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EFFECT OF MINERAL FERTILIZER RATES AND IRRIGATION REGIMES ON THE BIOMETRIC INDICATORS OF WINTER HARD WHEAT

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Annotation The requirements for mineral fertilizer rates and irrigation regimes were studied to obtain a high and quality grain yield from winter hard wheat under the conditions of anciently irrigated meadow soils of Andijan region.

Keywords: Field capacity, spike length, number of grains per spike, test weight of grain, 1000-grain weight, grain weight per spike.

Spike length, spike weight, number of grains per spike, and the 1000-grain weight of winter hard wheat are the main yield-determining factors, and they vary depending on the growing conditions, the biological characteristics of the variety, and the applied agrotechnology. The effectiveness of any applied agrotechnical measures is, of course, measured by yield.

In our research, in order to determine the influence of agrotechnical measures applied during the vegetation period on the yield components of winter hard wheat grown in different variants, we harvested plants from 1 m² plots at three points within each replication. The biometric indicators of the spikes were analyzed to assess productivity.

According to the results obtained (2016–2017), under the irrigation regime where pre-irrigation soil moisture was maintained at 60–70–60% of field capacity (FC) and mineral fertilizers were applied at the rate of N100P75K50 kg/ha (Variant 1), the average spike length was 7.1 cm, the number of grains per spike was 28.8, the grain weight per spike was 0.84 g, the 1000-grain weight was 29.1 g, and the test weight of the grain was 740.4 g/l. In comparison, in Variant 2, where mineral fertilizers were applied at a higher rate of N150P105K75 kg/ha, the average spike length was 8.3 cm, the number of grains per spike was 31.2, the grain weight per spike was 0.99 g, the 1000-grain weight was 31.8 g, and the test weight was 774.6 g/l. Thus, compared to Variant 1, Variant 2 showed an increase of 1.2 cm in spike length, 2.4 more grains per spike, 0.2 g more grain weight per spike, 2.7 g higher 1000-grain weight, and 34.2 g/l higher test weight of grain.

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Under the same irrigation regime, biometric indicators of spikes were analyzed in Variants 3 and 4, where mineral fertilizers were applied at rates of N200P140K100 and N250P175K100 kg/ha, respectively.

The results showed that the average spike length ranged from 8.8 to 9.3 cm, the number of grains per spike ranged from 32.7 to 33.0, the grain weight per spike was 1.09–1.11 g, the 1000-grain weight was 33.2–33.6 g, and the test weight of the grain was 796.2–817.5 g/l. Compared to Variant 1 (N100P75K50 kg/ha), these results indicate increases of 1.7–2.2 cm in spike length, 3.9–4.2 more grains per spike, 0.3 g more grain weight per spike, 4.1–4.5 g higher 1000-grain weight, and 55.8–77.1 g/l higher test weight of grain.

Under the irrigation regime where pre-irrigation soil moisture was maintained at 70–70–60% of field capacity, analysis of the variants showed that in Variant 5, where mineral fertilizers were applied at a rate of N100P75K50 kg/ha, the average spike length was 7.5 cm, the number of grains per spike was 29.3, the grain weight per spike was 0.89 g, the 1000-grain weight was 30.4 g, and the test weight of the grain was 753.8 g/l. In Variant 6, with mineral fertilizers applied at a rate of N150P105K75 kg/ha, the average spike length reached 8.8 cm, the number of grains per spike was 31.9, the grain weight per spike was 1.07 g, the 1000-grain weight was 33.4 g, and the test weight of the grain was 799.4 g/l. Compared to Variant 5, Variant 6 showed increases of 1.3 cm in spike length, 2.6 more grains per spike, 0.2 g more grain weight per spike, 3.0 g higher 1000-grain weight, and 45.6 g/l higher test weight of grain.

Under this irrigation regime, the biometric indicators of spikes were studied in Variants 7 and 8, where mineral fertilizers were applied at rates of N200P140K100 and N250P175K100 kg/ha, respectively. The results showed that the average spike length ranged from 9.4 to 9.7 cm, the number of grains per spike was 33.8–34.3, the grain weight per spike was 1.16–1.20 g, the 1000-grain weight was 34.4–35.0 g, and the test weight of the grain was 822.7–842.1 g/l. Compared to Variant 5 (N100P75K50 kg/ha), these results indicate increases of 1.9–2.2 cm in spike length, 4.5–5.0 more grains per spike, 0.3 g more grain weight per spike, 4.0–4.6 g higher 1000-grain weight, and 68.9–88.3 g/l higher test weight of grain.

Effect of mineral fertilizer rates and irrigation regimes on the biometric indicators of hard wheat spikes

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№	Irrigation regime, relative to field capacity (FC), %	Annual rate of mineral fertilizers, kg/ha	Spike length, cm	Number of grains per spike, grains	Grain weight per spike, g	1000-grain weight, g	Test weight of grain, g/l
1	60–70–60	$N_{100}P_{75}K_{50}$	7,1	28,8	0,84	29,1	740,4
2		$N_{150}P_{105}K_{75}$	8,3	31,2	0,99	31,8	774,6
3		$N_{200}P_{140}K_{100}$	8,8	32,7	1,09	33,2	796,2
4		$N_{250}P_{175}K_{125}$	9,3	33,0	1,11	33,6	817,5
5	70–70–60	$N_{100}P_{75}K_{50}$	7,5	29,3	0,89	30,4	753,8
6		$N_{150}P_{105}K_{75}$	8,8	31,9	1,07	33,4	799,4
7		$N_{200}P_{140}K_{100}$	9,4	33,8	1,16	34,4	822,7
8		$N_{250}P_{175}K_{125}$	9,7	34,3	1,20	35,0	842,1

The results obtained clearly show that, in both irrigation regimes, increasing the application rates of mineral fertilizers contributed to the improvement of productivity, leading to higher yields.

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