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DETERMINING THE WATER-SAVING IRRIGATION REGIME AND FERTILIZATION STANDARDS FOR TOMORROW'S POTATOES

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Abstract: The article presents the results of studying the effect of irrigation regimes, elements of irrigation technology, as well as fertilizer rates on the growth, development, and productivity of medium-early potato varieties *Sylvana* and *Saviola*.

Key words: old-irrigated light sierozom soils, potato varieties *Sylvana* and *Saviola*, irrigation regimes, irrigation scheme and rates, fertilizer rates, yield, resource-saving technology

摘要：本文介绍了灌溉制度、灌溉技术要素以及施肥量对中早熟马铃薯品种 *Sylvana* 和 *Saviola* 生长、发育和生产力影响的研究结果。

关键词: 旧灌轻质土壤, 马铃薯品种 *Sylvana* 和 *Saviola*, 灌溉制度, 灌溉方案和比率, 施肥量, 产量, 资源节约技术

Irrigated lands in the country are 4.1 million hectares, or 9.7 percent of the total land fund. Nevertheless, irrigated lands account for 92% of the value of gross agricultural output.

Potato is one of the main food crops grown in irrigated agriculture. In Surkhandarya region, 30-35 kg of potatoes are grown instead of the reasonable 50 kg per capita. The yield per hectare is 18-20 tons.

Despite the soil climatic conditions of the region, short and warm winters, the length of the frost-free period (240-260 days), the annual rainfall is 130-160 mm, the presence of irrigation facilities shows that it is possible to grow a stable abundant and high-quality crop.

According to scientific and production experiments, 5000-6000 cubic meters of water are used to harvest 200-300 quintals per hectare. The demand for water in the care of crops in agriculture is determined by the irrigation

regime, climatic conditions and soil types, depth of groundwater, biological characteristics of the variety and the growth and development phase of the plant, as well as soil fertility².

The rate of watering early potatoes depends on the moisture capacity of the soil, the thickness of the soil layer to be moistened and the pre-irrigation moisture. Frequent irrigation at the beginning of the growing season and at the time of formation of stems gives 300-400 m³ / water per hectare. In the middle of the growing season, the soil moisture layer increases, and when the soil moisture decreases, the irrigation rate increases to 600-700 m³ / ha. The total water consumption depends on the number of irrigations and the amount of water used for irrigation. In Uzbekistan, the difference between total water consumption is large, ranging from 2,000 m³ / ha to 7,000 m³ / ha².

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During the years of independence, the area of potatoes in the region has expanded more than 6 times and exceeded 10,000 hectares, and the volume of potato production amounted to 220-245 thousand tons.

In Surkhandarya region, increasing the yield of early potatoes, reducing water consumption per quintal depends in large part on the selection and widespread use of varieties adapted to the conditions of these conditions, as well as the development of water-saving irrigation procedures and technologies and optimal fertilizer standards. Therefore, it is theoretically and practically important to select varieties suitable for each specific condition, to develop optimal fertilizer standards, taking into account the convenient water-saving irrigation regime and technology, which are key elements of high and early harvest technology.

Scientific research on the definition of different irrigation regimes, techniques and standards of fertilizers for potato crops in Uzbekistan was carried out in the typical and grassland soils of Tashkent and Samarkand regions. However, this issue has not been sufficiently studied in the context of the ancient irrigated light gray soils of Surkhandarya region.

With this in mind, these conditions are used to determine the impact of different irrigation regimes, technologies and fertilizers on the growth, development, yield, yield, storage and quality of potatoes on the basis of the results obtained. The preparation of recommendations for production on technology and fertilizer standards is a topical issue.

During 2018-2020, the Surkhan farmers' association of Jarkurgan district of Surkhandarya region conducted special field experiments to study the growth, development, yield formation and yield of potatoes Sylvana and Saviola

medium ripening varieties under different irrigation regimes and fertilizers in the conditions of ancient irrigated light gray soils.

Humus (according to Tyurin) -0.9-1.1% in the tillage (0-30 cm) layer of soil; nitrates (according to Grandval'-Lyaju) -9.50-11.98 mg; mobile phosphorus (according to Machigin) -16.2-22.3 mg; The exchangeable potassium (according to Protasov) -192.3-206.5 mg per kilogram of soil. A one-meter layer of soil is a limited field or the smallest moisture capacity is 19.27-19.74%, the volume mass is 1.34-1.37 g / cm³. Moisture of the soil before irrigation during the growing season in the method of thermostatic drying on the layer 0-50 cm during the period of "germination"; 0.70 cm layer during the "flowering" period; During the period of "flowering-yellowing" it was determined on the layer of 0-100 cm.

The periods between irrigations were determined by the method of accelerated VE Kabaev by making balls from the soil.

The actual irrigation rate was calculated by adding 10% to the soil deficit moisture (taking into account losses and evaporation during the irrigation period).

Water consumption for irrigation was determined by Chipoletti water meter. The slope of the field test area is 0.0032. In the experiment, 3 irrigation regimes 65-75-75, 65-85-85 and 75-85-85% (compared to ChDNS) were studied. The following fertilizer standards with N: P: K ratios of 1.0: 0.8: 0.5 were tested in each irrigation regime (Table 1):

1. N₁₅₀ P₁₂₀ K₇₅ kg / ha (control);
2. 20 t / ha manure + N₁₅₀ P₁₂₀ K₇₅ kg / ha;
3. 20 t / ha manure + N₁₅₀ P₁₂₀ K₇₅ kg / ha;

Planting was carried out on January 18-23 at a depth of 6-8 cm in a scheme of 70 x 20 cm. The

area of Delyanka is 336 m² for irrigation regime and varieties, 112 m² for fertilizers. The number of repetitions was 4.

Table 1

Experimental options on irrigation regime and fertilizer standards, their actual performance

№	Irrigation regime, in % of ChDNS	Fertilization standards		Fertilization times				Irrigation			Seasonal irrigation rate, m ³ /ha				
		manure, t / ha	NPK, kg / ha	Plow		with planting (P ₂ O ₅)	during growth		numbers	scheme	standards, m ³ /ha				
				Manure	K ₂ O		when sprouting	honing			1-cycle	2-cycle	3-cycle		
Sylvana variety															
1	65-75-75 (control)	-	N150P120K75 (control)	-	75	90	30	75	75	7	1/1/2005	1050	790	760	5590
2		20	N150P120K75	20	75	90	30	75	75			1050	790	760	5590
3		20	N200P160K100	20	100	120	40	100	100			1050	790	760	5590
4	65-85-85	-	N150P120K75	-	75	90	30	75	75	8	1/2/2005	1050	580	550	4380
5		20	N150P120K75	20	75	90	30	75	75			1050	580	550	4380
6		20	N200P160K100	20	100	120	40	100	100			1050	580	550	4380
7	75-85-85	-	N150P120K75	-	75	90	30	75	75	9	1/2/2006	805	580	550	4685
8		20	N150P120K75	20	75	90	30	75	75			805	580	550	4685
9		20	N200P160K100	20	100	120	40	100	100			805	580	550	4685
Saviola variety															
10	65-75-75 (control)	-	N150P120K75 (control)	-	75	90	30	75	75	7	1/1/2005	1050	790	760	5590
11		20	N150P120K75	20	75	90	30	75	75			1050	790	760	5590
12		20	N200P160K100	20	100	120	40	100	100			1050	790	760	5590
13	65-85-85	-	N150P120K75	-	75	90	30	75	75	8	1/2/2005	1050	580	550	4380
14		20	N150P120K75	20	75	90	30	75	75			1050	580	550	4380
15		20	N200P160K100	20	100	120	40	100	100			1050	580	550	4380
16	75-85-85	-	N150P120K75	-	75	90	30	75	75	9	1/2/2006	805	580	550	4685
17		20	N150P120K75	20	75	90	30	75	75			805	580	550	4685
18		20	N200P160K100	20	100	120	40	100	100			805	580	550	4685

Maintenance, observation, measurement and calculations of potatoes on the field experimental plot (field) were carried out on the basis of generally accepted methods and recommendations.

The data show that when the irrigation regime is 65-75-75% of the limited field moisture capacity, it is irrigated 7 times in the 1-1-5 scheme during the growing season, the irrigation rate is 760-1050 m³ per hectare, the interval between irrigations is 7-13 days, the seasonal irrigation rate while 5590 m³.

When the irrigation regime was 65-85-85% of the limited field moisture capacity, 550-1050 m³ per hectare was used every 5-9 days in the 1-2-5 scheme, and 4380 m³ per season.

When the irrigation regime was 75-85-85% of the limited field moisture capacity, 550-805 m³ per hectare was given 9-7 times in 5-7-6 schemes every 5-7 days during the growing season, and 4685 m³ per season.

Irrigation regime and fertilizer standards had a significant impact on the growth, development and productivity of medium-sized potato varieties (Table 2).

When the irrigation regime was increased from 65-75-75 to 75-85-85 per cent of the field moisture capacity, the growing period of the Sylvana variety was extended from 82 days to 87 days, and that of the Saviola variety from 84 to 88 days.

Growth period for varieties was 82-85 and 84-85 days when fertilizer application rates were N150 P120 K75 kg / ha, and when fertilizer N200 P160 K100 kg was applied at 20 t / ha per day was 85-87 and 87-88 days and was extended by 2-3 days. observed.

Mineral fertilizers N150-200 P120-160 K75-100 kg / ha, local fertilizers 20 tons per hectare, when applied together and the irrigation regime is increased from 65-75-75 to 75-85-85% compared to ChDNS, the plant is tall, leafy, the

largest leaf surface was formed and vigorously branched, and the productivity of each bush was

found to be the highest (728–769 g in the Silvana variety, 760–804 g in the Saviola variety).

Table 2
Influence of irrigation regime and fertilization norms on potato growth, development and productivity (for 2018-2020)

№	Irrigation regime, in% of ChDNS	Fertilization standards			Growth period per day	(5-8.05) Plant height, cm	The number of stems in a bush	One bush, in grams	
		manure, t / ha	NPK, kg/ha	leaf weight				leaf weight	Tuber yield
Sylvana variety									
1	65-75-75	-	N ₁₅₀ P ₁₂₀ K ₇₅ (control)	82	67,3	3,4	0,63	418	632
2	(control)	20	N ₁₅₀ P ₁₂₀ K ₇₅	84	70,6	3,5	0,78	489	690
3		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	85	75,4	3,5	0,82	511	718
4		-	N ₁₅₀ P ₁₂₀ K ₇₅	83	70,8	3,3	0,65	428	656
5	65-85-85	20	N ₁₅₀ P ₁₂₀ K ₇₅	85	72,6	3,6	0,84	524	728
6		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	86	76,5	3,5	0,90	545	746
7		-	N ₁₅₀ P ₁₂₀ K ₇₅	85	71,8	3,5	0,70	438	679
8	75-85-85	20	N ₁₅₀ P ₁₂₀ K ₇₅	86	73,6	3,6	0,90	536	748
9		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	87	78,2	3,6	0,96	567	769
Saviola variety									
10	65-75-75	-	N ₁₅₀ P ₁₂₀ K ₇₅ (control)	84	72,9	3,7	0,71	462	676
11	(control)	20	N ₁₅₀ P ₁₂₀ K ₇₅	86	76,5	4,0	0,83	501	712
12		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	87	78,9	4,1	0,88	536	731
13		-	N ₁₅₀ P ₁₂₀ K ₇₅	85	75,2	3,8	0,76	478	714
14	65-85-85	20	N ₁₅₀ P ₁₂₀ K ₇₅	87	79,4	4,0	0,90	545	760
15		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	88	80,8	4,0	0,95	564	770
16		-	N ₁₅₀ P ₁₂₀ K ₇₅	85	76,0	4,0	0,79	488	751
17	75-85-85	20	N ₁₅₀ P ₁₂₀ K ₇₅	88	80,4	4,2	0,95	558	790
18		20	N ₂₀₀ P ₁₆₀ K ₁₀₀	88	81,8	4,2	0,97	575	804

Data on the impact of different irrigation regimes and fertilizer rates on yields and commodity consumption are presented in Table 3, with experimental options and varieties yielding from 24.6 to 37.8 tons per hectare. Increase the irrigation regime from 65-75-75 to 75-85-85% of the limited field moisture yield per hectare by 12.1-18.7% by varieties, fertilizer rates N₁₅₀P₁₂₀K₇₅ kg / ha to N₂₀₀P₁₆₀K₁₀₀ kg / ha local fertilizer when combined, it provided an additional yield of 14-24 percent.

Table 3

Impact of different irrigation regimes and fertilizer standards on productivity and yield per 1 cubic meter of water (for 2018-2020)

The highest commodity yield (35.8-37.4 t / ha) was recorded when the irrigation regime was 75-85-85% compared to ChDNS, when 20 t / ha of manure N₂₀₀ P₁₆₀ K₁₀₀ kg / ha were co-administered. At that time, the highest yield per cubic meter of irrigation water was found to be 7.73-8.07 kg.

Irrigation regimes and fertilizer standards increased yields in subsequent increased options, but it was within experimental error. Therefore, the main elements of water and resource (fertilizer) saving technology are the irrigation regime of 75-85-85% compared to ChDNS, and local and mineral fertilizer (20 t / ha manure and N₂₀₀ P₁₆₀ K₁₀₀ kg / ha norm) is a combined application.

This means keeping the irrigation regime at 75-85-85% compared to ChDNS for a stable high quality and cheap yield of potatoes from Surkhandarya region in the conditions of lightly irrigated light gray soils of Surkhandarya region, using 9 times 1-2-6 during the growing season. Irrigation at intervals of 5-7 days and binding with 20 t / ha of manure and N₂₀₀ P₁₆₀ K₁₀₀ kg / ha of fertilizers have a positive effect on potato growth, development, yield formation, yield and yield of more than 35-37 tons per hectare. gives This leads to a reduction in water consumption per quintal of potatoes to 12.4-12.9 m³.

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