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QUALITY INDICATORS OF THE FOURTH GENERATION HYBRIDS RESISTANT TO FLOURY FROST DISEASE

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ПОКАЗАТЕЛИ КАЧЕСТВА ГИБРИДОВ ЧЕТВЕРТОГО ПОКОЛЕНИЯ, УСТОЙЧИВЫХ К МУЧНИСТОЙ РОСЕ

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Abstract. In the article, the quantitative and qualitative indicators and correlations between the fourth (F_4) generation hybrid samples obtained from the hybridization of wheat genotypes introduced from international centers and local varieties selected for their resistance to diseases and distinguished by high quality indicators were studied.

Аннотация. В статье изучены количественные и качественные показатели и корреляционные связи между гибридными образцами четвертого (F_4) поколения, полученными в результате гибридизации генотипов пшеницы, интродуцированных из международных центров, и отечественными сортами, отобранными по устойчивости к болезням и отличающимися высокими качественными показателями.

Keywords: wheat, resistance, disease, hybrid, productivity, quality.

Ключевые слова: пшеница, устойчивость, болезни, гибрид, продуктивность, качество.

To ensure food security, it is important to increase the production of wheat varieties that are resistant to diseases and pests, with high quantitative and qualitative indicators, and to further develop agriculture. The wheat plant is infected with a number of diseases, which causes a decrease in their productivity. One such disease is powdery mildew. The causative agent of powdery mildew (*Blumeria graminis* (DC) e.o speer f. sp. tritici Marchal) continues its development from the beginning of the bushing phase of the vegetation to the end of the wax ripening phase, depending on the natural and climatic conditions, which causes yield loss. Meeting the population's need for high-quality bread is a priority for the agricultural sector in ensuring food security. In order to achieve an increase in the volume of grain production, it is important to use local varieties. Using eco-friendly plastic varieties with high yield potential helps in stable crop production. From an ecological point of view, plastic varieties are very important in unfavorable soil-climate conditions. Such varieties are moderately intensive, not very high, but stable in any conditions, resistant to abiotic and biotic

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stresses [5].

During the growing season, the wheat plant is exposed to many harmful organisms - pathogens, insects, rodents, etc. is affected. According to economic calculations, if there is no fight against diseases, pests and weeds, the yield loss reaches 20-30% [1].

Increasing both the production and quality of wheat, which is a food plant, meeting our demand at the expense of local production is an urgent problem, for the solution of which, the creation of new productive varieties, their distribution in our republic, improvement of the cultivation process, and the implementation of agrotechnical maintenance work at the required level are important issues [6].

The interaction of variety and stress factors plays a major role in the quality indicators of grain being [10]. the amount of protein in the grain of samples with low productivity is high, and it is low in varieties with high productivity [3].

The quality indicators of grain are complicated and complex signs, and are influenced by environmental factors and cultivation technology, disease agents, etc. because it is easily affected, it causes a decrease in quality indicators [4].

Material and methods

From more than 2 thousand wheat genotypes introduced from international centers, 30 genotypes were selected for their resistance to powdery mildew, and 18 samples with high quality indicators were used in hybridization.

Evaluation of the samples for powdery mildew was carried out on the basis of the 9-point scale compiled by N. Simlakovich (1966), which is widely used in European countries, and studied based on the methodical indicators proposed by V. I. Krivchenko and others (1980) [8].

The amount of nitrogen in the grain was determined by the modified Keldal micromethod with the help of the Kjeltectm 8200 device manufactured by the FOSS company. The coefficient Nx5.7 was used to determine the amount of protein [9].

The vitreousness of the grain is calculated by dividing 100 grains in half in a device equipped with a special knife and counting the vitreous, floury and semi-flourish grains. The amount of gluten was determined by weighing the flour by separating it from the starch, the amount of KDE was determined with the help of the IDK-I device, and the amount of sedimentation was determined by the method of recording the swollen volume of high molecular weight protein particles in 2% acetic acid [7].

Correlation relations between the quantitative and qualitative indicators obtained in the study were studied using the SPSS 16.0 computer program.

Conclusion and discussions

In the conducted research, in the creation of new varieties, the main goal is to make the varieties resistant to diseases and pests, as well as to have high quantitative and qualitative indicators and to obtain a stable product. The productivity and quality indicators of the fourth (F_4) generation hybrids selected for resistance to powdery mildew were studied and reflected in Table 1. From the fourth (F_4) generation hybrids — MV35-13 x Murov (830 g/m^2), Victoria x Guneshli (790 g/m^2), Lebed x Tale-38 (748 g/m^2), Mv-Rengo x Asgaran (720 g/m^2), Fo6476g5-1 Inc1 x Red Rose (728 g/m^2), F06325g1 x Khazri (718 g/m^2), etc. they had high productivity and quality indicators. The productivity of these hybrids was higher in 12 samples (61.1%) and lower in 7 samples (38.9%) compared to the standard Nurlu-99 variety (683 g/m^2). The mass of 1000 grains in the studied hybrids of F4 generation varied between 46.9.3-58.5 g. Also, according to this indicator, compared

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to the standard, 72.2% of the studied samples were found to be higher and 27.8% lower.

The amount of protein in the grain of the hybrid samples was higher compared to the standard Nurlu-99 variety. Among the quality indicators of the F_4 generation hybrid samples, grain vitreousness was also evaluated, and it was found that vitreousness in these hybrid samples varied in the range of 35-69% and was more in 7 hybrids and less in 11 hybrids compared to Nurlu-99 variety taken as a standard.

Table 1

QUALITY INDICATORS OF THE FOURTH GENERATION (F_4) HYBRID SAMPLES SELECTED FOR RESISTANCE TO POWDERY MILDEW

No	*The name of the genotypes*	*Product narrowness, g/m²*	*Say 1000 mass, q*	*Protein,%*	*Vitreous, %*	*Kleikofault, %*	*KDE, c.g*	*Sedimentation, ml*
	Standard Nurlu-99	683	48,6	12,3	56,0	29,5	84,1	33,0
95	OWL*2/7/T.SPH/2*H.567.71//CMH77.93/3/2*CMH 79.959/5/T.S x Nurlu-99	715	50,8	13,0	39,0	28,8	99,8	39,2
100	MV05-13 x Mirbəşir-128	710	49,9	13,2	43,0	29,8	95,2	38,1
107	MV35-13 x Murov	830	51,3	12,7	40,0	30,1	97,1	36,8
113	F08347g8 x Fatimə	512	48,2	14,5	59,0	34,2	91,8	37,7
115	Fo6476g5-1inc1 x Qırmızı gül	728	49,3	13,9	48,0	32,2	86,5	49,6
10	MV14-2000//Shark /F4105w2.1 x Onur	519	48,9	15,2	69,0	34,7	95,6	42,3
42	Chervona//ks82w409/spn/ 3trocadero x Şəfəq-2	697	49,6	13,1	40,0	30,9	82,1	36,2
95	Kualgan x Mətin	495	58,5	15,9	68,0	37,5	83,9	42,9
33	Ostrov x Ləyaqətli-80	690	47,9	13,9	48,0	31,5	97,3	35,3
35	Kalym x Aran	650	48,8	14,5	50,0	33,7	92,1	46,8
34	Lebed x Tale-38	748	49,1	13,1	42,0	32,9	84,0	45,5
38	CV.Nemchinovskaya 24 x Marxal	645	47,2	14,2	59,0	33,9	98,7	40,9
79	MV-Rengo x Əsgaran	720	49,3	13,3	35,0	29,2	96,8	37,5
71	Karahan-99 x Qobustan	570	49,1	14,7	66,0	30,1	89,8	52,1
4	Viktoriya x Günəşli	790	50,4	13,5	38,0	29,0	83,8	39,8
36	KR 11-9823 x Baba-75	692	48,9	13,9	38,0	31,2	91,4	44,6
19	Hubara-2/Qafzah-21//Dovin-2 x Giləvar	673	46,9	14,1	58,0	34,3	105,0	39,9
114	F06325g1 x Xəzri	718	48,3	15,6	65,0	31,5	83,9	41,7

The amount of gluten in grain in 16 hybrids (Kualgan x Metin (37.5%), MV14-2000//Shark /F4105w2.1 x Onur (34.7%), Hubara-2/Gafzah-21//Dovin-2 x Gilavar (34.3%), F08347g8 x Fatima (34.2%), etc.) varied in the range of 30.1-37.5%, compared to the standard Nurlu-99 variety, 88.9% was higher, and in 2 hybrid samples (Victoria x Guneshli (29.0%) and MV-Rengo x Asgaran (29.2%)) were found to be 11.1% less. The deformation coefficient of gluten in the fourth (F_4) generation hybrids is 82.1-105.0 c.g. compared to the standard (84.1 c.g.) Chervona//ks82w409/spn/3trocadero x Shafaq-2 (82.1 c.g.), Victoria x Guneshli (83.8 c.g.), Kualgan x Matin (83.9 c.g.), F06325g1 x Khazri (83.9 c.g.), Lebed x Tale-38 (84.0 c.g.) was higher in hybrids (82.1-84.0 c.g.), Fo6476g5-1inc1 x Red rose (86.5 c.g.), KR 11-9823 x Baba-75 (91.4

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c.g.), F08347g8 x Fatima (91.8 c.g.), Kalym x Aran (92.1 c.g.) etc. and in the hybrid samples, despite this indicator being low, according to the State standard, they entered the II quality group and the 3rd class of gluten, and the other hybrids entered the III quality group and the 4th class, respectively. In the conducted analyses, the value of sedimentation in the grain of F4 generation hybrids varied between 35.3-52.1 ml, the highest result was in Karahan-99 x Gobustan hybrid (52.1 ml). It was determined that the sedimentation indicators of the F4 generation hybrids were higher than the standard Nurlu-99 variety.

The study of the correlative relationship between the productivity and quality parameters of plants leads to high-level selection work and its acceleration by spending less time.

One of the main tasks of natural sciences is to study the interrelationship of phenomena occurring in nature. It is impossible to understand, control and pre-determine the dynamics of the events without determining the nature, interaction force, direction and mathematical-analytical expression of these relations. Events and changes occurring in nature are not random, but occur with certain regularities as a result of the influence of various factors. Correlation and regression analysis are widely used to study the statistical interaction or dependence of events and changes [2].

Correlation relationships between yield and quality indicators of F4 generation hybrid samples selected for disease resistance were determined (Table 2).

Table 2

CORRELATION RELATIONSHIPS BETWEEN QUALITY AND YIELD INDICATORS OF THE FOURTH GENERATION (F_4) HYBRID SAMPLES SELECTED FOR RESISTANCE TO POWDERY MILDEW

	DM	*MDK*	*DZ*	*DŞ*	*KL*	*KDE*	*DS*
DM	1						
MDK	-,218	1					
DZ	-,690**	,240	1				
DŞ	-,763**	,074	,762**	1			
KL	-,682**	,261	,700**	,641**	1		
KDE	-,003	-,331	-,086	-,054	,014	1	
DS	-,222	,060	,471*	,264	,268	-,182	1
****.** Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Note: Abbreviations are as follows: DM grain yield, MDK-min grain mass, DZ-grain protein, HZC-hectare protein yield, DH grain vitreousness, KL-gluten, KDE-gluten deformation coefficient, grain sedimentation

According to the results of the conducted research, there is a negative and positive correlation between the quantitative and qualitative indicators of wheat varieties. It has been determined that there is a correlation between the amount of protein and gluten in grain [2].

Inverse correlation between grain yield and 1000 grain mass (r=-0.218), grain protein content (r=-0.690**), glassiness (r=-0.763**) and gluten content (r=-0.682**), that is, there is a negative significant correlation. There is an inversely proportional relationship between grain yield and gluten deformation coefficient (r=-0.003), as well as sedimentation (r=-0.222).

Mass of 1000 grains and amount of protein per grain (r=0.240), vitreousness (r=0.74), amount of gluten (r=0.261), sedimentation (r=0.60), insignificant correlation with flatness, deformation coefficient of gluten (r= -0.331) negative, i.e. reverse, insignificant correlation was determined.

There is a positive relationship between the amount of protein in the grain and the glassiness

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of the grain (r=0.762**) and the amount of gluten (r=0.700**), and a negative, i.e., inversely proportional relationship between the deformation coefficient of gluten (r=-0.086), and between the sedimentation of the grain (r= 0.471*) has a positive, insignificant correlation.

There is a positive, significant correlation between grain vitrification and gluten amount (r=0,641**), negative, insignificant correlation between gluten deformation coefficient (r=-0,054), and weak, insignificant correlation between sedimentation (r=0,264).

A positive, insignificant correlation was noted between the amount of gluten and the deformation coefficient of gluten (r=0,014), and a positive, insignificant correlation between grain sedimentation (r=0,268).

There was an inversely proportional correlation between the deformation coefficient of gluten and grain sedimentation (r=-0.182).

Thus, hybrid samples with high technological quality indicators were selected for their resistance to phytopathogens and environmental factors, and these samples will be used in the creation of new varieties.

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