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CREATION OF NEW DROUGHT-RESISTANT, HIGH-YIELDING AND HIGH-QUALITY VARIETIES OF BREAD WHEAT FOR RAINFED AREAS

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Abstract
This article describes the results of experiments on the selection of high-quality lines of bread wheat, as well as the yield of bread wheat in the conditions of rainfed areas, and their transfer to the next stages. The experiment used 26 lines and 4 local check varieties created by local hybridization. According to the results of the study, 2 lines of winter soft wheat were selected and introduced into production, which are suitable for the conditions of arable lands, with high yields and grain quality indicators..

Keywords: bread wheat, variety, line, yield, protein content, gluten content.

Introduction

In order to grow high-yield and high-quality grain in different regions, it is important to create and place varieties of grain crops that are scientifically based, taking into account the soil and climatic conditions.
Wheat grains contain 11-20% protein, 63-74% starch, around 2% fat as much fiber and ash. Important indicators that determine the quality of wheat are the presence of

protein and gluten in the grain, the amount of protein determines the scope of application of wheat. For example, in baking you need 14-15% protein, in the preparation of pasta you need grain with 17-18% protein. The greatest value has high quality strong, valuable and durum wheat varieties. The basis for the classification of soft wheat according to the strength of flour (strong, medium and weak) is the quality of protein, gluten and gluten in the grain [5, 8, 11, 19, 23, 29, 32, 38, 43, 47, 54, 55, 56].

Strong wheat includes only varieties of soft wheat that contain 14% protein and 28% gluten in the first group. Gluten-free breads should be able to provide high-quality bread (large in size and crispy) not only in pure form, but also with the addition of weak grains to the bali [6, 9, 13, 16, 22, 26, 34, 36, 41, 48, 53, 57, 58, 59].

Strong wheat is said to be a booster because it has the ability to improve weak wheat. The average wheat grain contains 11.0-13.9% protein, 25-27% gluten (2 groups in quality), has good baking properties, but does not improve weak wheat flour [1, 4, 12, 17, 24, 27, 31, 37, 42, 46, 51, 60, 61, 62].

Weak wheat contains less than 11% protein and less than 25% gluten (according to the quality of the third group). Weak wheat flour produces low-quality bread, the dough does not rise, does not rise, the bread becomes dense and hard. Therefore, only strong wheat should be added to such flours, so that bread is prepared according to demand [2, 7, 15, 20, 21, 28].

Protein content is affected by soil climatic conditions. When planting cereals, the protein content of the grain increases as it travels from North to South and from West to East. Grain quality is affected by humidity, sunlight, nitrogen content and agronomic practices. For example, the protein content of spring wheat is 12.0% in the north-west, while in England, where sunlight is low, the protein content of wheat is 10-11%, which can be used as fodder. In the southern regions, the protein content in soft wheat is 14-16%, in hard wheat - 18-20% [33, 39, 44, 49, 63, 64, 65].

In addition to food, bread, pasta and confectionery products, alcohol, starch and dextrin are obtained from wheat. Dandruff products and straw are widely used in animal husbandry. There are 117 feed units per 100 kg of wheat grain and 30 feed units per straw. Pichandan is used as a bedding for livestock, in the production of high-quality paper products, in the production of hats, in basket weaving and as a building material [45, 50, 52, 66, 67, 68].

In the conditions of Uzbekistan, wheat occupies the main place among cereals, and wheat is currently grown on 1,084,000 hectares of irrigated land and 197,000 hectares.

Over the past five years, the diversification of agriculture, further strengthening food security and expanding the production of environmentally friendly products in the country are one of the bright features of the current modernization strategy of Uzbekistan. From the first years of independence, a number of reforms have been carried out to develop grain growing. In 1991, the country produced 940,000 tons of grain and the average yield was 17 quintals per hectare. tons (7 million 130 thousand tons in 2019) of grain is grown.

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If we look at the history of sowing of winter wheat cultivated on irrigated lands after independence, in 1990-1999 Sanzar-8, Yuna, Skifyanka, Spartanka, Intensivnaya varieties were planted, in 1999-2008 Polovchanka, Kupova, Umanka, Kroshka, Yubileynaya-100. The crop area of such varieties was high.

Since 2008, local varieties Andijan-2, Chillaki, Bobur, Jayhun, Krasnodar Tanya, Vostorg, Krasnodar-99, Esaul have been planted in the main areas. The yield potential of these varieties is 10 tons or more per hectare. However, in these varieties, due to unfavorable weather conditions, drought, heat. resistance to disease and pests, the possibility of a steady harvest over the years under the influence of bed rest. For this reason, the Turkestan, Yaksart, Jayhun, Asr, Gozgan, Bunyodkor and Hisorak varieties created in recent years have adapted to the drought and heat. is resistant to disease and pests and is highly productive.

Surkhak-5688, Krasnovodopadskaya-210, Kokbulak, Tezpishar, Sanzar-6, White wheat varieties, which are still grown in the arable lands of the republic, are being planted on the main fields.

In Uzbekistan, all regions of the republic are suitable for intensive technology in wheat selection

In assessing the quality of wheat grains are: protein content, sedimentation rate, the number of free fall, the ability to maintain the size and shape of the bread and the unit of gluten quality are the most important indicators in the production of bread. At the same time, the amount and quality of gluten in the grain is the first factor in assessing the technological and nutritional richness of wheat grain. At the same time, in the broad description of the technological quality of wheat grains, the environment in which wheat is grown also has a significant impact on the amount of protein, gluten content and quality. During the ripening period of wheat, the temperature is high and the precipitation is low, in which case the amount of protein and gluten in the grain is high. If it rains during the ripening period, the gluten in the grain is low [3, 10, 14, 18, 25, 30, 35, 40].

The gloss or hardness of the grain is one of the hallmarks of wheat navigation. However, these symptoms may vary depending on the growing conditions of the wheat plant. The gloss quality of grain decreases in conditions of excess moisture, lack of nitrogen. Although the sedimentation rate depends on the level of mineral fertilization of the plant, but determines the individual rate for each variety. It is known that timely and adequate nutrition of the plant not only increases productivity, but also has a positive effect on grain quality.

As a result of the analysis of varieties and forms created by the world selection, it was observed that the height of the wheat stalk has decreased by 50-60 cm over the last 25 years.

High yields can be achieved not only by repeated watering or fertilizing, but also by choosing a variety that is suitable for the same climatic conditions. The productive accumulation of wheat, the number of grains in the ear, the weight of 1000 grains, the topography of the area where the crop is grown or in the field can also be affected.

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The relationship between the height of the stem and lying down does not always appear. More reasons for lying down are the biological characteristics of the variety and primarily its anatomorphological structure. The lower joint spacing of stem-prone varieties is longer, the plant height is higher, the stem and joint thickness is smaller or thinner, the resistant varieties are shorter and the lower joint spacing is shorter.

Research Methods and Materials

Experimental placement and experimentation were carried out according to the method of phenological observation, calculation and analysis (All-Union Institute of Botany VIR, 1984) and biometric analysis according to the method of the State Variety Testing Commission of Agricultural Crops (1985, 1989). Mathematical and statistical analysis of the experimental results was carried out on the basis of the method of BA Dospekhov (1985). In the research study, the scheme of field experiments was based on the Alpha lattice design of the GenStat 13 program.

As part of the creation of new varieties of bread wheat for rainfed areas, a competitive variety nursery of bread wheat was established in the central rainfed area located in the Gallakor area of the Kamashi branch of the Southern Agricultural Research Institute. 4 standard varieties and 26 new lines were selected for the experiment. Kokbulak, Gallakor, Ravon and Oqsaroy varieties, which are grown on a large area in the rainfed areass of the republic, were taken as standard varieties.

The experiment was carried out in a randomized way in 3 rows, with a crop area of 30 m^2. In the experiment, the Alpha lattice design of the international program GenStat-13 was used to develop a scheme of random placement of genotypes.

Results

The number of spikes in one spike was 14 - 19. It was found that the number of spikes in Andoza Oqsaroy and Kokbulak varieties was 17, in Ravon variety - 14, in Gallakor variety - 15. When assessing the resistance of varieties and lines to deposition, all varieties were resistant to deposition and were rated 9 points.

When assessing the yield of varieties and lines, it was found that it was 11.0 - 27.8 c / ha.

Analyzing the yield of varieties and lines, the standard Gallakor variety yielded 17.0 c / ha, and according to statistical analysis, the Oqsaroy variety showed a high yield of 3.0 c / ha. Among the standard varieties, the lowest yield was observed in the Kokbulak variety, which was 14.0 c / ha, while in the Ravon variety, the yield was 15.6 c / ha. Of the 26 lines studied, 10 were higher than the standard Gallakor variety, and 16 lines were less productive. High productivity was observed in the lines KR15-NAZORAT-77-44 27.8 c / ha, KR19-21IWWYT-SA-9920 25.3 c / ha, KR15-NAZORAT-77-67 25.2 c / ha. observed.

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Table 1 Productivity and productivity indicators of varieties and lines, Kamashi, 2021.

№	Name	Yield, c/ha	The difference from the local check Gallakor variety			TKW, g	Test weight, g/l
			c/ha	%	Group		
1	Gallakor (check)	17.0	0.0	0.0	II	32.9	725.2
2	Ravon (check)	15.6	-1.4	-8.4	III	38.1	808.2
3	Oksaroy (check)	20.0	3.0	17.4	I	37.0	820.2
4	Kukbulok (check)	14.0	-3.0	-17.6	III	42.7	797.9
5	KR16-18IWWYTSA-9921	21.6	4.6	26.9	I	34.9	798.7
6	KR15-NAZORAT-77-67	25.2	8.2	48.2	I	43.4	795.4
7	KR15-NAZORAT-77-44	27.8	10.8	63.1	I	40.3	793.2
8	KR15-NAZORAT-77-55	13.0	-4.0	-23.7	III	31.4	720.0
9	KR16-18IWWYTSA-9912	14.0	-3.1	-18.0	III	32.6	729.0
10	KR16-18IWWYTSA-9919	12.4	-4.7	-27.5	III	31.6	723.0
11	KR15-22FAWWON-SA-30	14.6	-2.4	-14.4	III	32.0	721.8
12	KR15-22FAWWON-SA-53	13.1	-3.9	-23.2	III	32.0	722.2
13	KR15-22FAWWON-SA-50	22.7	5.6	33.1	I	37.9	803.1
14	KR19-21IWWYT-SA-9907	15.3	-1.7	-10.0	III	39.1	800.2
15	KR19-21IWWYT-SA-9909	11.7	-5.4	-31.5	III	31.8	723.8
16	KR19-21IWWYT-SA-9915	14.0	-3.0	-17.9	III	32.2	721.7
17	KR19-21IWWYT-SA-9916	11.0	-6.0	-35.3	III	31.6	721.9
18	KR19-21IWWYT-SA-9919	15.6	-1.4	-8.2	III	32.4	721.4
19	KR19-21IWWYT-SA-9920	25.3	8.3	48.8	I	36.2	775.5
20	KR19-21IWWYT-SA-9924	12.0	-5.0	-29.6	III	39.4	723.1
21	KR19-21IWWYT-SA-9927	11.5	-5.5	-32.5	III	31.7	721.6
22	KR19-21IWWYT-SA-9928	20.7	3.7	21.5	I	37.9	773.0
23	KR19-21IWWYT-SA-9930	14.1	-3.0	-17.4	III	31.5	726.0
24	KR19-21IWWYT-SA-9935	21.3	4.2	24.8	I	33.5	768.1
25	KR18BWF6-SA-P-9	14.7	-2.3	-13.6	III	31.1	721.7
26	KR18BWF6-SA-P-99	12.9	-4.1	-24.1	III	32.2	723.6
27	KR18BWF6-SA-P-113	21.2	4.2	24.5	I	37.7	824.0
28	KR18BWF6-SA-P-163	21.3	4.3	25.3	I	42.4	794.5
29	KR18BWF6-SA-P-198	22.7	5.6	33.0	I	37.4	821.9
30	KR18BWF6-SA-P-199	15.4	-1.6	-9.4	III	31.6	723.0
	Minimum	11.0				31.1	720.0
	Mean	17.1				35.2	758.1
	Maximum	27.8				43.4	824.0
	LSD_{05}	0.62				0.48	7.06
	LSD_{05} %	3.64				1.36	0.9
	CV %	1.8				0.7	0.5

According to the results, the weight of 1000 grains of varieties and lines was 31.1 - 43.4 g. The weight of 1000 grains was 32.9 g in Gallakor, 38.1 g in Ravon, 37.0 g in Oqsaroy

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and 42.7 g in Kokbulak. From the lines studied in the experiment, it was found that there were 3 lines weighing more than 40 g per 1000 grains, 7 lines with an interval of 35-40 g and 16 lines weighing less than 35 g. The weight of 1000 grains was 43.4 g on the KR15-NAZORAT-77-67 line, 40.3 g on the KR15-NAZORAT-77-44 line, and 42.4 g on the KR18BWF6-SA-P-163 line.When determining the grain yield of varieties and lines, it was 720.0 - 824.0 g / l. The standard varieties were 725.2 g / l in Gallakor, 808.2 g / l in Ravon, 820.2 g / l in Oqsaroy and 797.9 g / l in Kokbulak. It was found that there are 4 lines with a grain size above 800 g / l, 11 lines with a range of 750 - 800 g / l, and 15 lines with a grain size of less than 750 g / l.At present, the task is to ensure that the grain quality index for new varieties meets the requirements of strong wheat, and in the framework of selection experiments, great attention is paid to the selection of high-quality grain lines.In the laboratory for the assessment of grain quality indicators, the protein content of grains of varieties and lines was estimated at 14.7 - 18.3%. The protein content of the sample was 15.5% in Gallakor, 15.1% in Ravon, 15.3% in Oqsaroy and 16.3% in Kokbulak. Protein content was found to be 18.3% in the KR15-NAZORAT-77-55 line, 17.6% in the KR15-22FAWWWON-SA-30 line, 17% in the KR16-18IWWYTSA-9912 line, and up to 15.9% in the KR15-NAZORAT-77-44 line.

Table 2 Grain quality indicators of varieties and lines, Kamashi, 2021.

№	Name	Protein content, %	Grain moisture, %	Gluten content, %	IDK	Grain vitreousity, %
1	Gallakor (check)	15.5	7.6	28.4	109.3	32.8
2	Ravon (check)	15.1	8.2	27.8	99.6	27.8
3	Oksaroy (check)	15.3	8.2	26.9	99.1	30.8
4	Kukbulok (check)	16.3	7.4	25.2	107.5	50.3
5	KR16-18IWWYTSA-9921	15.4	7.5	29.8	113.4	31.3
6	KR15-NAZORAT-77-67	15.2	8.3	28.6	104.5	26.8
7	KR15-NAZORAT-77-44	15.9	8.2	30.0	104.5	60.3
8	KR15-NAZORAT-77-55	18.3	8.1	31.0	103.4	59.3
9	KR16-18IWWYTSA-9912	17.0	7.9	30.8	106.4	55.3
10	KR16-18IWWYTSA-9919	16.8	7.8	29.3	102.0	29.3
11	KR15-22FAWWON-SA-30	17.6	7.8	31.8	99.1	56.0
12	KR15-22FAWWON-SA-53	16.0	7.6	29.0	108.6	44.8
13	KR15-22FAWWON-SA-50	16.1	8.4	29.0	102.4	60.3
14	KR19-21IWWYT-SA-9907	14.7	8.7	27.1	108.0	61.0
15	KR19-21IWWYT-SA-9909	15.5	8.6	23.5	96.8	67.8
16	KR19-21IWWYT-SA-9915	15.5	8.4	27.7	110.6	33.8
17	KR19-21IWWYT-SA-9916	16.0	8.2	29.4	105.9	56.7
18	KR19-21IWWYT-SA-9919	16.2	8.0	25.6	108.3	26.8
19	KR19-21IWWYT-SA-9920	16.2	7.7	29.6	104.0	66.3
20	KR19-21IWWYT-SA-9924	16.9	7.9	26.7	110.7	56.8
21	KR19-21IWWYT-SA-9927	16.3	7.8	27.5	95.3	50.3
22	KR19-21IWWYT-SA-9928	16.5	8.3	29.0	96.9	46.3
23	KR19-21IWWYT-SA-9930	16.2	7.4	26.4	104.5	42.8
24	KR19-21IWWYT-SA-9935	16.8	7.4	28.5	110.6	47.8
25	KR18BWF6-SA-P-9	15.0	8.7	26.8	104.4	24.3
26	KR18BWF6-SA-P-99	15.8	8.3	25.1	106.5	52.8
27	KR18BWF6-SA-P-113	16.4	8.0	29.4	103.8	45.3
28	KR18BWF6-SA-P-163	15.2	8.0	29.5	109.7	60.0
29	KR18BWF6-SA-P-198	16.0	8.1	28.4	96.8	52.0
30	KR18BWF6-SA-P-199	16.3	7.6	25.5	97.4	43.8
	Minimum	14.7	7.4	23.5	95.3	24.3
	Mean	16.0	8.0	28.1	104.3	46.6
	Maximum	18.3	8.7	31.8	113.4	67.8
	LSD_{05}	0.4		1.6		
	$LSD_{05\,\%}$	4.9		5		
	CV %	2.9		2.9		

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According to the results, the grain moisture content was 7.4-8.7%. It is known that the allowable grain moisture during storage should not exceed 14%.

When determining the amount of gluten in the grain, it was observed that it ranged from 23.5 to 31.8 percent. The sample contained 28.4% gluten in Gallakor, 27.8% in Ravon, 26.9% in Oqsaroy and 25.2% in Kokbulak. It was found that there were 16 lines with gluten content above 28%. The amount of gluten is 31.8% in the KR15-22FAWWON-SA-30, 31.0% in the KR15-NAZORAT-77-55, 30.8% in the KR16-18IWWYTSA-9912, 30.0% in the KR15-NAZORAT-77-44. percent higher. Lines with high gluten content in the grain were recommended for use in selection work.

When analyzing the IDK of varieties and lines, it was 95.3 - 113.4.

When the grain vitreousness of the varieties and lines was studied, it was 24.3-64.8%. It was found that the standard varieties had 13 lines higher than the grain vitreous.

Table 3 **Interrelated correlations of valuable properties, Kamashi, 2021.**

Correlations	Gluten content, %	Yield, c/ha	IDK	Grain moisture, %	Spikelets, piece	Plant height, см	Peduncle length, см	Protein content, %	Spike length, см	TKW, g	Test weight, g/l
Yield, c/ha	0.40										
IDK	0.20	0.14									
Grain moisture, %	0.08	0.15	0.00								
Spikelets, piece	0.07	0.02	0.16	0.04							
Plant height, см	0.15	0.27	0.18	0.21	0.27						
Peduncle length, см	-0.04	0.04	0.23	0.22	0.34	0.35					
Protein content, %	0.40	-0.03	0.24	-0.23	0.37	0.11	-0.01				
Spike length, см	0.16	0.29	0.22	0.17	-0.04	0.06	0.06	-0.08			
TKW, g	0.15	0.64	0.18	0.19	-0.07	0.22	0.11	-0.11	0.46		
Test weight, g/l	0.22	0.75	0.06	0.17	-0.09	0.17	0.18	-0.17	0.35	0.79	
Vitreousity, %	0.22	0.11	0.06	0.19	0.14	0.21	0.07	0.32	0.07	0.19	0.08

When the correlation correlations of valuable properties were studied, r = 0.27 positive between yield and plant height, r = 0.29 positive with spike length, r = 0.64 strong with 1000 grain weight, r = 0.75 strong with grain nature a positive correlation was observed. It was found that plant height, spike length, 1000 grain weight, grain nature had a positive effect on the high productivity of varieties and lines studied in the conditions of dry lands.

Conclusion

Comparing all the valuable features of varieties and lines, the yield of KR15-NAZORAT-77-44 (Adir) line is 27.8 c / ha, weight of 1000 grains is 40.3 g, grain nature is 793.2 g / l, protein content is 15.9 percent, gluten content 30.0 percent, KR15-NAZORAT-77-67 (Lalmi) line yield 25.2 c / ha, weight of 1000 grains 43.4 g, grain nature 795.4 g / l, protein content 15, 2%, gluten content was 28.6%, and given the high performance of standard varieties, it was recommended to submit agricultural varieties to the testing center and use them as donor varieties in selection work.

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