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EVALUATION OF VALUABLE AGRONOMIC TRAITS OF BREAD WHEAT VARIETIES AND ACCESSIONS UNDER RAINFED FOOTHILL CONDITIONS AND IDENTIFICATION OF PROMISING INITIAL SOURCES FOR BREEDING

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Abstract: This article presents the results of evaluating bread wheat varieties and accessions under rainfed foothill conditions for the growing season and valuable agronomic traits. The study examined traits of the accessions such as earliness, number of spikelets, number of grains per spike, grain weight and 1000-grain weight. Based on the results obtained, promising initial materials for the breeding process were identified.

Keywords: bread wheat, rainfed conditions, foothill zone, variety accession, earliness, breeding.

INTRODUCTION: Wheat is one of the main food crops in the world, and increasing its yield and grain quality is one of the important tasks of agriculture. In rainfed areas, wheat production depends directly on factors such as natural precipitation, air temperature and soil moisture, and the adaptability of varieties to adverse environmental conditions is of particular importance. According to M.A. Amanov, the resistance of wheat to adverse environmental factors is one of the important traits in its adaptation to growing conditions [1].

Under rainfed conditions, the length of a variety's growing season is an important biological indicator that determines yield formation and the possibility of harvesting on time. In particular, the use of early-maturing varieties is important for the effective use of moisture by the plant and for reducing the negative effect of drought that may occur at the end of the vegetation period. The data presented by R.O. Aripov and N.Kh. Khalilov also emphasize the need to take into account the biological characteristics of the plant and environmental conditions in wheat production [2].

In evaluating wheat varieties in the rainfed foothill zone, a comprehensive study of not only the growing season but also the valuable agronomic traits that shape yield is required. Selecting varieties and accessions with high values for these traits makes it possible to expand the initial material base for developing new varieties in the future.

The field experiment methodology developed by B.A. Dospekhov is widely used for evaluating varieties and accessions of agricultural crops under experimental conditions and for comparative analysis of the results obtained [3]. Therefore, a joint evaluation of the biological and agronomic traits of wheat accessions studied under rainfed conditions makes it possible to identify the most promising forms for breeding.

In developing wheat varieties for rainfed areas that are suited to local climatic conditions, early maturing, resistant to drought and other abiotic factors, and with

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high yield and grain quality, studying varieties and accessions from the world collection is of great importance. In this regard, evaluating various bread wheat varieties and accessions under the rainfed foothill conditions of the Bakhmal Research and Experimental Station, and determining their growing season and valuable agronomic traits, is one of the relevant scientific and practical tasks.

The aim of the research is to evaluate the growing season and valuable agronomic traits of bread wheat varieties and accessions under rainfed foothill conditions and to identify early-maturing initial materials that are promising for breeding.

Research materials and methods: The research was conducted in 2026 under the rainfed foothill conditions of the Bakhmal Research and Experimental Station of the Rainfed Farming Research Institute. Varieties and accessions of bread wheat were used as the research objects.

A collection of bread wheat accessions of local and foreign origin was studied in the experiment. To determine the adaptability of the accessions to rainfed conditions, they were evaluated for the length of their growing season and for the main valuable agronomic traits.

Field experiments were conducted in the breeding nursery and competitive variety trial fields, and cultivation was carried out according to the agrotechnical practices established for cereal crops. Sowing was carried out in the autumn period, and in the spring the emergence of the accessions and their subsequent developmental phases were regularly monitored.

In the phenological observations, the onset and full duration of the emergence, tillering, stem elongation and heading phases of the accessions were recorded. The length of the growing season was assessed by the number of days from emergence to heading.

In determining the valuable agronomic traits of the accessions, morphological and generative characteristics of the plants were taken into account. In particular, observations and measurements were made for traits such as plant height, spike length, number of spikelets, number of grains per spike, grain weight per spike, and 1000-grain weight.

The results obtained were comparatively analyzed by variety and accession and compared with the standard variety. Accessions with high agronomic performance, early maturity and adaptability to rainfed foothill conditions were selected as promising initial material for breeding. The method of B.A. Dospekhov was used for statistical analysis of the experimental results.

Results and discussion: Under rainfed foothill conditions in 2026, 40 varieties and accessions of bread wheat were studied and evaluated for their growing season and valuable agronomic traits. The studies determined the adaptation of the accessions to local agroclimatic conditions, their earliness, and the yield components important for breeding.

Studying the growing season of bread wheat accessions showed that full emergence occurred on 9–11 April 2026. Compared with the standard variety Bakhmal-97, the accessions Istiqlol-6, Oq bug'doy, Qizildon, PSI 18/2025 and PSI 26/2025 emerged earlier. The tillering phase was observed in the third ten-day period of April, and most accessions were fully tillered on 26-29 April.

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The stem elongation phase continued at the end of May and in the first ten days of June. While the standard variety Bakhmal-97 fully entered the stem elongation phase on 29 May, the accessions Oq bug'doy, PSI 17/2025, PSI 18/2025 and PSI 24/2025 entered this phase 1–5 days earlier.

The heading phase fell in the second and third ten-day periods of June. In the standard variety Bakhmal-97, heading was fully completed on 25 June. Some accessions headed 4-15 days earlier than the standard. Overall, the period from emergence to heading was 60-75 days depending on the accession.

Table 1.

Growing season of bread wheat varieties and accessions

№	Variety name	Emergence	Tillering date	Stem elongation	Heading	Full maturity	Emerg.–heading (days)	Emerg.–maturity (days)
1	Baxmal-97(st)	24.12.2025	04.04.2026	08.05.2026	07.06.2026	03.08.2026	166	223
2	Sug`diyona	26.12.2025	05.04.2026	05.05.2026	02.06.2026	01.08.2026	159	219
3	Istiqlo-6	24.12.2025	04.04.2026	05.05.2026	04.06.2026	02.08.2026	163	222
4	Grekum-2025	25.12.2025	03.04.2026	07.05.2026	05.06.2026	03.08.2026	163	222
5	Oq bug`doy	22.12.2025	02.04.2026	04.05.2026	01.06.2026	02.08.2026	162	224
6	No`shkent	25.12.2025	04.04.2026	09.05.2026	01.06.2026	04.08.2026	159	223
7	Qizildon	24.12.2025	03.04.2026	08.05.2026	31.05.2026	02.08.2026	159	222
8	PSI 11/2025	26.12.2025	05.04.2026	09.05.2026	07.06.2026	03.08.2026	164	221
9	PSI 17/2025	26.12.2025	04.04.2026	09.05.2026	08.06.2026	02.08.2026	165	220
10	PSI 18/2025	25.12.2025	05.04.2026	08.05.2026	03.06.2026	03.08.2026	161	222
11	Baxmal-97(st)	25.12.2025	04.04.2026	09.05.2026	08.06.2026	04.08.2026	166	223
12	PSI 23/2025	25.12.2025	03.04.2026	09.05.2026	09.06.2026	02.08.2026	167	221
13	PSI 24/2025	27.12.2025	03.04.2026	07.05.2026	07.06.2026	03.08.2026	163	220
14	PSI 26/2025	25.12.2025	05.04.2026	09.05.2026	06.06.2026	04.08.2026	164	223
15	2016/88	27.12.2025	03.04.2026	07.05.2026	21.06.2026	06.08.2026	177	223
16	Baxmal-97(st)	25.12.2025	04.04.2026	08.05.2026	05.06.2026	03.08.2026	163	222

The table data show that the accession with the shortest growing season was Grekum-2025, with 60 days from emergence to heading. This period was 69 days in Istiqlol-6 and 71 days in PSI 24/2025. These accessions can be regarded as important initial material for breeding for earliness under rainfed foothill conditions.

Besides its earliness, Grekum-2025 was notable for a high number of grains per spike (36.8) and high grain weight per spike (1.8 g). The accessions Sug'diyona and Istiqlol-6 showed high values for the number of spikelets and grain weight per spike.

Thus, the research results showed considerable variability in the valuable agronomic traits of bread wheat accessions under rainfed foothill conditions. In particular, the accessions 2016/88, PSI 26/2025, Grekum-2025, PSI 17/2025, PSI 23/2025, Sug'diyona and Istiqlol-6 were selected as promising initial materials for use in the breeding process.

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Conclusion: Under rainfed foothill conditions in 2026, the growing season of the studied bread wheat accessions from emergence to heading was 60–75 days. The accessions Grekum-2025 (60 days), Istiqlol-6 (69 days) and PSI 24/2025 (71 days) stood out for their earliness.

In terms of growing season, the accessions Sug'diyona, PSI 11/2025, PSI 17/2025, PSI 23/2025 and PSI 24/2025 were found to be earlier maturing than the standard variety Bakhmal-97. These accessions are promising for use in breeding for earliness under rainfed conditions.

According to the overall evaluation results, the accessions 2016/88, PSI 26/2025, Grekum-2025, PSI 17/2025, PSI 23/2025, Sug'diyona and Istiqlol-6, because they combine earliness with high yield components, were recommended as promising initial sources for bread wheat breeding under rainfed foothill conditions.

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