

Heritability of Valuable Economic Traits in the Hybrid Generations of Bread Wheat

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Abstract: Wheat breeding aims to create high quality varieties that are resistant to dormancy, drought, disease and biotic and abiotic stress in general. In theory, it was decided to increase the wheat yield to 20 tons per hectare, but in practice the yield was up to 14 tons. The dependence of wheat yield on hereditary traits has been shown by many scientists.

It is known that the variability and genetics of quantitative traits are not uniquely determined. The most characteristic of them is dependence on the external environment, which creates great difficulties in breeding. The most important thing in breeding is a specific genotype or homoheterozygosity and other indicators of productivity, that is, what genetic potential it has. The hybridization of these two factors is associated with the problem of choosing the best genotypes from hybrid mixtures. The seeds of plants selected in G₂ are sown separately in the breeding nursery for generations, in which relatively even lines are distinguished in G₃. They make up no more than 5-10% of the total number of lines studied in the nursery this year. The selected lists will be reviewed prior to the start of the competition. According to the research results in 2012, 15 hybrids were bred with the participation of selected new lines and specimens that are resistant to various environmental influences and diseases, high yield, high quality grain.

In each of the created hybrids, hybrids that embody the parental forms are aimed at obtaining hybrids suitable for different soil climates and different extreme conditions. **Keywords:** wheat, generation, crossing, hybrid, dominance, heritability.

Introduction: Crossing is divided into two types - simple and complex crossing. The type of propagation depends on the biological characteristics of the plant being selected, the nature of the available starting materials, the requirements for the species being created, and so on.

Before starting the breeding process, the breeder must clearly understand in which direction the breeding task will move and how to parental choose.

Plant breeders must work in collaboration with biochemists, physiologists, cytogeneticists, disease specialists and technologists. Because a number of requirements are imposed on the new types that are created. For example, P.P. Lukyanenko. in the process of breeding winter wheat, the navigator Bezostaya-1 was able to determine the main biological and economic characteristics of 26 species. [8].

When creating winter wheat varieties created in the former Soviet Union, a paternal or maternal form was created based on the Bezostaya-1 variety, which belongs to the group of strong wheat created by P.P. Lukyanenko. Also, in the Gallaaral branch, the Research Institute of Grain and Leguminous Crops on irrigated areas has been established and operates.

These include varieties Hosildor (K50729xBezostaya-1), Grekum-439 (Grekum-646xBezostaya-1), Tezpishar-512 (Bezostaya-1xGrekum-646), grown in the grain fields of the republic. In order to achieve results in the creation of high-yielding varieties in various ecological geographical regions, they are implemented mainly through heat-resistant varieties and lines imported from abroad as a primary source. [9].

Hybridization is the most important and basic way to direct the process of formation in plants. New varieties of agricultural crops are created by selection from hybrid populations. In Prasad K. D and others researches result the maximum better parent heterosis for grain yield per plant was observed to be 59.7 per cent. The extent of standard heterosis however, was not of appreciable magnitude being 27.3 per cent for grain yield per plant [5].

According to Kumar A. research, significant heterosis over economic parent and mid parent was observed for almost all the traits studied. The magnitude of heterosis was highest (21.74%) for number of spikelets per spike over economic parent and for number of tillers per plant (13.73%) over mid parent [3].

As noted by Munir L and others, highest heterosis and heterobeltiosis values for days to 50 % heading and grain weight per main spike were recorded for hybrid drawn from across between Lu-26 x Mutant-1 for plant height, grains per spike and grain yield per plant for hybrid of C-271 x Pirsabak-85 and for 1000-Kernel weight for hybrid of a cross between Barani-70 x C-271. Hybrid of C- 271 x Pirsabak-85 performed better and is recommended for further evaluation [4].

According to opinion of Mamta Singh and others, the highest heterotic genotypes can be exploited in future breeding programs to attain self-sufficiency in food grains. However, comprehensive field evaluation over locations and years is advocated for the crosses having significant heterosis before their commercial exploitation [6].

In Kalhoro F and others research work, the mean squares corresponding to different traits of various hexaploid wheat genotypes indicated significant ($P < 0.01$) GCA (parents) and SCA (F1 hybrids) effects for the characters (plant height, tillers plant⁻¹, spike length, spikelets spike⁻¹, seeds spike⁻¹, seed index, and grain yield plant⁻¹) [2].

In research work of Jaiswal K. K. and others the heterosis estimates over mid-parent in the crosses were more frequent for days to flowering, plant height, spike length, number of tillers per plant, grains per spike, test weight and harvest index [1].

Parental organisms develop genes that control not only traits in their offspring, but also

genes that control the traits and traits that develop in the offspring, based on those genes [7].

As a result of a comprehensive study of the lists adapted to the southern regions of the country, Dilmurodov and others selected and selected donors for hybridization of the lists with elements of high yield, grain quality and technological characteristics of grain [16].

In southern regions, heat during ripening or ripening significantly influenced the choice of heat-resistant varieties, and intolerant varieties led to a greater decrease in grain quality and yield [15].

Hybrids from the first generation, obtained as a result of crossing, must be grown in appropriate agrotechnical conditions, that is, create conditions that fully ensure the formation and development of valuable genetic traits and traits in hybrids [10].

Materials and Methods: Field experiments were carried out at the Karshi experimental field of the Kashkadarya branch of the grain and leguminous research institute.

Phenological observations, calculations and analyzes in the experiment and during the experiment (All-Union Institute of Botany VIR, 1984) and biometric analyzes according to the methods of the State Commission for New Tests of Agricultural Crops (1985, 1989). Technological indicators of winter wheat grain grown in the experimental field "Methodological recommendations for assessing the quality of grain." [12], "Methods of biochemical research of plants" methodical manuals, gluten content was compared according to GOST 13586-1-68, grain vitreous GOST 10987-76, grain moisture GOST 13586-5-93, grain nature GOST 3040-55, weight of 1000 grains according to GOST 10842-89.

Yuriev and PP Lukyanenko (1960) generally accepted the method of cutting plates in the mix. [14], The pollination was carried out in the Twell style (Merozhko, Ezrokhin, Yudin, 1973) developed at the CIMMYT International Center.

Crossing was carried out in 14 hybrids in 2009, 60 in 2010 and 87 in 2011, and 2-3 maternal siblings were obtained from each. The hybrids were planted by hand in the "mother-hybrid-father" scheme.

The degree of dominance and genealogy were determined by D.W. Crumpacker [14], and the degree of correlation was determined in the Mordecai Black, Fox style.

In the study of valuable traits in hybrid offspring, the degree of predominance (H_p) was determined by the indicators of heritability, the elements of fertility, and the formula of F. Peter and Frey (1966) was used.

$$H_p = F_1 - P_{middle}, : P_{good} - P_{middle}$$

Here;

F_1 - average rate of hybrid vegetation;

P_{middle} - the arithmetic mean of the two-parent form;

P_{good} - good arithmetic or arithmetic mean of its formation,

$H_p < 0$ negative dominance;

$H_p = 0$ dominance is not observed

$H_p > 0-1$ partial dominance

$H_p > 1$ high dominance is observed.

Plant preparation (removal of anthers) for crossing was held on April 17-23. Planting preparations for planting began after 3 days and ended on April 26. Three spikes of plants were used for each parents. 20 flowers were left from each spike. Of the 15 stalls where the crossing took place, stools were donated.

Results: As a result of crossing, the number of hybrid grains was found from 16 to 52.

This indicator was found to be 27-87% in percentage terms. The highest dust capture capacity was 87% in the F02065G5-21-X Yaksart hybrid, 87% in the Vita x N-158 hybrid and N-158 x Alvd // Aldan / Ias // 37 / Ias In Zarrin77 hybrids it was 80% and 48-52 hybrid grains were obtained.

Table 1
Hybridization of bread wheat (Karshi, 2012)

T/p	The name of the hybrids	The number of resurrected thresholds, pieces	number of crossed spikes, pcs	formed grains	
				number	%
1	ST.ERYHTR x Alvd//Aldan/37/4/Zarri	3	60	42	70
2	Juvan x Krasnodar-99	3	60	36	60
3	MIT/TX93V5722//W95-301 x Jayhun	3	60	45	75
4	F02065G5-21X Yaksart	3	60	52	87
5	N-158 x Alvd//Aldan/Ias58/37/4/Zarrin	3	60	48	80
6	Yonbosh x MV17-3/CROS-1SQUAR	3	60	26	43
7	Alvd//Aldan/Ias58/37/4/Zarrin x Vita	3	60	34	57
8	ATTILA/3/AGRI/NAC x Alvd//Aldan	3	60	45	75
9	Selyanka x lvd//Aldan/Ias58/3/Zarrin78	3	60	33	55
10	Turkiston x vd//Aldan/Ias58/3/Zarrin78	3	60	47	78
11	Vita x N-158	3	60	52	87
12	Marvdasht/Soissons//AlvandxX.Beshir	3	60	16	27
13	KS00U755/TX98/D1170 x N-147	3	60	18	30
14	N-118 x ZARRIN	3	60	29	48
15	Alvd//Aldan/Ias58/3/Zarrin78 x Omad	3	60	37	62
Total:		45	900	560	62

The lowest grains were obtained in Marvdasht / Soissons // Alvand x H.Beshir hybrid 27%, KS00U755 / TX98 / D1170 x N-147 hybrid 30% and Yonbosh x MV17-3 / CROS-1SQUARROSA hybrid 43%. Yonbosh x MV17-3/CROS-1SQUARROSA 43% of the hybrid grains were obtained in the hybrid.

The grains obtained were mostly well-filled and the stalks were observed to develop normally. Hybrid grains will be planted next year along with the parent forms and the heritability of the traits will be assessed and selection will continue.

Heritability of plant height. To cross a plant from generation to generation, it is necessary to have undersized stems and tall forms that are sharply different from each other. According to this trait, heterosis is observed, even predominance is observed: in the first year, crossed hybrid lines were planted together with the parental form, their characteristics were compared and evaluated. In the second and third generations of the hybrid generation, work continued on the selection of lines of value.

Separating the valuable lines in the early stages of the offspring simplifies and shortens the selection process. Lines with a high degree of superiority over the parental forms are selected from the hybrid combinations and are recommended for selection.

Statistical analysis of the distribution of traits in the F₂ generation – χ^2 .

When analyzing the F₂ offspring of fully inherited organisms, we know that they are

phenotypically 3: 1 and genotypically 1: 2: 1. In terms of phenotype and genotype, if the number of organisms in F_2 is small, then organisms with dominant and recessive traits may change in a dominant or recessive way. Statistical verification of the degree to which the dominant or recessive shift is 3: 1, 1: 2: 1.

Testing the hypothesis compares the result obtained in practice with the theoretically expected result. If the experimental data are theoretically consistent with the expected result, then the hypothesis is valid. If the experimental data do not correspond to the expected theoretical results, then the hypothesis is considered incorrect.

The difference between the theoretical data and the expected result can be seen to some extent. In some cases this difference is very small and random, in other cases it is very large and fixed. Therefore, it is necessary to statistically evaluate the data obtained and expected in practice. The χ^2 method is widely used in genetics to solve this problem. This method was proposed in 1900 by the English mathematician K. Pearson. The heritability of the hybrid height in the studied bread wheat combinations is given in Table 2.

In the first generation of the 15 hybrid combinations studied, the plant height of the hybrid lines was found to be superior to the parental form, and in the F_1 generation, 14 hybrid combinations showed high dominance and 1 combination partial dominance. The long height of the plant has a positive effect on the productivity of the varieties, which is very important for its high growth. According to the results of the analysis of hybrids, the length of the plant in the first generation was 84.7-121.3 cm. KS00U755 / TX98 / D1170 x N-147 hybrids had the lowest plant height at 84.7 cm, and Juvan x Krasnadar-99 hybrids had the highest plant height at 121.3 cm.

In the second generation, the height of the hybrids decreased compared to the first generation, reaching 82.3-107.7 cm, in the third generation - 77.4-99.2 cm, in the fourth generation it was 79.6-102.1 cm.

If we analyze the transmission of the plant height from generation to generation in hybrid combinations ATTILA / 3 / AGRI / NAC x Alvd // AldanZarrin78, Juvan x Krasnodar-99, the highest heterozygosity is in the hybrid combination and the first generation, high degree of dominance $h_p = 23.6$ and 19.2

Table 2
Heritability of plant height in bread wheat generations F_1 - F_2 - F_3 .

№	Name of combinations	The mother form	Father form	The height of the plant, cm					
				F_1	(hp)	F_2	χ^2	F_3	F_4
1	ST.ERYHTR xAlvd//Aldan/37/4/Zarrin77	95,3	97	111,7	18,3	100,3	0,2	99,2	102,1
2	Juvan x Krasnadar-99	93	95,8	121,3	19,2	106	1,3	93	95,6
3	MIT/TX93V5722//W95-301 x Jayhun	100	101,9	105,3	4,6	103,7	0,9	98,9	96,2
4	F02065G5-21X Yaksart	90	97,9	112,7	4,7	98,3	1,9	91,8	93,4
5	N-158 xAlvd//Aldan/Ias58/37/4/Zarrin	90,7	97	104,3	3,3	96,7	0,2	90,3	92,5
6	Yonbosh x MV17-3/CROS- ISQUARROSA	86,3	91,6	105,7	6,3	99,3	0,1	88,6	86,3
7	Alvd//Aldan/Ias58/37/4/Zarrin x Vita	93,3	99,9	112,3	4,8	107,7	0,2	97,7	99,7
8	ATTILA/3/AGRI/NAC x Alvd//AldanZarrin78	80,7	81,4	89,3	23,6	87,7	1,9	85,7	84,6
9	Selyanka x Alvd//Aldan/Ias58/3/Zarrin78	87,7	89,8	102,3	12,9	97	2,8	89,7	91,7

10	Turkiston x Alvd//Aldan/Ias58/3/Zarrin78	78,3	87,4	107,7	5,5	102,7	1,3	88,6	87,1
11	Vita x N-158	80	103,2	110,7	1,6	97,3	0,9	90,5	92,6
12	Marvdasht/Soissons//AlvandxX.Бешир	86,7	104,2	107,3	1,4	106,7	0,5	95,9	97,7
13	KS00U755/TX98/D1170 x N-147	73,7	90,9	84,7	0,3	82,3	1,3	77,4	79,6
14	N-118 x ZARRIN	84	86,2	97	10,8	91,3	0,1	86,5	90,8
15	Alvd//Aldan/Ias58/3/Zarrin78 x Omad	76	79,6	92,3	8,1	88,3	0,5	82,5	84,4

According to statistical analysis, the degree of freedom is 1 hectare, and the probability is 0.05 tenge, which is equal to 3,841 hectares in Fisher's table. The quantity x^2 calculated by us was smaller than the value given in the table ($x^2 = 0.2$) and the results obtained corresponded to the ratio given 3: 1 (Table 3). According to the results, hybrids with very long plant heights were rejected, hybrid lines with a plant height of 100-110 cm were selected and recommended for use in selection work.

Heritability of the plant height was studied in all hybrid combinations studied, and the results of statistical analysis showed that the results were less than 3,841, which corresponds to the Fisher table, and the results were correct (Table 3). In the analysis of the length of the plant, 100 plants were taken and measured.

Table 3

Heritability of plant height in a ST.ERYHTR x Alvd//Aldan/37/4/Zarr77hybrid combination of wheat.

Information	Number of plants		
	Tall	Short	Total
The result obtained in practice, p	77	23	100
Expected ratio	3	1	4
theoretically expected result, q	75	25	100
The difference, d=p-q	2	-2	0
d^2 – square of differences	4	4	0
d^2/q -ratio	0,05	0,16	$x^2=0,2$

Heritability of spike length. In plants, spike length is directly related to plant height and can be partially changed under the influence of external environmental factors. Lack of moisture in the soil has a negative effect on the length of the spike and the height of the plant, and in many cases has a positive effect. Some scholars have suggested that the transmission of spike length from generation to generation occurs mainly in the intermediate and dominant state.

Data on the heritability of the spike length of the hybrid lines studied. Table 4. In the hybrid combinations studied, spike length was observed to be higher in the early generations. In the first generation, a high degree of dominance was observed in 12 of the hybrid combinations. It was noted that there was a partial dominance in the 3 hybrid combinations. It was noted that the spike length of the hybrid offspring was 9.5-11.5 cm. Heterosis was observed in most hybrid offspring, and spike length was noted to be high. In the second generation the spike length was 8.2-10.8 cm, in the third generation 7.6-9.4 cm, in the fourth generation 7.7-9.6 cm (Table 4). In the hybrid combination KS00U755 / TX98 / D1170 x N-147 with the highest dominance, a high

degree of dominance $h_r = 4.3$ was observed in the first generation. Hybrid lines selected according to spike length index were recommended for selection work.

Table 4
Heritability of spike length in bread wheat F₁- F₂- F₃ generations.

№	Name of combinations	The mother form	Father form	Spike length, sm					
				F ₁	(hp)	F ₂	χ^2	F ₃	F ₄
1	ST.ERYHTR x Alvd//Aldan/37/4/Zarrin77	8,7	9,7	10,8	0,2	10,8	0,48	9,2	9,1
2	Juvan x Krasnadar-99	8,3	10,7	10,8	1,1	9,5	1,3	8,9	9,2
3	MIT/TX93V5722//W95-301 x Jayhun	9	10	10,2	1,4	9,7	0,2	9,1	9,3
4	F02065G5-21X Yaksart	8,7	10	10,7	0,5	9	1,9	8,8	8,7
5	N-158 x Alvd//Aldan/Ias58/37/4/Zarrin77	8	9	9,5	2	9,1	0,1	8,8	8,9
6	Yonbosh x MV17-3/CROS-1SQUARROSA	9,3	10,7	10,9	1,3	9,8	0,2	9,4	9,6
7	Alvd//Aldan/Ias58/37/4/Zarrin x Vita	10	8,3	10,7	1,8	10,4	0,9	9,2	9,4
8	ATTILA/3/AGRI/NAC x Alvd//AldanZarrin78	10	10,7	11,2	2,4	9,8	1,3	8,2	8,5
9	Selyanka x Alvd//Aldan/Ias58/3/Zarrin78	9	10,7	10,4	0,6	9,6	1,9	8,3	8,1
10	Turkiston x Alvd//Aldan/Ias58/3/Zarrin78	9,3	10,7	10,9	1,3	9,8	0,5	9,2	9,4
11	Vita x N-158	10,7	9,3	11,1	1,6	9,1	0,5	8	8,3
12	Marvdash/Soissons//AlvandxX.Beshir	8,7	9,7	10,2	2	9,1	1,3	7,6	7,7
13	KS00U755/TX98/D1170 x N-147	10,7	11	11,5	4,3	10,3	2,8	9	9,4
14	N-118 x ZARRIN	9	10,7	10,8	1,1	10,5	1,3	9,4	9,6
15	Alvd//Aldan/Ias58/3/Zarrin78 x Omad	8	10	10,4	1,4	8,2	0,1	7,6	7,9

ATTILA / 3 / AGRI / NAC x Alvd // AldanZarrin78 Consider the heritability of spike length in a hybrid combination. The spike length of ATILA / 3 / AGRI / NAC used as a mother form in hybridization is 10.0 cm, The spike length of Alvd // AldanZarrin78 variety, obtained as a paternal form, was found to be 10.7 cm, Of the 100 plants studied, 80 had spike lengths in the paternal form, and 20 spikes had a spike length of about 10 cm, resembling a maternal shawl. From the results obtained, it was found that the length of the spike was superior to the shortness and was the dominant sign (Table 5).

Table 5
Heritability of threshing length in wheat ATILA / 3 / AGRI / NAC x Alvd // AldanZarrin78 hybrid combination.

Information	Number of plants		
	Tall grain	Short grain	Total
The result obtained in practice p	80	20	100
Expected ratio	3	1	4
theoretically expected result, q	75	25	100
Difference, d=p-q	5	-5	0
d ² – squares of difference	25	25	0
d ² /q - ratio	0,33	1	$\chi^2=1,33$

Heritability of the number of grains on per spike. According to the results of the experiment, the heritability of the number of grains on per spike varied from generation to

generation, depending on the characteristics of the varieties. The high number of grains in per spike helps to increase the yield. In the study of hybrid combinations, it was observed that the number of grains in the first generations was high. Based on the results of the analysis of hybrid lines, the best lines were selected and recommended for use in the next stages of selection work. Information on the number of grains per spike of the hybrid combinations studied is given in Table 6. In the hybrid combinations studied, it was observed that the number of grains in the spike was higher in the first generations.

In the first generation, a high degree of dominance was observed in 11 of the hybrid combinations. It was noted that there was a partial dominance in 4 hybrid combinations, and sampling was carried out on hybrid ridges with high grain numbers. It was noted that the number of grains in the first generation of hybrids was 47-66. In most hybrid generations, heterosis was observed and the number of grains in the spike was high. It was noted that the number of grains in the second generation was 45-58, in the third generation 41-55, and in the fourth generation 42-56. In the fourth generation, hybrid lines with a high number of grains were selected and involved in selection work.

Table 6
Heritability of the number of grains in the bread wheat F₁- F₂- F₃ generations.

№	Name of combinations	The mother form	Father form	The number of grains in per spike of wheat					
				F ₁	(hp)	F ₂	χ^2	F ₃	F ₄
1	ST.ERYHTR x Alvd//Aldan/37/4/Zarrin77	62	50	66	1,7	58	0,2	50	52
2	Juvan x Krsnadar-99	46	59	59	1	54	1,9	52	56
3	MIT/TX93V5722//W95-301 x Jayhun	48	45	59	8,3	50	2,8	45	42
4	F02065G5-21X Yaksart	43	51	56	2,3	48	1,3	46	48
5	N-158 x Alvd//Aldan/Ias58/37/4/Zarrin77	40	50	56	2,2	47	0,9	45	46
6	Yonbosh x MV17-3/CR-1SQARROSA	47	52	59	3,8	55	0,5	42	45
7	Alvd//Aldan/Ias58/37/4/Zarrin x Vita	49	53	58	3,5	52	1,3	47	49
8	ATTILA/3/AGRI/NAC x Alvd//AnZarrin78	49	53	52	0,5	46	0,1	44	45
9	Selyanka x Alvd//Aldan/Ias58/3/Zarrin78	44	53	65	3,7	54	0,5	52	54
10	Turkiston x Alvd//Aldan/Ias58/3/Zarrin78	45	53	51	0,5	49	0,9	46	44
11	Vita x N-158	44	50	58	3,7	52	1,3	50	48
12	Marvdasht/Soissons//AlvandxX.Beshir	48	59	56	0,5	52	0,9	49	52
13	KS00U755/TX98/D1170 x N-147	42	43	56	27	53	1,9	43	45
14	N-118 x ZARRIN	61	60	62	3	58	0,2	55	56
15	Alvd//Aldan/Ias58/3/Zarrin78 x Omad	50	41	47	0,3	45	0,1	41	44

The highest dominance in the MIT / TX93V5722 // W95-301 x Jaihun hybrid combination was noted to have a high dominance $hp = 8.3$ in the first generation. High grain yields are an important indicator of productivity, and it is advisable to have an average of 50-60 grains per crop. High-yielding varieties and lines were selected from the studied hybrid combinations and involved in selection work.

Table 7
Heritability of the number of grains on per spike in the combination of wheat ST.ERYHTR x Alvd // Aldan / 37/4 / Zarrin77.

Informations	Number of plants
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	the number of grains is large	The numbers of grains is small	Total
Experimental results,p	77	23	100
Expected ratio	3	1	4
theoretically expected result,q	75	25	100
Difference, d=p-q	2	-2	0
d ² – squares of difference	4	4	0
d ² /q - ratio	0,05	0,16	x ² =0,2

In the analysis of hybrid offspring, it was observed that 77 out of 100 plants studied yielded more than ten grains, while in 23 hybrid lines the number of grains on the head was 50 and less, resembling the paternal form.

Heritability of 1000 grain weight. The weight of 1000 grains is an indicator of the size and fullness of the grain. This is a sign of greed, but also depends on the climatic conditions during the period of strong maturation. It has been scientifically determined that the size of a grain of wheat depends on the duration of the growing season, in particular, the period of ripening and ripening. Table 5.8 shows the weight and heritability of 1000 grains of the studied hybrids. In hybrid combinations, the weight of 1,000 grains was observed to be higher in the early generations than in the parental forms. In the first generation, 13 of the hybrid combinations showed a high degree of dominance. Partial dominance was observed in 1 hybrid combination, and negative dominance was observed in 1 hybrid combination. In the first generation, a selection was made from 12 generations weighing more than 1,000 grains. In the first generation, it was noted that the hybrids weighed 38.39-50.58 g per 1,000 grains. It was noted that the weight of 1000 grains in the second generation was 33.33-48 g, in the third generation 27.13-47.8 g, and in the fourth generation 29.65-46.51 g (Table 8).

Table 8
Heritability of 1000 grain weight in F₁- F₂- F₃ generations.

№	Names of combinations	The mother form	Father form	1000 grain weight, g					
				F ₁	(hp)	F ₂	x ²	F ₃	F ₄
1	ST.ERYHTR xAlvd//Aldan/37/4/Zarrin77	37,84	42,47	39,34	-0,35	40,4	0,5	39,77	41,25
2	Juvan x Krasnadar-99	39,24	40,97	41,35	1,44	42,5	0,9	39,87	38,62
3	MIT/TX93V5722//W95-301 x Jayhun	44,38	32,53	50,58	2,05	43,4	1,9	39,17	40,86
4	F02065G5-21X Yaksart	36,12	36,07	38,39	91,8	37,83	0,2	36,13	38,94
5	N-158 xAlvd//Aldan/Ias58/37/4/Zarrin77	45,47	45,23	48,52	26,42	47,63	0,1	46,27	45,28
6	Yonbosh x MV17-3/CROS-1SQUARROSA	41,21	39,63	44,54	5,22	45	0,2	44,1	45,64
7	Alvd//Aldan/Ias58/37/4/Zarrin x Vita	45,29	47,53	50,08	3,28	48	1,9	47,8	46,51
8	ATTILA/3/AGRI/NAC x Alvd//AldanZarrin78	33,19	38,1	39,11	1,41	33,33	2,8	27,13	29,65
9	Selyanka x Alvd//Aldan/Ias58/3/Zarrin78	40,86	41,5	46,41	16,3	43,87	1,3	42,3	40,35
10	Turkiston x Alvd//Aldan/Ias58/3/Zarrin78	42,38	41,37	47,58	11,3	45,77	0,9	43,8	44,15
11	Vita x N-158	42,07	39,1	48,17	5,11	40,87	0,5	37,17	39,74

12	Marvdasht/Soissons//AlvandxX.Beshir	40,83	39,83	40,53	0,4	39,57	1,3	38,4	38,46
13	KS00U755/TX98/D1170 x N-147	42,49	42,67	46,4	42,44	47,4	0,1	41,67	42,37
14	N-118 x ZARRIN	42,32	34,53	49,69	2,89	43,83	0,5	43,43	42,55
15	Alvd//Aldan/Ias58/3/Zarrin78 x Omad	42	37,73	45,39	2,59	44,33	0,9	41,27	43,21

The MIT / TX93V5722 // W95-301 x Jayhun hybrid with a maximum grain weight of 1000 was 50.58 g and the productive ridges were isolated. Hybrid lines with a grain weight of more than 1,000 grains were recommended for selection work.

Hybrid lines with high dominance were selected. In the second generation, genetic analysis of traits was genetically analyzed and the degree of heritability was studied. ST.ERYHTR x Alvd // Aldan / 37/4 / Zarrin77 hybrid combination maternal form ST.ERYHTR variety thousand grain weight 37.8 g, paternal Alvd // Aldan / 37/4 / Zarrin77 thousand grain weight 42.5 g Of the 100 hybrid lines studied, 78 per thousand grains weighed 42 g and above, and dominance was observed.

Table 9

Heritability of 1000 grains in bread wheat ST.ERYHTR x Alvd // Aldan / 37/4 / Zarrin77 hybrid combination.

Informations	1000 grain weight		
	Large grain	Small grain	Total
Experimental results,p	78	22	100
Expected ratio	3	1	4
theoretically expected result,q	75	25	100
Difference, d=p-q	3	-3	0
d ² – squares of difference	9	9	0
d ² /q - ratio	0,12	0,36	x ² =0,5

According to the results, hybrid lines with a grain weight of 1000 grains were selected and recommended for use in selection work. According to the results of the study, hybrid lines with high productivity were selected and involved in selection work.

Generation of F₄ hybrids of bread wheat are the offspring of hybrids bred in 15 combinations. F₄ hybrids of bread wheat were planted and studied in an area of 5 m². From the hybrid populations, a selection was made based on the biological and external agronomic characteristics of the valuable farm. To separate the disease-resistant lines, a thread was tied to the head of the resistant lines. From the 15 hybrid combinations studied, 50 plant spikes were selected from each combination of disease-resistant plants with predominant external agronomic traits. A total of 750 plant spikes were selected from 15 hybrid combinations. After that, the heads of the selected plants were ground separately in the laboratory and selection was carried out according to the grain. Selection was continued according to the size of the grains and the fact that they were flat glassy. 20 ears of corn were selected from each hybrid combination and prepared for planting the following year. A total of 300 F₄ lines were selected.

As part of the study, 300 new hybrid lines belonging to 15 hybrid combinations of bread wheat, productive, resistant to environmental factors and diseases, have been created and are being studied in the nursery for the first year.

Conclusion. New lines of heterosis were observed from the hybrid offspring, which were superior to the parent and parent forms, and the heritability of traits in the F₂ generation was

analyzed, and productive, hybrid lines resistant to environmental factors were isolated.

New lines of heterosis were observed from the hybrid offspring, which were superior to the parent and parent forms, and the heritability of traits in the F₂ generation was analyzed, and productive, hybrid lines resistant to environmental factors were isolated.

To date, 300 new hybrid lines belonging to 15 hybrid combinations of bread wheat, productive, resistant to environmental factors and diseases, have been created and studied in the first year of selection nursery. In the first year, 85 pure lines were isolated from 300 hybrid lines studied in the breeding nursery and starting materials were created in the selection work. The ridges selected according to the biometric and morphological characteristics of the hybrid offspring were allocated for planting in irrigated and fallow areas.

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