I/ch	I/ch	13,2	14,7	65,9	82,2	3,6	4,7
2	Arleta	65-65-60	0-50	14,3	13,6	68,7	72,9	1,7	2,2
3	Arleta	65-65-60	0-70	14,8	12,2	70,6	72,8	1,6	2,1
4	Arleta	75-75-65	0-50	15,8	12,1	74,4	61,5	1,5	1,7
5	Arleta	75-75-65	0-70	14,3	11,4	79,5	60,7	1,7	2,1

It is no exaggeration to say that the main reason for the growing interest of farmers in this area is the high yield per hectare of sunflower fields in Kashkadarya region and the possibility of producing about 400-450 kilograms of oil per ton of seeds. Therefore, it will be necessary to study the processes of its cultivation, growth and development in a more thorough and comprehensive way. In the study of irrigation regimes, growth, development processes of replanted sunflower, it was found that when irrigated by the method of crop production at the lowest height (option 2), 32.7 as of the first day of August, September and October; 114.7 and 144.4 cm, number of leaves 4.1; 12.8; The formation of the first baskets on the plant, which amounted to 16.5 pieces, occurred on August 26.

According to the results of biometric observations, in the calculated layer with the highest height of sunflower 0-70 cm, the limited field moisture capacity of the soil was 75.65-65% when irrigated, in the above analysis 34.6; 131.5 and 156.8 cm, number of leaves 5.1; 17.6; Reaching 18.8 units, the formation of the first baskets coincided with the 25th of August. In other variants, these figures occupied an intermediate position.

Table 8

Growth and development conditions of replanted sunflower (In the case of barren soils).

Opt.	Varieties	Irrigation moisture,%	Height of sunflower, cm			Number of leaves, number, d			Formation of baskets, day
			1.08	1.09	1.10	1.08	1.09	1.10	
2	Jahongir	I/ch	32,7	114,7	144,4	4,1	12,8	16,5	26.08.19
4	Navruz	65-65-60	35,1	116,4	129,9	4,2	16,8	20,3	20.08.19

6	Navruz	65-65-60	33,9	121,6	153,6	4.8	17,2	19,3	21.08.19
8	Navruz	75-75-65	34,0	126,7	155,5	4,4	17,0	18,1	23.08.19
10	Navruz	75-75-65	34,6	131,5	156,8	5,1	17,6	18,8	25.08.19

In the analysis of the experimental yield, the highest grain yield was obtained in 2 variants of the experiment, ie with a calculated layer of 0-50 cm at 65-65-60% soil moisture, irrigated 3 times during the application period, and the grain yield per hectare was 26.7 ts. formed.

The minimum soybean yield in Experiment 1 was 21.9 quintals of grain per hectare. From options 3, 4 and 5 of the experiment, the grain yield was intermediate (24.6, 23.6 and 22.8 quintals per hectare, respectively).

The highest blue mass yield of the shade was obtained in option 3 (228.3 ts / ha) and the lowest blue mass yield was obtained in variant 4 of the experiment (210.7 ts / ha).

According to the data on the yield of sunflower in the Tashkent region, the pre-irrigation of the variety "Navruz" in the order of irrigation was 65-65-60% of the ChDNS, in the calculated layer of soil 0-50 cm was 28.2 ts / ha. This indicator increased by 6.1 ts / ha in the experimental “Navruz” variety compared to the controlled “Jahongir” variety.

The diameter of the stem of Jahongir variety (variant 1), studied as a control, irrigated under production conditions, was 2.0 cm, the number of leaves was 16.5, the length of the leaf surface was 15.4, its width was 12.7 cm, and the yield per plant was 239. grams, the weight of 1000 seeds was 83 grams, and the yield per hectare was 22.1 quintals.

As a result of research in Kashkadarya region, according to the data on the yield of sunflower, the pre-irrigation of the variety "Navruz" in the order of irrigation was 65-65-60% of the ChDNS, in the calculated layer of soil 0-70 cm was 27.1 ts / ha. This indicator increased by 5.5 ts / ha in the experimental “Navruz” variety compared to the controlled “Jahongir” variety.

The diameter of the basket of Jahangir variety (variant 2), studied as a control, was 16.9 cm, the diameter of the stem was 2.1 cm, the number of leaves was 16.5, the length of the leaf surface was 15.4 and the width was 12.7. cm, the yield per plant was 42.7 grams, the weight of 1000 seeds was 98.7 grams, and the yield per hectare was 21.6 quintals.

According to the data obtained at the Akkavak experimental farm in Tashkent region, the yield of soybean varieties was 20.9-26.7 ts / ha. In terms of high yields, the following Arleta cultivar was 0-6 cm 26.7 t / ha in the calculated layer of soil before irrigation with 65-65-60% of ChDNS. In the "Dream" (control) variety, this figure increased by 4.8 ts / ha.

According to the data obtained in Mirishkor district of Kashkadarya region, the yield of soybean varieties was 20.9-25.6 ts / ha. In terms of high yield, the following Arleta cultivar was 4.6 ts / ha compared to the control navigator at 0-

70 cm in the calculated layer of soil before irrigation with 65-65-60% relative to ChDNS.

According to the yield of sunflower varieties, the weight of 1000 seeds was 83-99.4 grams, the yield of kernels was 26.6-30.5%, the yield of one plant was 82-100 grams, the yield was from 20.9 to 25.6 ts / gani.

Picture:

a b

Figure 1 The process of irrigation procedures and observations of shade and sunflower plants

biometric measurements (a), the process of studying nodular bacteria in the root of the shadow Microbiologist Professor, Z.Shakirov and basic doctoral student J.Eshonkulov, (b)

Determination of oil content in the grain of soybean varieties studied in the experimental field was carried out in a special laboratory (Kashkadarya Regional Research Institute of Cereals and Legumes). The grain content of soybean varieties was slightly higher in terms of grain oil content - 40.5%. In terms of irrigation regimes, there was a slight difference in the level of oil content. Experiments have shown that the pre-irrigation soil moisture in all varieties is 65-65-60% higher than the control in the variant with a calculated soil layer of 50 cm compared to ChDNS.

5. Conclusions

1. The use of resource-efficient irrigation technology in the planting and care of soybeans and sunflowers after winter wheat in the conditions of typical gray soils of Tashkent region and barren soils of Kashkadarya region allows to obtain high-quality grain products, creating favorable conditions for their good growth.
2. When growing soybeans and sunflowers as a secondary crop, irrigate to a depth of 50 cm in typical gray soils and 70 cm in loamy soils, taking into account the topsoil (0-30 cm) and subsoil (30-50 cm) layers of soil where their main root system is scattered. sufficiency is scientifically based.
3. In order to obtain a certain yield of soybeans and sunflower in the central (Tashkent) and southern (Kashkadarya) regions of the Republic, it has been proved in practice that they can be irrigated in an economical order of 65-65-60% relative to the limited field moisture capacity of the soil.

4. Irrigation of soybean and sunflower plants in the conditions of typical irrigated gray soils of Tashkent region (accepted on the farm) in the control variant 1-2-1 system 4 times seasonal water volume 2532 m3 / ha, in the experimental economical irrigation variant 65-65-60% soil layer In 50 cm 1-1-1 irrigation system 1674 m3 / ha of irrigation water was supplied, 858 m3 / ha of irrigation water was saved compared to the control and high productivity was achieved.
5. Irrigation of shade and sunflower plants in the conditions of fertile soils of Kashkadarya region (accepted on the farm) in the control variant 0-1-1 system 2 times seasonal water content 3080 m3 / ha, in the experimental variant 65-65-60% of the calculated layer of soil at 70 cm In the 1-1-1 irrigation system, 2082 m3 / ha of irrigation water was supplied, 811 m3 / ha of irrigation water was saved compared to the control, and a high yield was obtained.
6. The highest yield of sunflower variety "Navruz" in Tashkent region was 65-65-60% in relation to CHDNS in the calculated layer of soil 0-50 cm before irrigation - 28.2 t / ha, and 6.1 t / ha more than the control. In the soybean crop, the Arleta variety was 4.8 ts / gan, respectively.
7. The highest yield of sunflower variety "Navruz" in Kashkadarya region was 65-65-60% in relation to ChDNS before irrigation in the calculated layer of soil 0-70 cm - 27.1 t / ha, and an additional 5.5 t / ha compared to control. In the soybean crop, the Arleta variety was 4.7 ts / gan, respectively.
The grain fat content of soybean varieties proved to be on average 36.4% in the control (Dream) variety, and in the experimental variant "Arleta" this figure was proved to be 40.1% on average, ie 3.7% higher than in the control variety.

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