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The Effect Of Irrigation On The Yield Of Winter Wheat Varieties

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Abstract. This research work presents an analysis of the formation of winter wheat yield depending on irrigation methods and irrigation regimes in the cultivation of winter wheat varieties in the conditions of irrigated light gray soils of the Kashkadarya region. According to the average 3-year results obtained during 2022-2024, the yield of winter wheat varieties ranged from 44.3 c/ha to 74.0 c/ha, and it was established that the yield of winter wheat varieties was higher when irrigating with sprinkler irrigation, with an irrigation regime of 70-75-65% of LFC before irrigation.
Keywords: light gray soils, winter wheat, varieties, yield, sprinkler irrigation, furrow irrigation, irrigation methods, irrigation regimes.
Аннотация. В данной исследовательской работе представлен анализ формирования урожайности озимой пшеницы в зависимости от способов и режимов орошения при возделывании сортов озимой пшеницы в условиях орошаемых светло-серых почв Кашкадарьинской области. По средним 3-летним результатам, полученным в 2022-2024 годах, урожайность сортов озимой пшеницы варьировала от 44,3 ц/га до 74,0 ц/га, и установлено, что урожайность сортов озимой пшеницы была выше при поливе методом дождевального орошения режимом орошения 70-75-65% от ППВ.
Ключевые слова: светло-серые почвы, озимая пшеница, сорта, урожайность, дождевание, полив по бороздам, методы орошения, режимы орошения.

Introduction. In world agriculture, wheat plays a leading role and ranks first in terms of sown area and gross grain yield. It is mainly cultivated for the purpose of producing flour for making bread, confectionery, or pasta. In addition, various cereals are made from wheat grain. Specially created varieties serve for food preparation [1].

Winter wheat is a valuable food crop and one of the most productive grain crops. The importance of winter wheat as a food crop is not inferior to spring wheat. Winter wheat is much more productive than spring wheat. Winter wheat also has greater organizational and economic importance than spring wheat. Because it can be sown in autumn, harvested in spring 8-10 days earlier than spring wheat, and agricultural machinery can be used more effectively. In Uzbekistan, winter wheat yields 40-80% more in rainfed conditions compared to spring wheat. On irrigated lands, the winter wheat yield is higher than when sown in spring. Winter wheat, compared to spring wheat, better utilizes soil moisture from autumn, winter, and spring precipitation, forms a high yield, and is less susceptible to extreme heat and hot winds [3].

For obtaining a high yield of winter wheat, it is important to timely and efficiently carry out such work as high-quality preparation of the land for sowing, correct determination of sowing dates and rates, and quick and high-quality irrigation. Experiments show that from winter wheat varieties cultivated in various soil and climatic conditions of our republic, it is possible to harvest more than 60-70 c/ha. Seeds are sown at optimal times, and when moisture is sufficient, the seeds germinate evenly, forming 3-4 stems before the onset of cold weather, and overwinter fully. Early or late sowing of seeds negatively affects plant growth, development, and yield [2].

Research materials and methods. The research was conducted in 2022-2024 under the conditions of irrigated light gray soils of the Kashkadarya region. The soil of the experimental plot is light gray soils. The experimental system was carried out with 2 different irrigation methods, 3 different irrigation regimes, 18 variants, and 3 replications, the variants were arranged systematically. Irrigation was carried out using traditional methods, i.e., furrow irrigation, as well as sprinkler irrigation, which is one of the modern water-saving irrigation methods. Blocks: block 1 - furrow irrigation (standard), block 2 - sprinkler irrigation. In the

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experiment, the soil moisture before irrigation was 65-70-60% of LFC; 70-75-65% LFC; It was carried out according to 75-80-70% LFC regimens.

The selection of soil and plant samples, taking into account soil moisture, water, and the yield of winter wheat, their preparation, and analysis were carried out according to generally accepted methods.

Statistical processing of the obtained experimental data was carried out by the dispersion-analytical method of B.A.Dospekhov [4].

Research results and analysis. The correct choice of irrigation timing for agricultural crops is the main factor ensuring high crop yields. To obtain a high yield of winter wheat, it is necessary to provide the plant with optimal water during its growth and development [5].

The duration of the growth period depends on many factors. Depending on the region and climate, the vegetation period is affected by air temperature, frosty days, the amount of precipitation, or the length of daylight hours. Among the factors influencing the full growth and development of plants grown during the growing season, water availability plays an important role.

According to the results of studies conducted on the study of irrigation methods and regimes of winter wheat varieties in the conditions of irrigated light gray soils of the Kashkadarya region, the yield of winter wheat varieties ranged from 44.3 to 74.0 c/ha (Table 1).

According to the results of research conducted in 2022-2024, when irrigating winter wheat varieties using the standard furrow irrigation method, the soil moisture before irrigation was 44.3 c/ha for the "Tanya" variety, 47.8 c/ha for the "Asr" variety, 49.1 c/ha for the "Yaksart" variety, the soil moisture before irrigation was 57.8 c/ha for the "Tanya" variety, 62.4 c/ha for the "Asr" variety, 63.6 c/ha for the "Yaksart" variety, and the soil moisture before irrigation was 57.5 c/ha for the "Tanya" variety, 61.1 c/ha for the "Asr" variety, and 62.4 c/ha for the "Yaksart" variety.

Table 1

Influence of irrigation on grain yield of winter wheat varieties, c/ha (2022-2024).

№	Irrigation method	Pre-irrigation soil moisture relative to LFC, %	Variety name	In 2022	In 2023	In 2024	Average
1	Furrow irrigation (Standard)	65-70-60	Tanya	45,7	42,8	44,3	44,3
2			Asr	50,4	46,8	46,3	47,8
3			Yaksart	52,5	48,2	46,7	49,1
4		70-75-65	Tanya	57,5	56,9	59,1	57,8
5			Asr	63,3	61,8	62,1	62,4
6			Yaksart	63,8	63,0	64,0	63,6
7		75-80-70	Tanya	59,0	55,0	58,5	57,5
8			Asr	62,4	58,1	62,9	61,1
9			Yaksart	63,0	60,4	63,8	62,4
10	Sprinkler irrigation	65-70-60	Tanya	59,4	49,6	47,8	52,3
11			Asr	63,7	54,3	49,6	55,9
12			Yaksart	65,7	56,3	50,7	57,6
13		70-75-65	Tanya	70,0	66,4	64,1	66,8
14			Asr	74,6	70,5	71,3	72,1
15			Yaksart	76,3	73,2	72,4	74,0
16		75-80-70	Tanya	68,3	61,8	63,5	64,5
17			Asr	71,2	66,0	67,4	68,2
18			Yaksart	73,1	69,4	68,5	70,3
Experimental error			S_x	0,24	0,24	0,27	x
Average error of difference			S_d	0,33	0,34	0,38	x
Minimum difference, c/ha			NSR_{05}	0,87	0,88	0,98	x
Minimum difference, %			NSR_{05}	4,84	4,90	5,44	x
Standard deviation			S	0,41	0,41	0,46	x

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Coefficient of variation	Sv %	2,27	2,30	2,55	x
For the irrigation method	NSR_{05}	0,96	0,97	1,07	x
For irrigation norms	NSR_{05}	0,62	0,63	0,70	x
For varieties	NSR_{05}	0,62	0,63	0,70	x

When irrigating winter wheat varieties with sprinkler irrigation, which is a water-saving irrigation method, the yield was 52.3 c/ha for the "Tanya" variety, 55.9 c/ha for the "Asr" variety, 57.6 c/ha for the "Yaksart" variety, 66.8 c/ha for the "Tanya" variety, 72.1 c/ha for the "Asr" variety, 74.0 c/ha for the "Yaksart" variety, 64.5 c/ha for the "Tanya" variety, 68.2 c/ha for the "Asr" variety, and 70.3 c/ha for the "Yaksart" variety at an irrigation regime of 65-70-60% of LFC.

Conclusion. Comparing the irrigation methods of winter soft wheat varieties, according to the results of scientific research on the study of irrigation regimes and rates, it was established that the lowest water consumption for all irrigation regimes was observed in the sprinkler irrigation method. With the sprinkler irrigation method, which is considered one of the modern water-saving irrigation methods compared to furrow irrigation, when irrigating with a pre-irrigation soil moisture regime of 70-75-65% of LFC, a high yield of winter wheat varieties was observed.

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