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SELECTION OF PERENNIAL WHEAT COLLECTION SAMPLES IN MOUNTAIN AND SUB-MOUNTAIN REGIONS

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ABSTRACT

Perennial wheat varieties have long become a problem, further improving the condition of eroded and degraded soils, creating the possibility of rational use of land coming without unproductive use. Perennial wheat can be planted once and harvested for several years (3-5 years). This saves a huge amount of resources and funds in production. On October 17, 2022, the seeds of 34 collection specimens of perennial wheat were planted in three repellents at the Rainfed agricultural research and Experimental Station. The field experimental area of the perennial wheat collection nursery was 153 m².

Key words

perennial wheat, variety, erosion, degradation, grain, drought, root, yield.

Literature review.

Ensuring food security at this moment, when the world's population is rapidly growing and the climate is changing dramatically, is one of the global challenges in the world [3]. Annual crops such as corn, rice and wheat serve as the main sources of cereals. Annual crop production has negative environmental impacts as a result of water pollution, soil erosion, reduced carbon accumulation, increased

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greenhouse gas emissions, and the application of large amounts of fertilizers [6]. Nitrogen loss as a result of annual crop production can be 30-50 times higher than in perennial crops [7]. The introduction of perennial crops that can grow in the fields for several years into crop rotation can increase food safety. Scientists in the world have been paying great attention to this area for many years [1]. Omsk state Agrarian University was one of the important geographical points in testing perennial germpolasm in many places [4].

It is environmentally beneficial for perennial crops to reduce soil erosion, protect water resources, minimize nutrient washouts, and keep carbon in the soil at high levels [5]. Growing perennial crops reduces the costs of seed and fertilizer (as crops can be planted once and harvested over a long period of time), as well as reducing the costs of weed control and tillage. Perennial crops can be used not only for the production of food and nutrients, but also for fuel and other non-food biomass [2]. The main strategies used in the development of new perennial cereal crops are pollination of wild perennial species i.e. interspecific hybridization of annual crops with perennials. The interspecific hybridization method is preferable due to the reduction in the time it takes to create (obtain) new perennial cereal crops [8].

The grain of perennial wheat is small, the weight of 1000 grains is 16-18 grams, and the grain yield is 18-20 s/Ha. Overcoming these shortcomings of perennial wheat, the creation of new varieties is the most fundamental issue. Today there is extensive selection work in this direction [9].

Research object. An international collection of 34 perennial cereal crops, of which two lines of perennial barley from the Swedish Agricultural University, the rest were perennial wheat: five lines based on Agropyron (Thinopyrum) elongatum, fourteen lines based on Agropyron (Thinopyrum) intermedium, seven lines based on Agropyron (Thinopyrum) ponticum, and two lines based on Agropyron (Thinopyrum) junceiforme. Two samples were taken from Bezostaya1 as the standard variety for comparing yield and biometric indicators compared to one-year autumn soft wheat, as well as two samples from Thinopyrum intermedium (intermediate wheat grass)to compare resistance to frost, drought, rust diseases and life expectancy compared to perennial wheat. Material for the study was cited from the Land Research Institute of the U.S.A of Kansas through the International Scientific Center for corn and Wheat Improvement (CIMMYT).

Research method. The placement, calculation and analysis of the experiment was carried out according to the Vir (former All-Union Research Institute of Plant Sciences) method (1984), the placement and analysis of field experiments was carried out using the GenStat 13 program.

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Research results and discussion. Field experimental research on the study, evaluation and selection of collection samples of perennial wheat is carried out at the Bakhmal Scientific Experimental Station of Rainfed Agricultural Scientific Research Institute. This experimental site is located in the Bakhmal District of Jizzakh region and the coordinates of the experimental site are 39.41 degrees north latitude and 68.07 degrees east longitude (39°41'44"N, 68°07'46"E).

The field experimental area of the perennial wheat collection nursery is 153 m² and the experimental area is 35.1 m tall and 4.35 m wide. The seeds of 34 collection specimens of perennial wheat were planted in the field experimental area in one hundred and two varieties on three returns on October 17, 2022. In the experimental field, 16 corridors were left between the varieties, 0.6 m wide [10].

Table 1

Initial material nursery data

Number			Variety square, m²	
Numbe r of varieties, pcs	The number of grains in one variety, pcs	The number of rows in one variety, pcs	One variety	Total varieties
17	21	1	1,28	21,76
17	21	1	1,05	17,85
68	125	3	1,05	71,4

Table 2

Biometric analysis and yield indicators of perennial wheat collection samples (Bakhmal Scientific Experiment Station field experiment, 2023)

No	Number of accumulation		Plant t, cm	Spike ı, cm	The er of s on the pcs	The er of s in a pcs	Weight ains in a g	Total weight,	From grain ıt, g
	General ıulation, pcs	Productive ıu-lation, pcs						Average	
1	3,0	2,6	74,0	9,6	18,8	45,0	8,5	178,5	71,6
2	3,6	3,2	59,2	10,0	13,6	24,0	2,8	67,7	17,6
3	2,4	2,0	66,4	10,7	15,2	27,8	2,7	25,5	4,8
4	4,2	3,6	62,4	10,9	16,2	24,8	2,6	80,8	12,4
5	3,6	2,0	67,8	9,5	14,6	20,0	2,0	58,3	8,5
6	3,4	3,0	71,2	11,0	17,4	41,2	4,9	183,4	54,8
7	3,8	2,4	74,0	9,9	12,4	24,0	3,2	103,1	22,3
8	3,2	2,4	81,8	12,0	18,4	45,0	6,8	217,6	59.6

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9	4,0	3,6	78,6	11,9	19,2	42,0	5,6	81,5	24,8
10	5,2	4,4	105,8	14,1	14,0	39,8	5,4	81,3	19,4
11	4,2	2,8	97,4	13,2	13,0	33,0	4,5	136,4	34,7
12	5,4	5,0	52,0	5,5	20,2	16,4	2,5	124,6	43,1
13	4,0	3,8	71,6	8,5	14,6	28,2	6,1	280,1	113,0
14	4,8	4,2	90,6	10,4	17,2	41,0	10,0	161,4	56,3
15	7,2	6,0	59,0	6,6	23,8	18,0	3,3	108,0	27,3
16	2,8	1,6	67,6	9,4	12,8	24,6	3,0	138,2	35,7
17	3,2	2,2	78,0	11,2	13,8	32,2	4,4	156,2	26,7
18	4,2	2,8	70,0	10,7	15,0	26,6	3,0	112,3	20,8
19	3,0	2,6	59,4	8,2	16,6	35,0	2,8	120,5	26,6
20	4,0	3,0	105,0	13,6	14,6	41,0	5,0	96,1	24,0
21	4,2	3,6	83,0	9,5	19,0	51,6	9,2	263,3	102,8
22	3,6	2,6	76,2	11,8	17,4	46,6	6,3	145,4	43,6
23	4,0	3,2	87,6	10,8	17,8	57,4	9,6	385,5	130,0
24	3,8	3,0	84,7	12,4	18,6	53,8	5,5	160,0	35,4
25	3,8	3,0	66,8	9,2	12,0	20,8	2,6	97,3	20,0
26	4,0	3,4	88,2	8,8	18,6	48,2	9,1	368,0	149,7
27	3,6	2,8	89,2	9,3	19,2	44,6	8,1	364,1	131,2
28	3,8	3,2	109,4	13,1	13,8	35,0	4,6	88,8	19,0
29	3,4	2,4	99,9	11,9	13,4	26,0	3,1	133,2	23,0
30	3,8	3,2	56,0	9,2	12,6	30,3	2,2	69,7	8,0
31	3,0	2,8	72,8	11,3	17,4	40,6	5,1	175,1	52,4
32	2,4	1,4	88,2	8,9	16,6	39,2	6,8	213,3	70,1
33	2,8	2,2	93,4	9,0	15,8	38,8	7,0	153,7	47,1
34	3,6	2,4	91,6	11,6	13,0	24,4	2,9	47,2	8,8

In the third decade of August, biometric measurements of plants were carried out. Biometric analysis and yield indicators of perennial wheat collection samples were compared with one-year wheat Bezostaya variety. It was found that the height of the plant was 74.0 cm and 88.2 cm in the model Bezostaya variety. In our 9 collections, i.e. 10, 11, 14, 20, 27, 28, 29, 33, 34, the plant height is 90.6-109.4 cm compared to the model variety. Plant height was found to have a high index.

The productivity indicators of one-year soft wheat Bezostaya variety in 1 and 26 options were 71.6 g and 149.7 g. Compared to the sample variety of the first variant, the grain weight was 113.0 g, 102.8 g, 130.0 g, and 131.2 g in 13, 21, 23, and 27 variants of our 4 collections.

For interspecies hybridization of wheat, the varieties and lines that kept the valuable characteristics and features of the parent forms were selected.

2 [TAM110/PI401201//JAG&2137], 6 [HEZUO#2/AG.INTERMEDIUM//WHEAT], 8 [WHEAT-AGROPYRON PONTICUM PARTIAL AMPHIPLOID], 9 [WHEAT-AGROPYRON PONTICUM

PARTIAL AMPHIPLOID2], 13 [MADSEN//CHINESE SPRING/PI531718], 17 [PI573182/BFC2-4//BFC2N/3/PI44-0048/4/(TAM110/PI401201//JAG&2137)/5/(PI636500/PI414 667//PI-41-4667/3/(PI573182/PI314190//B-FC1-FF))2], 21 [MADSEN//CHINESE SPRING/PI 5317183), 22 (VILMORIN 27*2/AG.INTERMEDIUM], 23 [WHEAT-AGROPYRON INTERME-DIUM PARTIAL AMPHIPLOID6], 25 [WHEAT-AGROPYRON INTERMEDIUM PARTIAL AMPHIPLOID7], 26 [BEZOSTAYA1], 27 [TAM110/PI401201//JAG&21373], 31 [HEZUO#2 /AG.INTERMEDIUM//WHEAT 2] and 33 [TAM110/PI401201//JAG&21372] variants from perennial wheat collection varieties and samples were crossed with local one-year soft wheat varieties (Sogdiana, Qizildon, Tezpishar, Oqbugdoy, Eritospermium-81, Baxmal-97, KSI-14/2019). Perennial wheat collection varieties and samples were crossed with local one-year soft wheat varieties, and F_0 hybrid seeds were collected.

Conclusion

1. In the first return options, drought-resistant samples of perennial wheat varieties and samples were selected.

2. In the second and third returns, perennial wheat varieties and samples selected based on the results of phenological observation and biometric analysis were crossed with local one-year soft wheat varieties.

3. Hybrid seeds that retain the best traits and characteristics of the parents are obtained.

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