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Development of the efficiency of winter wheat irrigation in the conditions of Bukhara region.

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Annotation: Summarizing the information presented in the scientific literature, it shows that determining the timing of planting wheat planted in autumn is one of the important factors of obtaining high and quality grain from irrigated lands. Planting periods have a significant effect on the degree of seed germination, characteristics of the formation of the wheat root system, the speed of development periods, accumulation, the level of plant resistance to cold, the activity of plant photosynthesis, resistance to diseases and pests, grain yield and its quality. has an effect.

Key words: Planting dates, fertilizer rates, irrigation methods, plant growth, development, crop structure, grain and straw yield.

Introduction: Planting dates, fertilizer rates, irrigation methods, plant growth, development, crop structure, grain and straw yield, determination of winter wheat varieties. Summarizing the information presented in the scientific literature, it shows that determining the timing of planting wheat planted in autumn is one of the important factors of obtaining high and quality grain from irrigated lands. Planting periods have a significant effect on the degree of seed germination, characteristics of the formation of the wheat root system, the speed of development periods, accumulation, the level of plant resistance to cold, the activity of plant photosynthesis, resistance to diseases and pests, grain yield and its quality. has an effect [11; b.83-99].

Like all crop species under irrigated farming, the effectiveness of winter wheat irrigation regimes depends on pre-irrigation soil moisture. Because nutrients are transferred to plants through the roots only in the state dissolved in water. Therefore, determining the water requirements of winter wheat during the development period is of great importance in determining the weight of the grain harvest in the future. [60; b.19-22].

A.I. Zadantsev writes that the roots of grain crops reach the lower layers of the soil, which creates a great opportunity for them to be supplied with water and food during flowering and harvesting periods. Additional moisture in the soil increases the number of lateral roots of grain crops and has a positive effect on its weight. [61; b.284].

At the Moscow Agricultural Academy named after K. A. Timiryazev, S. K. Kondrashev determined that the roots of autumn grain crops can reach a depth of 220-260 cm and even up to 400 cm. [62; b.73-78].

G.A. Goryukin in his research in the North Caucasus and along the Volga found that a high grain yield can be obtained if 1230 m^3 of water per hectare is given in a single irrigation of winter wheat, and if the seasonal rate of irrigation is set at 3335 m^3/ha [63;b.17-57].

Research methods and applied agrotechnical measures: Field experiments were conducted in 2021-2022 in the field of the farm "Karim Shahzod", Bukhara district. The Polovchanka variety, which is included in the Uzbekistan state register of winter wheat, was planted here. The experimental system is presented in Table 1

Experimental options (4) are placed on the I-level in 3 turns, the area of each option is 4.8 x 50 m^2 = 240 m^2, the total area is 120.0 m^2.

There are 12 plots on the first level, the field width is 236.0 m, the plot area of each variety is 236.0 m (width) x 50 m (length) = 11800.0 m2. 2 varieties of winter wheat were placed in 1 layer, occupying 11800.0 m^2 (varieties) = 23600.0 m^2 (2.36 hectares).

There is a 10-meter protection zone between each level, and it is 50 m long and 236 m wide, equal to 9440.0 m^2. The total area of the fields was equal to 47200.0 m^2 = 4.72 hectares.

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Winter wheat in the experimental field was fed twice with nitrogenous fertilizers (according to the experimental structure) during the heading and tuberting periods, and the water demand was carried out according to the experimental system. Mineral fertilizers are applied as usual: phosphorus and potassium 100% under the plow.

Table-1

Experience system (2021-2022).

Order of options	**Planting periods**	**Irrigation method in relation to the LFMC, %**	**Rate of mineral fertilizers, kg/ha**			**Before the plough**		**In full swing**	**In piping**
			N	P	K	P	K	N	N
1		gentle	-	-	-	-	-	-	-
2		70-70-65	150	100	75	100	75	75	75
3	1-10.10		200	140	100	140	100	100	100
4		70-80-65	150	100	75	100	75	75	75
5			200	140	100	140	100	100	100

Note: Winter wheat: Polovchanka variety was planted in the experiment.

The following phenological observations, measurements and calculations were made in the experiments:

- phenological observations and biometric measurements;
- the effect of applied agrotechnical measures on the growth, development and productivity of winter wheat was studied;
- germination dynamics of winter wheat varieties;
- periods of development of wheat varieties (tufting, tuberization, earing, flowering);
- ripening periods of winter wheat varieties (milk, wax and whole);

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- actual seedling thickness: before wintering, after wintering and before harvesting, pieces per 1 m^2.

At the end of the growing season of winter wheat in the experimental field, 100 plants were sampled from 1 m^2 of plants marked in each plot to continue the remaining biometric measurements in laboratory conditions, and the following were determined in the plots:

- actual seedling thickness (number of bushes) per 1 m^2;
- the total number of stems per bush, per 1 m^2;
- the number of productive (spike) stalks, per 1 m^2;
- the number of grains in the spike, the number of spikes in the spike, the length of the spike 1000 grain weight;
- plant height (cm), grain and straw productivity, s/ha.

All indicated phenological observation, biometric measurements, soil and plant sampling "Methods of conducting field experiments" methodological manual of UzPITI [78; p.1-146] was implemented.

Agrochemical analyses.

a) Soil analysis. 0-30 of experimental field soils; Before planting winter wheat in layers of 30-50 cm, soil samples were taken and humus, total nitrogen, phosphorus,

The amount of potassium and its mobile forms (N-NO3, P2O5, K2O) was determined by the following methods:

Amount of humus according to I.V. Tyurin's method; total NPK in one sample - according to I.M. Mal`tseva and P.P. Gritsenko; mobile phosphorus - according to B.P. Machigin; exchangeable potassium

It was carried out in a flame photocolorometer by the method of P.V. Pratasov. All agrochemical analyzes "Metodi agrokhimicheskikh analizov pochv i rastenyi" [79; c.187] methodically

was analyzed based on the instructions.

b) Plant and grain analyses. Plant samples from pre-defined 1m^2 plots from each plot according to winter wheat development periods

taken, and they contain:

- total nitrogen, phosphorus and potassium according to the accelerated (accelerated) method;
- protein in grain - according to Barnshein's method;
- the amount of gluten, transparency and nature of grain was determined according to GOST-9353-84.

Yield indicators of the experiment on returns and options B.A. Dospekhov [78; p. 1-146, 80; s.351] was processed statistically and dispersion was analyzed

and experimental error (EKF05) and experimental accuracy (R %) were calculated.

v) In determining the duration and norms of irrigation, according to the experimental system, it was calculated based on the formula of S.N. Rijov according to the difference between the CHDNS and the moisture content of the soil before irrigation [81; c.244].

The total water reserve on the globe is 1454.3 million cubic kilometers and 2% of it is fresh water. Of this 20% water, only 0.3% can be used. Therefore, using it carefully and sparingly is the most important task.

80, some 90% of agricultural crops consist of water. 4-5 g of water is needed to form 1 g of dry matter. From this point of view, it seems that the plant has more water than it needs, but when we consider the water consumption of different crops, we come to a different opinion. For example, autumn rye has a transpiration coefficient of 500-800 units, and for 1 g of dry matter, the plant transfers 500-800 g of water from its body.

Winter wheat is a plant that consumes water very sparingly, 450-600 g of dry matter is required for 1 g of dry matter, spring wheat is even less - 340-500 g, barley 300-350 g, and sorghum 200-300 g of water. spends Water consumption of red clover is 310-900 g, but it consumes the water it receives slowly. A rice plant consumes 600-800 g even if it is constantly in water.

So, plants use only 0.2% of the water they receive for the formation of organic matter, and the remaining 99.8% goes to evaporation and transpiration.

It should be noted that transpiration is the main means by which plants obtain the necessary nutrients from the soil. Therefore, according to the level of water supply, crops should be planted selectively in different soil conditions.

In addition, it is necessary to determine the limited field moisture capacity of each soil type in order to determine crop irrigation regimes.

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Limited field moisture capacity (LFMC) - the water holding capacity of soil is an important moisture constant, which refers to the ability of a soil layer to hold water without percolation.

Soil moisture levels are determined to be 0-30; LFMC of 0-50 and 0-70 cm layers is proportionally 23.4; It is determined to be 23.6 and 23.2% (Table 2).

Biz adabiyot sharhida ham, keyingi ayrim bo'limlarda ham yozganimizdek, sug'oriladigan dehqonchilik sharoitida tuproqda maqbul miqdorda namlik bo'lishi o'simlikdagi barcha jarayonlarning to'la-to'kis o'tishini ta'minlaydi.

Table-2
Limited field moisture capacity of meadow-alluvial soils (LFMC)

Soil layer, cm	Moisture detection points					Average
	1	2	3	4	5	
0-30	23,0	23,4	23,5	23,6	23,0	23,4
30-50	23,7	23,8	23,0	23,9	24,1	23,4
50-70	21,9	22,9	22,5	22,8	22,4	22,5
0-50	23,6	23,4	23,8	23,5	24,6	23,6
0-70	23,3	23,4	23,1	23,0	23,2	23,2

Soil moisture is not only water for the plant, but it dissolves nutrients in the soil and serves as the main factor controlling water-air exchange processes.

It should be said that in the conditions of meadow-alluvial soils, there is a lack of precipitation from the atmosphere in order to obtain a high quality grain and straw harvest from winter wheat.

But taking into account the amount of precipitation, the soil moisture before irrigation of winter wheat was determined for three years in relation to LFMC and dry soil in the defined soil layers along its development periods.

In our research, irrigation norms S.N. Rizhov [81; c.244] was calculated based on the formula.

M=(Wn-Wm)• 100 dh+k

Where: Wn - field moisture capacity in % of soil weight
Wm – soil moisture before watering, %
d - volume weight of soil, g/cm^3
h – considered soil layer, cm
k – additional to the amount of water that evaporates during irrigation – 10%.

It should be noted that the irrigation timings of winter wheat mainly depend on the actual soil moisture, which varies with the arrival of the weather, that is, when determining the irrigation timings in the irrigation regimes established in the early stages of plant development. causes some difficulty.

In the experiment, after the winter wheat varieties were planted in the specified periods, the seeds were watered the next day. During the period of operation of winter wheat varieties, the irrigation regime was irrigated 3 times for 3 years in the variants defined as 70-70-65% compared to LFMC, and 4 times in 70-80-65%. It is worth noting that in the conditions of 2021, the 1st watering was carried out on February 24, depending on the actual soil moisture (64.5%) in the options set as 70-70-65% according to LFMC, 612 per hectare, 8 m^3/water was given. These calculations were made based on the formula we wrote above.

The 1st water was given on March 1, at the rate of 819.2 m^3 per hectare, in the options of 70-70-65% of irrigation procedures compared to LFMC.

One more thing that should be explained separately is that the varieties of winter wheat, planting dates and fertilizer rate were not taken into account in the options with irrigation schedules, because these irrigation rates are the same in all options. is methodologically required.

In the experiment, the 2nd waterings were carried out on March 23 and 30, respectively, in the conditions of 2021, at the rate of 739.7 and 814.2 m^3/ha. The difference between irrigations was 7 days and 745.0 m^3/ha.

In the next 3 irrigations, the irrigation rates were increased to 933.5 and 1296.1 m^3/ha, taking into account the moisture in the 0-70 cm layer of the soil. Seasonal irrigation standards were close to each other and equaled 3279.8 and 3091.2 m^3/ha. In the experiments, the following 2021-2022 years also received indicators close to the above for the options. (Table 2).

Therefore, since the climatic conditions of the research years were close to each other, and rainfall did not differ much, it was possible to irrigate winter wheat varieties at the specified soil moisture.

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