

The selection of donors based on the valuable economic characteristics of wheat

¹Amanov Oybek Anvarovich, ²Dilmurodov Sherzod Dilmurodovich,
³Juraev Diyor Turdiqulovich

^{1,2,3} Kashkadarya branch of Research Institute for Grain and Leguminous crops (KbRIGLc)
180100, Beshkent Yuli, Karshi, Kashkadarya region, Uzbekistan.
Email: alp.lentinus@yandex.ru

Abstract: *Inhybridization to create the varieties with high yield it is expediently if donor varieties will be involved with the complex characteristics which belong to different ecological and geographical areas. To select the donor varieties for the evaluation and hybridization on the valuable economic characteristics of varieties and samples which were created in foreign and local conditions, and involvement these donor varieties for the breeding is provided to get the hybrid materials for the purpose.*

For the creation varieties of wheat with high yield, the best indicators of grain quality, high resistance to abiotic factors of external environment, diseases, pests first of all a selection of donor varieties and primary material for the breeding and crossing process with their participation plays the important role for the irrigated fields of the Republic of Uzbekistan. For this, more important to study and select the resistance to the abiotic and biotic of varieties and samples which are available nowadays. The research of a productivity, the indicators of grain quality and morphological-biological features of varieties and lines is more important for the selection donor varieties for crossing.

Key Words: *variety, sample, donor, hybrid material, breeding, vegetation period, productivity, growth stages.*

1. INTRODUCTION:

There are important rules on the selection donor varieties. In the practice of synthetic breeding for the creation breeding material first of all parenting pairs are selected by hybridization. The success of hybridization depends on how properly the parent pairs are selected.

In the process to create new varieties with high yield, the crossing is carried out to take an attention of productivity features of plants. For example, for the wheat they are the quantity of productive plants, a grain size, a weight of 1000 grains, a yield of variety and etc [2, 5].

The duration of vegetation stages are used for the selection of pairs and creation varieties with early maturity [1, 3]. Moreover, for this, in the crossing process a vegetation stage of a pair should be shorter, on the second pair not exactly this vegetation period, but another one should be short. Only then, it could be for the purpose of what was focused [4].

2. MATERIALS AND METHODS:

On the nursery of the selection of primary source and donors for the breeding 100 varieties and samples were selected and researched which belonged to different ecological and geographical regions. The varieties and samples were placed on 5 m² with 3 replications. In research a placement scheme of the field experiment was based on the "Alpha lattice design" of the program Genestat 3. A placement of the experiment and during the research a phenological observation, a calculation and analysis were based on the method of Union Institute of Plant Breeding (UIP, 1984), and biometric analysis were based on the methods of the Commission of the State variety testing of agricultural crops (1985, 1989). Mathematical and statistical analysis of the experiment were committed according to the developed guide by B.A. Dospekhov (The method of field experiment, 1985).

3. RESULTS AND DISCUSSION:

On the research grows stages of the varieties and samples were studied and donors were selected for the creation new varieties with earliness, high yield and resistance to diseases of wheat.

On conditions of the global climate changes the earliness of varieties and samples is more important especially on the south regions of our Republic. A grain filling stage of early varieties usually begins early and it gives to have enough time for the full filling of grains before the coming drought, heat and dry hot wind at the last months

days of spring season. Regarding this early stage of grain filling valuable farm characteristics, yield and weight of 1000 grains are higher.

Table 1

Classification of varieties and samples on their valuable characteristics (Karshi, 2012)

Valuable characteristics	The criteria of evaluation	Quantity of varieties and samples	in %
Germination-earring stage	165-169 days	14	14,0
	170-174 days	42	42,0
	175-179 days	40	40,0
	180-184 days	4	4,0
Plant height	Dwarf (50-75 cm)	2	2,0
	Short (76-90 cm)	28	28,0
	Medium (91-110 cm)	70	70,0
Weight of 1000 grains	Large (> 40,0 gr)	59	59,0
	Medium (35,1-40,0 gr)	34	34,0
	Csmall(30,1-35,0 gr)	7	7,0
Yield, centner/ha	60,1-80,0 c/ha	35	35,0
	40,1-60,0 c/ha	60	60,0
	< 40,0 c/ha	5	5,0
Amount of protein, %	12,1-13,0 %	9	9,0
	13,1-13,9 %	28	28,0
	< 14 %	63	63,0
Amount of gluten, %	< 22 %	1	1,0
	22,1-26,0 %	18	18,0
	26,1-28,0 %	34	34,0
	> 28 %	47	47,0

As the results of the research showed, germination stage of varieties and samples was observed on the 1-4 of November. And tilling was on the 11-16 of December, tubing stage was on the 8-15 of March. Earring stage of the varieties and samples was observed and it lasted from the 17 of April to 04 of May. The quantity early varieties was 14 which germination-earring stage lasted 161-163 days. The other varieties and samples were founded as a medium and late maturity.

According to experience data, “germination-earring” stage was identified as 165-184 days. Chillaki, Kh.Beshir, Jaykhun, Starshina, Rapsodiya, Zvezda, Dragona, Navruz, Alex, Bologna, Bunyodkor was founded as the varieties which had earliest earing and short “germination-earring” stage. These varieties were recommended as the donors for hybridization purpose to create early varieties.

The transition period to maturity stage of varieties and samples was between the 30 of May and 10 of June. There were 10 varieties, which went into the earing stage between the 30 of May and the 01 of June. According to duration of growth periods, the varieties and samples were chosen as donors, which went into the maturity stage during the short time, and these were recommended for hybridization.

During the analysis of yield of varieties and samples a standard Krasnodarskaya-99 was recorded with yield 55,4 centner/ha. After it was founded that there were 47 varieties and samples, which had higher yield than the standard.

Measure researches were carried out on biometric data as a plant height, the length of the last node of stable, the length of ear and the quantity of ears of the varieties and samples, which were researched in the features of the experiment. It is important when these dates are higher and due to this the varieties can have high yield.

When the plant height of the researching varieties is high it influences to get high yield. In drought weather condition the dwarf varieties has a low yield and quality of grain. In this case, in irrigated areas a selection the varieties with high plant height is more important feature.

According to the dates of research, a plant height of varieties was recorded as a between 71,7 and 106,7 cm. Two varieties were founded as a dwarf and their plant height was lower than 75 cm. There were 28 varieties which were recorded with plant height ranging between 76 and 90 cm. Plant height of 70 varieties and samples was medium, which was within the range of 91 and 106,7 cm. A standard variety Krasnodarskaya-99 had a plant weight with 95,7 cm.

Table 2

Selected varieties and samples according to the valuable farm features and characteristics (Karshi, 2012)

No	Name of variety	Yield, centner/ha	Weight of 1000 grains, gr	Amount of protein, %	Amount of gluten, %	Plant height, cm	Quantity of grains on an ear, pcs
1	Bobur	65,8	39,7	14,6	28,9	95,3	66
2	Omad	61,8	38,8	14,5	28,3	85,0	46
3	Rapsodia	64,6	41,3	14,4	28,4	80,7	57
4	Jaykhun	70,6	44,0	16,4	28,5	98,3	66
5	Turkiston	74,0	42,1	16,1	31,2	102,3	56
6	Oktyabrina-70	63,7	42,7	14,6	28,8	89,7	47
7	Navruz	66,4	43,1	15,6	31,4	97,0	64
8	KP11-100-42	61,5	42,4	15,7	28,2	100,0	51
9	KP11-100-57	62,2	41,1	14,6	28,3	95,7	49
10	KP11-100-58	76,6	42,1	15,3	29,9	80,0	62
11	Koperniko	65,4	41,5	14,6	28,2	86,7	65
12	Nudela	62,2	41,2	15,0	28,4	83,0	58
13	Antonovka	67,5	38,6	14,3	29,4	81,3	61
14	Miranda	66,0	39,0	14,0	28,3	99,3	64
15	Kh.Bashir	73,6	42,8	14,3	28,8	103,7	63
16	Elomon	71,9	41,6	14,1	28,3	101,7	63
17	KP11-100-85	61,3	34,9	16,4	30,2	71,7	62
18	KP11-100-87	62,6	46,1	14,3	29,9	103,0	55
19	Kiria	62,8	40,9	14,4	28,1	91,3	54
20	Bologna	66,8	42,7	15,4	29,0	90,3	58
21	Krasnodarskaya-99 (cr)	55,4	40,9	14,0	28,3	95,7	54
LSD05		1,73	1,06	0,37	0,73	2,99	1,98
Cv %		1,9	1,6	1,6	1,7	2,0	2,2

When a connection between plant height and yield was researched $r=0.06$, accordingly with weight of 1000 grains $r=0.29$; with a weight of ear $r=0.30$ and after it was found out that there was a positive correlation between plant height and all of them. As is evident from the foregoing, the plant height had an impact on the high elements of yield.

As a lot of scientists confirmed, the longest of the last node of stable is one of the parameter which can perform the resistance to drought. On the research, the length of the last node of stable of varieties was observed and it was between 25,1 and 46,6 cm. There were 9 varieties and samples which had the length of the last node 30 cm and lower, accordingly this identified that 52 varieties and samples had between 30-35 cm; 32 varieties and samples had between 35-40 cm; 7 varieties and samples had 40 cm and more than it.

The weight of 1000 grains was researched and according to the results it was 40,9 gr of the standard variety Krasnodarskaya-99 and when this indicator was observed on 50 varieties and samples it showed that these had higher weight of 1000 grains than standard. It was identified that there were 7 varieties and samples which had the weight of 1000 grains between 30,1-35,0 gr, accordingly it 34 varieties and samples had between 35,1-40,0 gr; 59 varieties and samples had 40,0 gr and more than it. The varieties and samples with a higher weight of 1000 grains were recommended for the using at hybridization as the donors.

When researched the content of protein in grain, it was found out 12,0-16,4%. If the content of protein in grain is higher than 14%, it is included in I class, accordingly when it is 11-13,9% to II class; lower than 10,9% to III or IV classes. It was researched that there were 63 varieties which the content of protein was higher than 14% and included in I class.

The characteristics of bread baking of wheat flour are usually evaluated with the amount and quality of gluten. When we are talking about the amount and quality of gluten, it means the hydrated gel rubber-like paste consists of especially water-insoluble protein, which after wheat dough is washed in water.

Depending on the amount of gluten a grain of wheat is divided into the next classes:

I class – amount of gluten is 28% and not lower than it, a gluten quality of grain is not lower than II group;

II class – amount of gluten is not lower than 25%;

III class – amount of gluten is not lower than 22%.

If the amount of gluten is lower than 22% and quality of gluten is lower than II group, in this case a grain of wheat is named as a “without class”.

As the results of our research showed the gluten amount of grain of 48 varieties was higher than 28%.

4. CONCLUSION:

When researched the valuable farm characteristics of varieties and samples it was founded out and selected as the donors by earliness 10, with medium plant height 70, the yield of 47 varieties was higher than standard, 59 varieties had the weight of 1000 grains of 59 varieties was higher than 40 gr, the protein amount of 63 varieties was higher than 14%, the gluten amount of 48 varieties was higher than 28% and all of these were recommended for the using in targeted hybridization.

REFERENCES:

1. Galderini, D.F., M.F. Dreecer, and G.A.Slafer. 1995. Genetic improvement in wheat yield and associated traits. A re-examination of previous results and the latest trends. *Plant Breeding* 114: 108-112.
2. Hazratkulova Sh., Ram C. Sharma., Alikulov S. 2012. Analysis of genotypic variation for normalized difference vegetation index and its relationship with grain yield in winter wheat under terminal heat stress. *Plant Breeding*. 131. 716-721.
3. Heyne E. 1998. Wheat and wheat improvement. Second number 13 in the series *Agronomy*. p 85.
4. Juraev D.T., Dilmurodov Sh., Hazratkulova Sh., Azimova M., Juraev S.T. 2017. Influence of hot dry winds on productivity elements of wheat crop observed in southern regions of the republic of Uzbekistan. // *International journal of applied and pure science and agriculture*. Volume 4, Issue 1. p. 27–31.
5. Sharma R. C., A. K. Tiwary and G. Ortiz-Ferrara. 2008. Reduction in kernel weight as a potential indirect selection criterion for wheat grain yield under terminal heat stress”. *Plant Breeding*. 127. 241-248.