COLD TOLERANCE OF WINTER BREAD WHEAT IN THE NORTHERN REGIONS OF UZBEKISTAN

Dilmurodov Sherzod Dilmurodovich
Doctor of philosophy on agricultural science,
Senior scientific researcher, Southern research institute of Agriculture, 180100, Karshi city, Kashkadarya region, Uzbekistan.

Abstract: Creating cold-resistant varieties in wheat breeding programs is one of the most difficult tasks because several genes are involved. The main difficulty in creating cold-resistant varieties in breeding is usually the relationship between high cold tolerance and low yield and late ripening. Therefore, the purpose of selection is not to maximize cold tolerance, but to create varieties that can withstand the minimum temperature for a particular area. One of the important features of the regionalized wheat varieties in the country is their tolerance to cold and adverse winter conditions, as in some years, due to the very low temperatures, the germination of germinated seedlings increases and seedlings become sparse.

Key words: bread wheat, cold tolerance, variety, genotype, line.

Wheat (Triticum aestivum L.) is one of the most important cereal crops in world agriculture. The world produces 760 million tons of grain annually. Bread wheat occupies 17% of the total crop area [1, 10, 14, 19].

The advantage of winter wheat is reflected in good wintering, so autumn-winter and early spring are the most important periods for this crop. During this period, winter wheat can be damaged by some unfavorable conditions, sometimes completely destroyed. In Uzbekistan, winter wheat is in a dormant period for about 3.5-5 months [3, 11, 17].

One of the most important external factors affecting the plant is a sharp drop in temperature, which causes the formation of ice in the cell and disrupts the physiological processes in the plant [4, 9, 16].

In order to withstand winter colds and prevent freezing of winter wheat, the blind layer should be 5 cm at a temperature of -8 ^{0}C, 7 cm at -10 ^{0}C, 14 cm at -15 ^{0}C, 20 cm at -20 ^{0}C , Should be 27 cm when -25 ^{0}C. This means that in winter, thick snow cover protects the plant from cold and freezing, and the thicker the snow, the longer it will withstand low temperatures [6, 8, 13].

Varieties such as Saratnitsa, Pal-pich, Kuma are cold-resistant varieties, which can withstand low temperatures of -18, -20 for a certain period of time. Other varieties of winter wheat normally freeze at very low temperatures if the plant is not covered

with a blind cover. Especially young, weak, grassy plants are more susceptible to cold [5, 12, 18].

In winter hardiness of winter wheat pays special attention to the correct selection of varieties. According to the authors, the winter hardiness of local wall varieties is stronger than that of selection wall varieties. This is due to the fact that the process of accumulation of carbohydrates in the plant is accelerated in the accumulation of wall varieties. Therefore, the authors recommend the use of local wall varieties and foreign biological autumn varieties in the creation of winter and cold-resistant selection varieties [2, 7, 15, 20].

In order to assess the cold tolerance of varieties and lines, an experiment was conducted in the field experimental field of the Agricultural Research Institute of the Republic of Karakalpakstan. In the winter of 2013-2014, a sharp drop in temperature was observed. It was found that this figure reached -25-30oS in some northern regions. Winter hardiness depends on the depth of the accumulation joint in winter wheat samples, feeding up to the dormancy period and other physiological processes. Experiments have shown that cold damage reached 100% in 2014, and some varieties were not harvested. To assess the cold tolerance properties of winter wheat varieties and lines, 150 cultivar lines at 2 cm and 4 cm depths were planted in 2 reps and the effect of cold tolerance on the accumulation joint was studied. Krasnodar-99, Tanya and Yaksart varieties regionalized for the Republic of Karakalpakstan were taken as standard varieties.

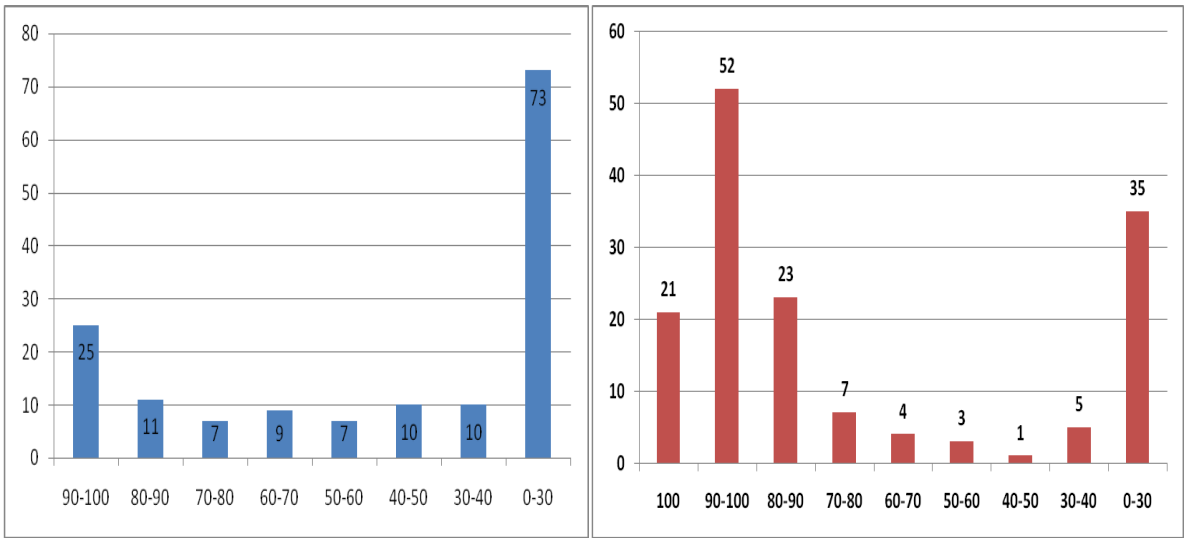

Figure 1. The degree of cold tolerance of varieties and lines planted at a depth of 2 and 4 cm.

Experiments have shown that when wheat varieties are planted at a depth of 2 cm, they are more susceptible to cold damage due to the location of the collection joint on the surface. In our experiments, out of 150 varieties, 25 genotypes were 90 to 100 percent resistant, 11 genotypes were 80-90 percent, 7 genotypes were 70-80

percent, 9 genotypes were 60-70 percent, 7 genotypes were 50-60 percent, and 10 genotypes were 40. -50 percent, 10 genotypes had tolerance of 30-40 percent and 73 genotypes had tolerance of 0-30 percent. In the wheat selection program, these 25 varieties can be used to create cold-resistant varieties from the samples.

Table 1

Variety and lines with a high index of cold tolerance planted at a depth of 2 cm.

№	Name	Number of germination plants (Before winter)	Number of plants after winter	Cold tolerance, %
1	15IWWYTSA-30	86	85	98,8
2	20FAWWIR-144	90	88	97,8
3	20FAWWSA-249	86	84	97,7
4	Yaksart	71	69	97,2
5	20FAWWIR-142	99	96	97
6	Kiriya	91	88	96,7
7	15IWWYTSA-29	90	87	96,7
8	20FAWWSA-296	96	92	95,8
9	Tanya	91	87	95,6
10	13YTIR-6153	89	85	95,5
11	Victoriya	88	84	95,5
12	Yonbosh	94	89	94,7
13	20FAWWSA-305	90	85	94,4
14	20FAWWSA-294	79	74	93,7
15	KR11-9043	94	88	93,6
16	13AYTIR-9005	74	69	93,2
17	20FAWWIR-38	95	88	92,6
18	13YTIR-6018	92	85	92,4
19	20FAWWSA-291	76	70	92,1
20	Bezostaya-1	87	80	92
21	20FAWWIR-9	87	80	92
22	20FAWWSA-293	86	79	91,9
23	Moskvich	92	84	91,3
24	Krasnodar-99	94	85	90,4
25	Turkiston	92	83	90,2

In our experiment, more winter-resistant genotypes were identified in cultivar lines planted at a depth of 4 cm than in cultivar lines planted at a depth of 2 cm. Of course, the location of the accumulation vapor in the lower soil layer played an important role in this.

Varieties planted at a depth of 4 cm were found to be 100 percent overwintering in 21 genotypes. Fifty-two lines had a tolerance of 90 percent to

100 percent. According to the early ripening mark of the studied varieties, the standard varieties Krasnodar 99 and Tanya cultivated on May 16, while 42 varieties germinated 1-4 days earlier.

Table 2

Variety and lines with a high index of cold tolerance planted at a depth of 4 cm.

№	Name	Number of germination plants (Before winter)	Number of plants after winter	Cold tolerance, %
1	Yonbosh	85	85	100
2	13YTIR-6074	80	80	100
3	20FAWWSA-283	83	83	100
4	Turkiston	80	80	100
5	Sahray	80	80	100
6	20FAWWSA-216	87	87	100
7	20FAWWSA-295	78	78	100
8	20FAWWSA-296	81	81	100
9	20FAWWIR-139	86	86	100
10	20FAWWIR-88	85	85	100
11	20FAWWIR-38	90	90	100
12	20FAWWSA-249	81	81	100
13	20FAWWSA-293	73	73	100
14	KR11-28	77	77	100
15	15IWWYTSA-29	81	81	100
16	Krasnodar-99	96	96	100

The standard variety Krasnodar-99 had a cold tolerance of 90.4% when planted at a depth of 2 cm, and 100% when planted at a depth of 4 cm.

So, in conclusion, it is important to choose the right planting depth to get high yields from varieties. Of the varieties and lines planted at a depth of 2 cm, 25 varieties and lines were rated as 90-100% cold-resistant. Of the varieties and lines planted at a depth of 4 cm, 16 were evaluated and selected as 100% cold

tolerant. Selected varieties and lines were recommended for use in selection work to create cold-tolerant varieties.

References:

1. Juraev D. T. et al. To study the heat tolerance features of bread wheat varieties and species for the southern regions of the Republic of Uzbekistan European Journal of Molecular & Clinical Medicine. 2020. V. 7. No. 2. pp. 2254-2270.

2. Dilmurodov Sh. D., Kayumov N. Sh. Evaluation of productive indicators of bread wheat lines. Bulletin of Science and Education. 2020. No. 17-1 (95).

3. Dilmurodov Sh. D. Selection of source material for breeding bread winter wheat for the conditions of Uzbekistan based on the study of economically valuable characteristics. Agrarian science. 2018. No. 2. pp. 58-61.

4. Dilmurodov Sh. D. et al. Evaluation of some valuable features of drought-resistant winter bread wheat varieties and lines. Young scientist. 2020. No. 34. pp. 158-161.

5. Dilmurodov S. Some valuable properties in evaluating the productivity of bread wheat lines. International scientific and technical journal “innovation technical and technology”. 2020. V. 1. No. 1. pp. 60-62.

6. Dilmurodov Sh.D., Ziyadullaev Z. F. Selection of early and productive lines in preliminary yield trial of bread wheat. International scientific and technical journal “innovation technical and technology”. 2020. V. 1. No. 1. pp. 55-59.

7. Fayzullayev A. Z. et al. Selection of high-yielding and high-quality lines of bread wheat. International scientific and technical journal “innovation technical and technology”. 2020. V. 1. No. 3. pp. 10-14.

8. Shakirjanovich K. N., Dilmurodovich D. S. Analysis of yield and protein content of drought-resistant chickpea lines for rainfed areas. International journal of discourse on innovation, integration and education. 2021. V. 2. No. 1. pp. 108-111.

9. Dilmurodov Sh. D., Kayumov N. Sh., Boysunov NB. Value of biometric and productive indicators in creating wheat with a complex of valuable properties. Life Sciences and Agriculture. 2020. No. 2-3.

10. Dilmurodovich D. S. et al. Analysis of yield and yield components traits in the advanced yield trial of winter bread wheat. International journal of discourse on innovation, integration and education. 2021. V. 2. No. 1. pp. 64-68.

11. Dilmurodovich D. S., Bekmurodovich B. N., Shakirjonovich K. N. Winter bread wheat grain quality depends on different soil-climate conditions. International journal of discourse on innovation, integration and education. 2020. V. 1. No. 5. pp. 377-380.

12. Дилмуродов Ш. Д., Бойсунов Н. Б. Отбор продуктивных линий мягких пшеницу из гибридного питомника в условиях южного региона Республики Узбекистан //World Science: Problems and Innovations. – 2018. – С. 58-60.

13. Dilmurodov Sh. D. et al. Hybridization in various directions and the creation of a hybrid generation of bread wheat. Innovative development of science and education. 2018. pp. 74-77.

14. Dilmurodov Sh. D. Valuable properties affecting high-yield elements of bread wheat. BBK. 2020. V. 60. pp. 38.

15. Kayumov N. S., Dilmurodov S. D. Selection of heat and drought tolerant varieties and lines of chickpea for rainfed areas. High technologies, science and education: current issues, achievements and innovations. 2020. pp. 129-131.

16. Dilmurodov S. D., Tukhtayeva U. A. Selection of high-yielding and grain-quality donors of winter bread wheat for irrigated areas. Science and education: preserving the past, creating the future. 2020. pp. 92-95.

17. Dilmurodov S. D., Toshmetova F. N., Fayzullayeva D. Selection of high-quality donor varieties of bread wheat for hybridization. Young scientists of Russia. 2020. pp. 55-58.

18. Dilmurodovich D. S., Nasirulloevna T. F. Selection of early maturity lines in agroecological yield trial of bread wheat. Science, education, innovation: topical issues. pp. 41.

19. Dilmurodov Sh. D., Boysunov NB Breeding of local hybrid lines of common wheat in the south of the Republic of Uzbekistan. Collection of materials. 2018 . pp. 113-119.

20. Dilmurodovich D. S. et al. Productivity, quality and technological characteristics of bread wheat (Triticum aestivum L.) variety and lines for the southern regions of the Republic of Uzbekistan. Plant cell biotechnology and molecular biology. 2021. pp. 63-74.