



## RESULTS OF SELECTING VARIETIES AND LINES OF BREAD WHEAT WITH HIGH PRODUCTIVITY ELEMENTS FOR RAINFED CONDITIONS OF UZBEKISTAN.

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Article history:	Abstract:
<b>Received:</b> 20 <sup>th</sup> March 2024 <b>Accepted:</b> 11 <sup>th</sup> April 2024	The grain yield of Bread Wheat varieties grown in rainfed (dry) areas varies under the influence of unfavorable factors of the external environment. Grain yield in Bread Wheat is determined by productivity elements. In the article, the results of the scientific research carried out in 2022 show the inter dependence of the elements of productivity in the Bread Wheat varieties, samples and lines.
<b>Keywords:</b> Productivity elements, main spike, spike length, spikelets, number of spikelets, number of grains, number of grains in spike, variety, line, 1000 of kernel weight, yielding.	

**INTRODUCTIONS.** The yield of crops grown on rainfed (dry land) in Uzbekistan is completely dependent on weather conditions. In addition, in recent years, due to global climate changes, frequent annual droughts and high temperatures during the growing season of Bread Wheat in dry lands have a great influence on the plant, causing a decrease in productivity and grain quality. leading to a decrease in yield and grain quality.

In the dry region of Uzbekistan, the growth and development of grain crops are severely damaged by the low temperature in winter and the heat and warm winds that occur during the flowering phases of wheat cultivars.

Today's modern agriculture requires wheat breeders to create high-yielding, excellent-quality Bread Wheat varieties. Therefore, one of the main directions in wheat breeding today is to improve grain quality along with increasing productivity. Development of Bread Wheat varieties of intensive type with high grain quality is important in grain production.

Based on these tasks, the developing of new local varieties of Bread Wheat, resistant to extreme adverse factors of the external environment, earlyripening, good bread-making and with high protein content, for planting in dry areas is one of the urgent tasks of today.

**MATERIALS AND METHODS.** Local varieties and hybrids of Breadt wheat available at the Research Institute of Rainfed Agriculture, more than 1300 lines belonging to ICARDA and SIMMIT International Scientific Centers and other wheat initial materials of foreign selection were used in the research.

Agrotechnical measures in carrying out scientific research are based on the recommendations and methods developed by the Research Institute of Rainfed Agriculture in 1994, phenological observations, evaluations and analyzes of various indicators in field and laboratory conditions. was carried out on the basis of developed methodological manuals.

Evaluations of wheat variety samples and lines in field experiments were evaluated according to the methods developed for the genus Tritisum of the International CEV classification.

**RESULTS AND DISCUSSIONS.** In Bread wheat varieties, traits and characteristics such as productive stems, spike length, number of spiklets in a spike, number of grains in a spike and grain, 1000 of kernel weight are important indicators in determining productivity.

Weather conditions and rainfall in dryland wheat cultivation affect grain yield. In the 2021-2022 years, it was observed that the amount of precipitation was 33.4 mm more than the average multi-years, the air temperature was -2.10C lower, and the relative air humidity was 4% lower.

Precipitation in October is around the average multi-year (17.1 mm), air temperature is -2.10 C lower than average the multi-year (12.10 C), precipitation in November is less than the average multi-year (35 mm) by -34.6 mm, air temperature is -1.60C lower, precipitation in December is -41.6 mm less than the average multi years, and air temperature is 3.50C higher. As a result of the lack of moisture and temperature in the soil during these months, it had a negative effect on the elongation of seed germination and field fertility.

In January and February, the amount of precipitation was higher than the average multi years standards, and the air temperature in the soil was sufficient, which created conditions for the germination of crops. It was observed that the long duration of the germination phase has a negative effect on the field fertility of the seeds.

In March, the precipitation was 108.6 mm above the average multi years, and the air temperature was -0.70C lower, which had a positive effect on the crops.

In April, it was observed that the amount of precipitation was -14.3 mm less than the average multi years, and the air temperature was +5.50C higher than the average multi years, which had a negative effect on the growth and development of plants. In this month, it was observed that the rapid growth and accumulation of biomass, the formation of productivity elements, the productivity and other valuable economic indicators were negatively affected (Table 1).

**Table 1.**

**Weather conditions in the years of the experiment (Gallaaral meteorological station data, 2022).**

Months	Precipitation, MM			Air temperature, °C			Air relative humidity, %		
	total	average multiyear	difference, ±	average	average multiyear	difference	average	multiyear	difference, ±
October	18,4	<b>17,1</b>	1,3	10	<b>12,1</b>	-2,1	52	<b>62</b>	-10
Novomber	0,4	<b>35</b>	-34,6	4,3	<b>5,9</b>	-1,6	66	<b>73</b>	-7
December	13,8	<b>55</b>	-41,2	3,8	<b>0,3</b>	3,5	75	<b>82</b>	-7
January	53,4	<b>40,4</b>	13	3,4	<b>-4</b>	-0,6	86	<b>85</b>	1
February	13	<b>52</b>	-39	4,7	<b>0,4</b>	4,3	73	<b>82</b>	-9
Murch	173,6	<b>65</b>	108,6	4,9	<b>5,6</b>	-0,7	76	<b>75</b>	1
April	39,3	<b>53,6</b>	-14,3	18,2	<b>12,7</b>	5,5	63	<b>69</b>	-6
May	78	<b>35,4</b>	42,6	20	<b>18,4</b>	1,6	62	<b>59</b>	13
June	5,8	<b>8,4</b>	-2,6	25,4	<b>24,6</b>	0,8	43	<b>45</b>	-2
<b>Total or average</b>	395,3	<b>361,9</b>	33,4	10,5	<b>12,6</b>	-2,1	66	<b>70</b>	-4

In the researches, the main characteristics of the variety are the spike length and the number of spikes. It has been determined that such characteristics as productive mass, the number of grains in a spike, and the 1000 of kernel weight depend on climatic conditions and have different amounts in different years.

The number of stems formed in a wheat plant is the result of general budding and is divided into productive and non-productive stems. Spikes are formed on fertile stems, and their large number leads to an increase in the number of grains obtained from one plant and is considered the main factor in determining productivity.

There is a positive correlation between the productive number of plants and grain yield. In strongly flowering plants, the spike is small, and the number of grains in the spike is also low [5], [6], [7].

In drought years, the abundance of productive stems in plants caused a decrease in the number of grains in the spike and the formation of empty grains, which led to a significant decrease in yield.

The highest grain yield was observed when there were 2-3 productive stems with spikes equal to each other in one plant, and the appearance of productive stems other than the main stem depends on the size of the feeding area [5].

When large grains and small grains were planted in the same variety, plants sprouted from large grains were less affected by fungi diseases, and plants sprouted from large grains were resistant to adverse environmental conditions [5].

The 1000 of kernel weight is a genetic trait, and it varies under the influence of external climatic conditions, diseases and pests, and agrotechnical measures. In wheat varieties, this indicator varies from a few grams to several tens of grams under the influence of various factors.

In wheat, the weight of 1000 grains is different in different parts of one ear. Large grains are formed in the spikes in the middle part of the spike, while the grains in the upper and lower spikes are smaller. Small grains are produced from the flowers in the middle of the spikes, and large grains are produced from the flowers on the sides [1].

In dry regions, the weight of 1,000 grains decreases sharply during the period of grain maturity when drought occurs, as well as when it is affected by fungal diseases.

Grain yield in wheat is formed depending on the influence of several biotic and abiotic factors affecting its quantity and quality. The number of grains in the spike depends on heredity, and it is effective to carry out selection work on this component [2], [7].

According to Reynolds et al. [7], the number of grains in the spike depends on the biology of the plant, that is, in the high agro background, the length of the spike and the number of grains in the spike increase significantly. Selection for the number of grains in one spike was effective. There is a positive relationship between this indicator and productivity, and a negative relationship with 1000 grain weight [7]. According to the studies of J.E. Flintham et al [2], a positive relationship was observed between the length of the spike and the number of grains in the spike.

Field trials conducted in 2022 for the study evaluated valuable traits and characteristics of Bread wheat cultivars and lines in Preliminary Variety Trial (PVT) and Competitive Variety Trial (CVT) nurseries.

According to the research results in Preliminary Variety Trial (PVT), the plant height is 75.3 cm in Tezpishar variety, 94.3 cm in SP-II-2020/83/sp2-2019/157, 87.3 cm in KP-2020/72 sp2-2019/53, KP-2020 /74. In the sp2-2019/87 line, it was 87.0 cm, and the standard variety was found to be tall compared to the variety. It was determined that the grain yield was 10.5 s/ha in the Tezpishar variety, 20.0 s/ha in the Kp84/2021 174/2020 (Semrug x Bahmal-97) line, and 18.2 s/ha in the KP-2020/72 sp2-2019/53 line.

Spike length is 8.7 cm in Tezpishar variety (an), the longest spikes are 11.5 cm in line KP-2020/72 SP2-2019/53, 11.8 cm in SP-II-2020/83/SP2-2019/157 , Kp84/2021 was 10.9 cm in 174/2020 (Semrug x Bahmal-97). According to the number of grains per spike and 1000 grain weight, respectively, Kp84/2021 174/2020(Sem x Bah) (43.0 grains and 47.2 g), SP-II-2020/83/sp2-2019/157 ( 35.8 pieces and 45.6 g), KP-2020/72 sp2-2019/53 lines (41 pieces and 43.0 g) were higher compared to the sample (36.6 pieces and 36.1 g) (Table 2).

**Table 2.**

**Valuable traits of varieties and lines in the Preliminary Variety Trial (PVT) (Gallaaral, 2022)**

№	Samples and lines	Plant height, cm	On main spike:				1000 of kernel weight, g	Yielding, s/ha
			long, cm	spikelets, pcs	grains, pcs	grains weight, g		
1	Tezpishar (st)	75,3	8,7	15,8	36,6	1,4	38,1	10,5
2	PSI-2020/8	70,6	8,7	16,8	38	1,3	34,8	11,0
3	PSI-2020/10	68,0	9,6	17,2	35,4	1,2	34,0	12,8
4	KP-2020/30	71,5	8,0	15,5	42,0	1,5	36,4	14,8
5	KP-2020/72 SP2-2019/53	87,3	11,5	16,3	41,0	1,8	43,6	18,2
6	KP-2020/74. sp2-2019/87	87	9	16,5	33,5	1,3	39,2	10,8
7	SP-II-2020/83/SP2-2019/157	94,3	11,8	19,3	35,8	1,6	45,6	16,5
8	KP83/2021/173/2020(Sem x Bah)	61,0	9,4	17,3	43,0	1,8	41,6	11,3
9	KP84/2021 174/2020 (Sem x Bah)	73,8	10,9	17,8	43,0	2,0	47,2	20,0
10	KP86/2021 178/2020 (Sem x KP-2016/57)	73,0	9,8	17,0	42,0	1,7	41,5	9,8
11	19/2020(ICA)	70,5	9	16	35,5	1,3	36,0	9,8
12	21/2020 (ICA)	59,8	8,1	15,4	36,4	1,4	38	13,3
13	24/2020 (ICA)	47,7	7,3	14,7	33,0	1,1	33,4	11,0
14	30/2020 (ICA)	64,3	9,3	16,7	42,0	1,5	34,8	10,0
15	32/2020 (ICA)	63,3	8,0	15,0	39,0	1,2	31,2	13,8
	LDS05							3,4

The following results were obtained when the valuable economic characteristics and characteristics of soft wheat varieties, variety samples and lines were studied in the Competitive Variety Trial (CVT) nurseries.

According to the research results, the plant height is 77.5 cm in the Tezpishar variety, 91.3 cm in the Noshkent variety, 87.0 cm in the Bakhmal-97 variety, 89.8 cm in the KSI-2020/16 kp-2016/58 line, SP-2016/303 ( Grekum-2023)

was 85.3 cm in the new naviline and 81.3 cm in the KP-2020/38 line, and it was determined that the model was taller than the variety. The spike length was 8.6 cm in the Tezpushar variety (model), and the longest spikes were 10.6 cm in the Bakhmal-97 variety, 10.0 cm in the Istiklol-6 variety, and 10.3 cm in the 01/2020 line.

According to the number of grains in the spike and the weight of 1000 grains, respectively, in PSI-2020/9 (43.5 grains and 42.4 g), in SP-2016/303 (40.3 grains and 41.2 g), in line 01/2020 (39.7 units and 42.8 g) lines were higher than the model (30.3 g and 37.4). Grain yield is 11.5 s/ha in Tezpushar variety, 18.5 s/ha in KSI-2020/16 kp-2016/58 line, 17.0 s/ha in PSI-2020/6 line and 13.5 s/ha in 2016/303 line. / was found to be (Table 3).

Table 3.

**Valuable traits of varieties and lines in the Competitive Variety Trial (CVT) nurseries (Gallaaral, 2022)**

№	Samples and lines	Plant height, cm	On main spike:				1000 of kernel weight, g	Yielding, s/ha
			long, cm	spikelets, pcs	grains, pcs	grains weight, g		
1	Tezpushar (st.)	77,5	8,6	15,3	30,3	1,14	35,5	8,5
2	Bakhmal-97	87,0	10,6	14,0	32,0	1,41	44,2	9,0
3	Sanzar-6	53,0	7,0	15,0	37,3	1,40	37,4	7,0
4	Istiklol-6	81,3	10,0	17,7	35,0	1,35	38,5	12,9
5	Sugdiona	51,5	7,5	14,5	32,3	1,29	40,0	8,8
6	<b>Nushkent</b>	91,3	9,0	17,0	39,5	1,79	45,2	12,8
7	Kizildon	52,3	7,6	13,5	36,0	1,40	38,8	11,7
9	PSI-2020/6	82,3	9,1	16,0	36,3	1,36	37,6	17,0
10	PSI-2020/9	62,0	9,5	17,5	43,5	1,84	42,4	11,0
11	<b>KSI-2020/16 KP-2016/58</b>	89,8	9,3	15,5	34,5	1,44	41,6	18,5
12	KP-2016/88	69,0	8,7	16,7	35,7	1,33	37,2	11,0
13	<b>KP-2020/38</b>	81,3	8,3	13,5	36,0	1,23	47,2	13,5
14	<b>SP-2016/303</b>	85,3	9,0	15,8	40,3	1,66	41,2	13,5
15	35/2020 ICA. 22 th IWWYT- SA9935/2020	63,5	9,8	17	37	1,42	38,4	11,0
17	KP-2020/26	65,7	9	16,3	37	1,63	44	9,5
18	01//2020	68,3	10,3	15,7	39,7	1,7	42,8	14,0
	LDS <sub>05</sub>							2,7

**CONCLUSIONS.** Тадқиқот натижаларига кўра, лалмикор минтақаларда буғдойда бошоқдаги дон сони бўйича танлаш ишларини олиб бориш самарали бўлиши аниқланди. Бошоқдаги дон сони кўп линияларда дон ҳосилдорлиги юқори бўлиши кузатилди. Шунингдек, бошоқдаги дон сони, дон ҳосилдорлиги, 1000 дон дон вазни ўртасида кучсиз боғланиш борлиги исботланди, яъни бошоқдаги дон сон кўп ва 1000 дон дон вазни юқори бўлсада дон ҳосилдорлиги паст бўлганлиги, 1000 дон дон вазни юқори бўлса ҳам дон ҳосилдорлиги паст бўлиши тадқиқотлар натижасида маълум бўлди.

According to the results of the research, it was found that it would be effective to carry out selection work on the number of grains in the spike of wheat in rainfed conditions (dry regions). It was observed that the grain yield was higher in the lines with more number of grains per spike. Also, it was proved that there is a less relationship between the number of grains in the spike, grain yield, 1000 of kernel weight, that is, the grain yield is low even if the number of grains in the spike is high and the 1000 of kernel weight is high.

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