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# EFFECT OF IRRIGATION METHOD AND RATE ON GRAIN YIELD OF WINTER WHEAT

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**Abstract**
This article presents an analysis of scientific data regarding the impact of irrigation procedures on the growth and productivity of the winter wheat variety "Starshina" under the conditions of alluvial, medium sandy soils in the Bukhara region. According to the research findings, soil moisture levels before irrigation for the Starshina variety of winter wheat ranged between 70-80-70 % of the field's maximum moisture capacity. In the fourth scenario, irrigation norms were set at 737-842 m3/ha, with a seasonal irrigation norm of 4622 m3/ha, resulting in a yield of 6.38 t/ha.

**Keywords**: Winter wheat, Starshina variety, irrigation rate, irrigation regime, growth and development, yield.

## Introduction

Today, there are 200 million people in more than 100 countries in the world. Wheat was planted on more than 100,000 hectares, and 729.0 mln. tons of grain are grown. Of this, the weight of autumn soft wheat is 90-95 percent. Today, in many countries, in addition to mineral fertilizers, there is an increasing interest in using non-traditional agrarian materials to obtain a high and quality harvest from winter wheat. An example of this is that according to statistical analysis, more than 12,000 tons of non-traditional agro-ores are mined annually from 45 countries of the world, and they are widely used in various fields of agriculture and national economy.

Wheat is an important food crop in the world. Two-thirds of the world's population eats bread made from wheat flour. Because it contains all the necessary nutrients for the human body. Wheat bread is extremely nutritious. Nutritiousness depends on the amount of protein content (12-20% and more).

## Research materials and method.

Бухоро вилояти Бухоро туманида жойлашган Ғаллачилик илмий тадқиқот институти Бухоро филиалининг қадимдан суғориладиган ўтлоқи аллювиал, механик таркиби бўйича ўрта қумоқ тупроқлари шароитида ўтказилган тажриба натижаларидан олинган маълумотларга кўра тажриба дастурида белгиланган каби кузги буғдой 2 октябрдан







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5 октябрга бўлган муддатларда экилиб, 11-12 кунда тўлиқ униб чиқишга эришилди ҳамда ўтказилган тажрибаларда махсус намлик ўлчовчи қурилмалар, яъни тензиометрлар ўрнатилиб, soil moisture indicators were determined during the irrigation process.

During the experiment, in order to moisten the soil before sowing winter wheat and ensure high-quality seed harvest, 700-750 m3 of seed water per hectare was applied each year before sowing the grain. The following formula (1.) of S.N. Ryzhov was used to determine the irrigation rate for winter wheat. γ

$$M = (W_{чднс} - W_x) \cdot 100 \cdot \gamma \cdot h + K, \qquad (м^3/га)\ (1.)$$

In the formula given by S.N. Rizhov, Wchdns is the limited field moisture capacity, in %; **W** h is the soil moisture before irrigation, in %; **γ** is the bulk density of the soil, g/cm$^3$; h is the calculated layer thickness, m; K is the amount of water spent on evaporation during irrigation, m$^3$/ha (in terms of moisture deficit, 10%).

In the 1st variant of research, winter wheat was irrigated 6 times during the growing season, the irrigation rate was 835-934 m$^3$/ha, and the seasonal irrigation rate was 5348 m$^3$/ha. In the course of scientific research, the soil moisture before irrigation of winter wheat was irrigated at 70-70-65% compared to ChDNS. In the 2nd option, the irrigation rates were 804.7-1132 m$^3$/ha, the seasonal irrigation rate was equal to 4886 m3/ha, and 461 m$^3$/ha less water was used compared to the control option.

Also, during the experiments, in variant 3, where the soil moisture before irrigation of winter wheat was irrigated at 70-75-70% of the SSN, the irrigation rate was 807.3-1064.7 m$^3$/ha and the seasonal irrigation rate was 4724 m3/ha, while in variant 4, where the soil moisture before irrigation of winter wheat of the Starshina variety was irrigated at 70-80-70% of the SSN and the fertilization rate N-250; P-175; K-90 kg/ha was used, the irrigation rates were 737-842 m$^3$/ha, and the seasonal irrigation rate was 4622 m$^3$/ha, which achieved water savings of 726 m$^3$/ha compared to the control variant.

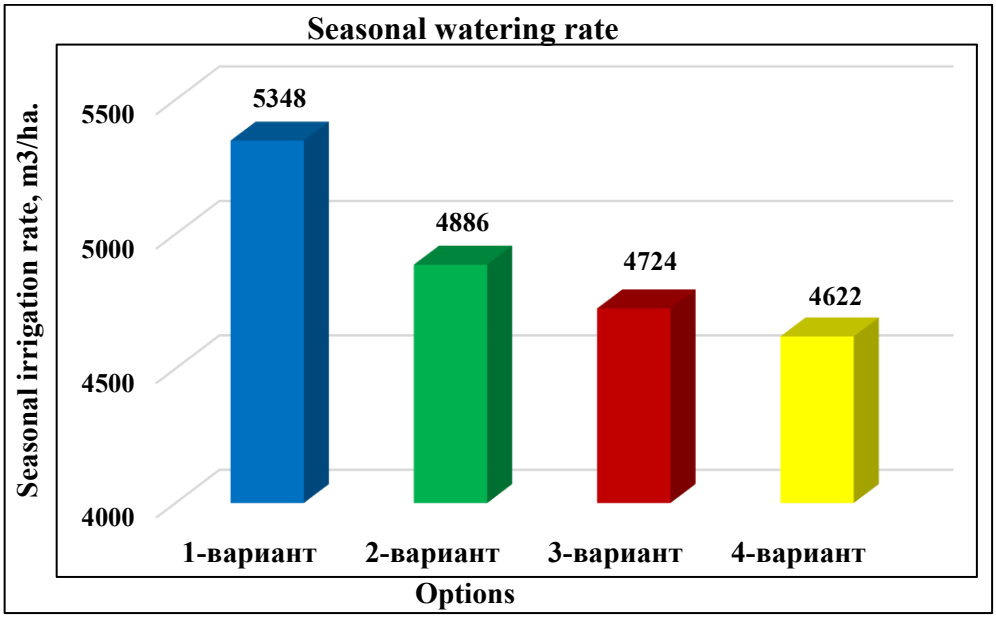


**Figure 1.** Seasonal irrigation rate of the Starshina variety of winter wheat.

In the experiments conducted to study the irrigation regime of winter wheat under saline soil conditions, in the control, i.e., variant 1, an average grain yield of 55.9 c/ha was obtained from winter wheat over three years. In the 2nd variant of the studies, i.e., in the field irrigated with a soil moisture content of 70-70-65% relative to the NDMS, the average grain yield of winter wheat over three years was 59.7 c/ha, which was 4.2 c/ha higher than the control variant.

In the course of scientific research, the winter wheat variety Starshina was irrigated at 70-75-70% soil moisture before irrigation in the 3rd variant, the grain yield of winter wheat was 60.8 t/ha on average, and 4.9 t/ha higher grain yield was achieved compared to the control, i.e. winter wheat field grown under farm conditions. During the researches, the grain yield was equal to 63.8 t/ha in the 4th variant, which was irrigated at 70-80-70% soil moisture before irrigation of winter wheat compared to ChDNS, and 7.9 t/ha higher yield was achieved compared to the control variant (Table 1).

**Table 1 Effect of winter wheat irrigation on grain yield, (ts/ha)**

| Options | Soil moisture before irrigation, in % relative to ChDNS | Returns | | | Average yield, ts/ha |
|---|---|---|---|---|---|
| | | I | II | III | |
| **On average in 2003-2005** | | | | | |
| Option 1 | Control | 56,2 | 55,8 | 55,8 | 55,9 |
| Option 2 | 70-70-65 | 59,5 | 59,8 | 59,7 | 59,7 |
| Option 2 | 70-75-70 | 60,9 | 60,7 | 60,6 | 60,8 |
| Option 3 | 70-80-70 | 63,7 | 63,8 | 64,0 | 63,8 |

**Conclusion:**

It was found that in the conditions of the Bukhara region, in the conditions of the alluvial, medium-sandy, moderately saline soils of the Bukhara region, winter wheat Starshina variety was irrigated with a soil moisture content of 70-80-70% relative to the average soil moisture content, 6 irrigations in the 2-3-1 system, and the application of the N-240 kg/ha; K180 kg/ha and P90 kg/ha fertilization rates, an average grain yield of 63.8 c/ha was obtained from winter wheat, and the profitability level was 19.1%.

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