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CULTIVATION OF A NEW VARIETY "MINGCHINOR" OF DURUM WHEAT IN NON-IRRIGATED FARMING CONDITIONS: THE ROLE OF PLANTING TIMES AND NORMS

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Abstract:

The article notes that in the world and our country, non-irrigated fields have long been one of the important sources in meeting the needs of the population for grain crops, that durum wheat is a hot and dry climate crop, and that the demand for the production of durum wheat (Triticum durum), the most important raw material in the pasta and confectionery industry, is increasing Effective use of non-irrigated fields, increasing the yield of grain grown in non-irrigated fields, resistant to unfavorable factors, taking into account the high need for grain of durum wheat (Triticum durum) in the domestic and foreign markets, the creation of new varieties of durum wheat that meet the requirements of the state template, with a high yield and grain quality for non-irrigated fields, as well, taking into account soil and climatic conditions, ensuring the cultivation of a high and high-quality product based on the improvement of their scientifically based cultivation technology is one of the important tasks. Based on this, the goal of our research is to determine and introduce into production the optimal sowing times and norms for the cultivation of a cost-effective and high grain crop from new durum wheat varieties in the conditions of typical meadow soils of the non-irrigated hilly steppe (flat steppe) region of Kashkadarya region. The article presents scientists who have carried out scientific prohibitions on the treatments of selection and cultivation of durum wheat in the Republic and abroad on non-irrigated fields, materials and methods of research, the results of the study show the influence of the timing and norms of planting on the growth, development, grain yield and quality of the new variety "Mingchinor" of durum wheat. According to the results of an average 3 – year study, a new Mingchinor variety of durum wheat was obtained after pure plowing-2.5 million per hectare on October 21. the highest grain yield when sown germinate seed is 18.6 centner per hectare, and with its delay, the sowing standards are 3.0 million per hectare, when increasing the germinate seed, it is indicated that 16.8 centner will be obtained in the period of November 11 and 13.9 centner high grain yield in the period of December 1.

Keywords: non-irrigated fields, hilly steppe region, durum wheat, Mingchinor, new variety, planting time, planting norm, yield, grain quality

INTRODUCTION:

Climate change on Earth, an increase in desertification, a decrease in drinking and irrigation water are putting in front of all humanity the issue of saving water and growing agricultural products in conditions of waterlessness. A solution to this problem is to convert non-irrigated lands into crops and increase their yield.

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Today, non-irrigated fields in the world are 1.4 billion. It accounts for 85-87 percent of hectares or total farming land [19]. The humidity in the non-irrigated fields largely depends on the level of precipitation, which they liked in the autumn and winter seasons. All over the world, the area of such land changes every year depending on the level of humidity. Today, non-irrigated fields are an increasingly important part of agriculture development, providing the opportunity to more effectively use non-irrigated areas. Today, non-irrigated fields are considered widespread mainly in Afghanistan, Iran, China, India, Pakistan, Sudan, Turkey, Central Asian countries. Durum wheat is a hot and dry climate crop. Durum wheat is one of the most important grain crops, and 38.1 million tons of durum wheat grain is grown worldwide on an area of more than 17 million hectares. [12]

According to the decree of the president of the Republic of Uzbekistan dated June 17, 2019 PF-5742, a major task was to ensure the organization and implementation of scientific research on increasing soil fertility and utilizing non-irrigated lands more effectively [1].

Uzbekistan's natural and climatic conditions are favorable for cultivating durum wheat in the non-irrigated areas. Despite the fact that several new varieties of durum wheat have been created for planting in the non-irrigated areas of our republic, the arable land of these varieties is very scarce and cannot meet the demand of the pasta-conditer industry, which is developing in our republic, for durum wheat grain. However, in our republic there are scientific and practical opportunities for the cultivation of durum wheat in sufficient quantities. However, in subsequent years, the use of non-irrigated fields sharply decreased. Many of these factors can be attributed to the fact that the weather is arid in some years, a decrease in agricultural productivity, the lack of research into planting timing and norms, as well as the biological characteristics of varieties, soils, and climates. Based on this, the goal set by our research is to determine and introduce into production the optimal sowing time and norms for the production of a cost-effective and high grain crop of the new durum wheat "Mingchinor" variety in the conditions of typical meadow soils of the non-irrigated hilly steppe (flat steppe) region of Kashkadarya region.

MATERIALS AND METHODS:

Field experiments were carried out in the conditions of typical meadow soils of the non-irrigated hilly steppe region of the Kashkadarya region of the 'Yashin-Yamin' farm. This research was conducted in four terms involving the new Mingchinor variety of durum wheat; I-1.X. (Control); II-21.X; III-11.XI and IV-1.XII, where we studied germinate seeds of 2, 5, 3, 0 and 3, 5 million pieces in each term.

All observation, measurement, calculation and analysis work in field experiments was carried out based on generally accepted methods and recommendations [2].

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The field experiments were repeated four times in 50-meter square plots, placed in two tiers.

Statistical processing of the results obtained in field experiments was carried out using WinQSB-2.0 and Microsoft Excel programs using the method of B. A. Dospekhov [3].

The average annual air temperature in non-irrigated regions is 10-16°C. The amount of annual precipitation increases from lowland non-irrigated fields to mountainous areas and averages 250-280 and 400-450 mm. As the place rises above sea level, the air temperature decreases and the amount of precipitation increase.

The average annual precipitation at Chimkurgan weather station, located near Yakkabag district, is 374.8 mm, the average annual monthly temperature is 11.0°C, and the average relative humidity is 68.2%.

According to the Chimkurgan weather station, the weather conditions in 2017-2020, when the experiment was conducted, were as follows:

In 2018, when the experiment was conducted, the amount of precipitation during the growing season of durum wheat (February-June) was 109.8 mm. This indicator is 120.4 mm less than the average annual (230.2 mm) for the same period.

Long-term studies and observations show that the distribution of precipitation during the growing season of winter crops in non-irrigated areas, the amount of moisture in the soil is of great importance for the formation of grain yield. In this regard, in 2019, the amount of precipitation in the early growing season of durum wheat varieties (tillering-stem extension) amounted to 311.2 mm. However, in 2018, weather conditions were unfavorable for winter grain crops in arid areas. This year, the amount of precipitation in May-June (heading-ripening) was significantly less (22.6 mm) compared to the norm (49.2 mm), which led to a sharp decrease in soil moisture. Extremely low rainfall, especially in the most critical period for the harvest, i.e. at the stage of flowering and milk-dough ripeness, led to a decrease in soil moisture and, as a consequence, a decrease in grain yield.

In 2017-2020, when the experiments were conducted as a whole, during the sowing period-germination, tillering and wintering of durum wheat seeds in October, November, December, the average daily air temperature during seed germination (I-1.XI) is 12.6-15.5 ° C, period (II-21.X-III-11.XI) 5.5-10.1 °C, period (IV-1.XII) 0.7-7.0 °C.

According to the Chimkurgan weather station, the amount of annual precipitation in October is 14.6 mm, in November - 42.5 mm, in December - 25.4 mm. In the 2017-2018 and 2019-2020 harvest years, when we conducted the experiment, there was less precipitation than in many years. Only in the 2018-2019 agricultural year, the monthly rainfall was higher than in many years, and this had a positive impact on the wheat harvest.

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The density, or bulk density of typical loamy gray soils with which we experimented is 1.17-1.43 g/cm3 per soil section. The highest indicator of soil density (1.43 g / cm3) corresponds to a layer of 20-30 cm, i.e. the "bottom of the cork".

The limited field moisture capacity (LFMC) of typical wet serozems is almost the same in all its layers - 18.0-19.3%.

The withering humidity of the plant varied from 4.3 to 5.6% in different layers of the soil section. This indicator was significantly higher only in the soil layers of 0-40 cm - 4.7-5.7%.

The amount of productive moisture that plants can absorb in the soil of the experimental field (limited field moisture capacity) is on average 18.4% in a layer of 0-180 cm.

RESULTS AND DISCUSSION:

The germination period of winter wheat seeds, the duration of the development phases depends on many factors, such as temperature, humidity, lightening, nutrient availability, genetic characteristics of the variety, plant infestation with diseases and pests, timing and sowing rates [10].

As a result of the interaction of sowing dates and norms, the duration of the phases of development of durum wheat of the Mingchinor variety is shown in Fig. 1.

The duration of the period before the germination-tillering phase was reduced with the postponement of the sowing dates, and the postponement of the sowing dates and the increase in the norms for the peak of germination accelerated the transition of the development phases. This pattern was observed throughout the entire period of maturation.

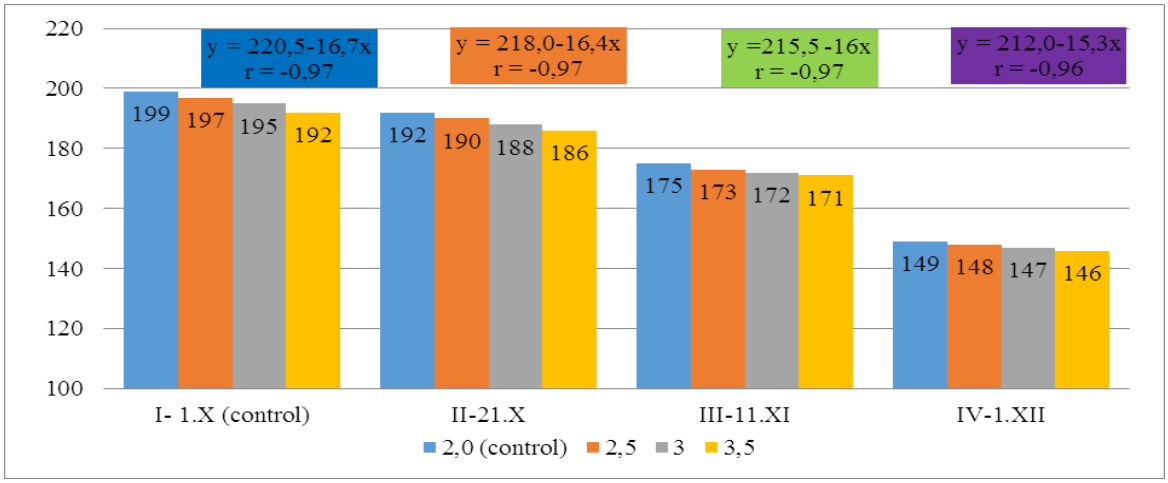

Figure 1: Dependence of sowing dates and vegetation norms of durum wheat of the Mingchinor variety

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Mingchinor variety October 1 (control) 2.0 million/ha. Wheat ripens in 199 days with late sowing and in 175 days; it ripens in 149 days. This trend was also observed in a separate analysis of the Mingchinor variety. It is statistically proved that the growing season is somewhat shortened with a delay in sowing dates and even more shortened with an increase in the sowing rate (Fig. 1). It is established that the dependence obeys the regression equation $y=a – bx$ and the correlation coefficient $r > 0.97$. With the delay in sowing dates, the germination period of durum wheat varieties is associated with a decrease in soil moisture and temperature, that is, according to the Chimkurgan weather station, the average annual precipitation is 14.6 mm, in October 42.5 mm. in November and 25.4 mm in December.

As the seeding rates increased, the growing season of durum wheat decreased. 2.0 million/ha in the period as of October 1 (control). 3.5 million Per hectare of ordinary durum wheat in 199 days. Increased to 7 days.

During the growing season of a wheat plant, adhesion is the main indicator determining productivity. A number of scientists note in their data the presence of a positive relationship between the productive population and productivity [7]. In our experiments, durum wheat varieties planted in autumn have a reduced crowding. Wheat seeds sown at a late date germinate late due to a decrease in temperature, and the formation of the nodule corresponds to the spring period. This affects the number of productive stems per plant (Table 1). The yield of individual durum wheat plants planted early was acceptable and higher compared to plants planted late. But 1 sq. The number of productive stems per meter was relatively high when planted at early and late dates according to all planting standards at optimal planting times. 1 sq. m of the Mingchinor variety, planted in an acceptable time and according to the norm (2.5 million / ha). Produced 218.8 productive stems per meter. The level of tillering of grain crops is directly related to the seeding rate.

The difference in the number of productive stems of plants of different thicknesses will not be large. Plants adapt to the conditions, striving to create an optimal bush density. With sparse planting, tillering increases, and with dense, on the contrary, very weak plants die due to unfavorable conditions, and the development of the remaining plants is delayed, and tillering decreases. With a dense planting, some factors are missing, as a result of which the plant dies early, without forming secondary roots, when it gives two or three leaves during the emergence of seedlings.

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Table 1: Depending on the timing and norms of planting, productive tillering and productive stems per 1 sq /m, pcs. (Mingchinor variety, 2017-2020)

Seeding period Seeding rate million germinating seeds/ha Productive yield of 1 sq. m. productive stems in

Sowing period	Sowing rate million germinating seeds/ha	Productive tillering	1 sq. m. productive stems/ pieces
I-1.X (control)	2,0 (control)	2,11	162,3
	2,5	1,81	157,5
	3,0	1,55	154,8
	3,5	1,52	152,3
II-21.X	2,0 (control)	2,11	184,6
	2,5	2,08	218,8
	3,0	1,91	217,9
	3,5	1,57	175,5
III-11.IX	2,0 (control)	1,90	159,3
	2,5	1,71	172,4
	3,0	1,65	184,1
	3,5	1,55	163,8
IV-1.XII	2,0 (control)	1,64	113,0
	2,5	1,47	122,7
	3,0	1,37	125,4
	3,5	1,30	118,3

Thus, in the growth and development of the wheat plant, two opposite and interrelated processes occur simultaneously, as well as the process of self-regulation of the optimal density of the plant.

With a delay in sowing dates, the sowing rate is set at 2.0 million hectares. From 3.5 million. Increase to 1 sq. m. the number of productive stems per meter increases compared to plants planted at an early and optimal time. In the early periods, the planting rate is 3.5 sq. m. the number of productive stems per meter in the Mingchinor variety is 152.3 pieces, in the late periods (III–11.XI), when planting, the most highly productive stems are 184.1 pieces and (IV-1.XII), and when planting - 125.4 pieces. In this case, the amount of productive stems, depending on the timing and planting rate of the Mingchinor variety, is due to the productive tillering of durum wheat, plant survival, that is, the number of plants preserved before harvest.

On the lands of the hilly steppe district of non-irrigated fields, durum wheat varieties have an acceptable ripening period (II.10-XI) and with moderate sowing (2.5 million /ha) form more than 1 square meter of productive stems. Delay in the sowing period (III-11.XI) and (IV-1.Since XII), an increase in productive stems was observed at the seeding rate (3.0 million/ha).

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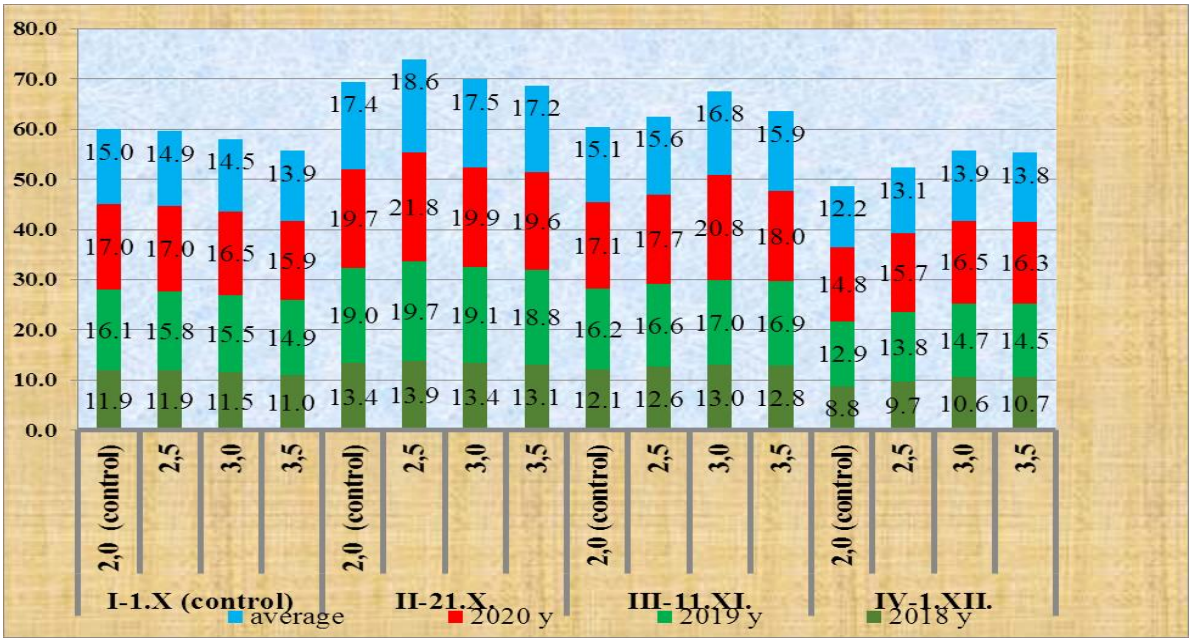

Figure 2. The influence of sowing dates and norms on the yield of durum wheat varieties, c/ha (Mingchinor variety, 2017-2020)

The sowing rate of winter wheat varies at different sowing dates [4; 8].

According to our experiments, the varieties of durum wheat Mingchinor on October 1 (control) is 2.0 million / ha. When sowing with sprouted seeds, the grain yield was normally 15.0 t/ha. The seeding rate is 2.0 million per hectare. From 3.5 million pieces when it was increased to the grain yield decreased. The sowing rate of grain crops is 3.5 million tons. 2.0 million When planting germinating seeds. Compared with sowing by varieties, it decreased by 1.1 c/ha (Fig. 2).

When the planting rate of the Mingchinor variety for the period of October 21 was increased from 2.0 million to 2.5 million hectares, grain yield increased by 0.3 c/ha. When the seeding rate was increased from 2.5 million to 3.5 million hectares, grain yield decreased by 0.5 c/ha.

Thus, on the lands of the non-irrigated fields of hilly steppe of Kashkadarya region, the durum wheat variety Mingchinor was sown on October 1 (Control) and optimal (II-21.X) and when sowing 2.5 million germinate seeds per hectare on time, and in late period (11.XI), (IV-1.XII) it is optimal when 3.0 million germinate seeds per hectare in terms of time and provides high yields.

The thickness of the plant bush is one of the important factors determining the growth, development and yield of winter wheat. When studying the relationship between sowing dates and norms on the Mingchinor variety on October 21, when sowing 2.5 million

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germinating seeds per hectare, 18.0 c of high-yielding seeds per hectare was obtained. With a repeated increase in the seeding rate, there was no significant difference in grain yield. With a delay in the sowing period, on November 11 (the second 10-day of November), increasing the rate by 0.5 million germinating seeds per hectare (20 kg /ha), that is, when sowing 3.0 million germinating seeds per hectare, a harvest of 16.8 c/ha was obtained. With a repeated increase in the seeding rate, there was no significant difference in grain yield. In our experiments, the timing and sowing rates affected the weight of 1000 grains. In our experiments, the mass of 1000 grains decreased with an increase in the seeding rate. On October 21, planting rate of Mingchinor variety increased from 2.0 million to 3.5 million seeds per hectare, resulting in a weight loss of 5.5 grams for 1000 grains. This pattern was also observed at the sowing dates of October 1 (control), November 11 and December 1. In the durum Mingchinor variety, with an increase in the seeding rate from 2.0 million seeds/ha to 3.5 million seeds/ha on October 21, grain quality decreased by 21 g/l. This pattern was also observed during the sowing dates of October 1 (control), November 11 and December 1.

The increase in seeding rates during all sowing periods led to a decrease in the protein and gluten content in the grain, as well as other grain quality indicators.

The new variety of durum wheat Mingchinor should be sown on October 21, after clean plowing, in conditions of typical dry-mountain gray soils. At the same time, the sowing of the Mingchinor variety on October 21 at the rate of 2.5 million germinating seeds per/ha (100-105 kg/ha) and the postponement of sowing 3.0 million germinating seeds per ha (120-125 kg/ha) is favorable for the growth and development of the plant by creating conditions for high-quality yield of durum wheat. As a result, it was possible to increase the yield from 16.8 to 18.0 c/ha with non-irrigated field agriculture.

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