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EVALUATION DURATION OF THE VEGETATION PERIOD OF BREAD WHEAT VARIETIES AND SAMPLES

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Abstract

It is known that many experiments have shown that the duration of the growth period of bread wheat varies depending on various environmental factors. In particular, the duration of growth and the start time of development stages are mainly determined depending on temperature, precipitation, geographical latitude, and day length. For this purpose, in the experiments, when assessing the duration of the growing season of bread wheat varieties and samples in the studied collection nurseries, the main attention was paid to the selection and evaluation of early-ripening varieties with a short germination-heading period. According to the analysis results, the average duration of the germination-heading period of bread wheat varieties and samples was 3 days earlier compared to the standard Zamin-1 variety (179 days). It was also observed that the coefficient of variance series is 1.30-4.20, and the minimum indicators are 178-182 days. According to the results of statistical analysis of bread wheat variety samples, the duration of the germination-heading period according to the Mode indicator of the program was the most observed - 177 days.

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Keywords. Bread wheat, growing season, varieties and samples, germination, heading, ripening.

Introduction

Bread wheat (Triticum aestivum L.) is one of the most cultivated grain crops in the world, occupies most of the total area in the world, and is important as a source of food for the population. The cultivation of bread wheat is mainly widespread in Europe, Asia, America, and Australia, with leading producers being China, Russia, the USA, France, Canada, Pakistan, and Australia. As a result of the global climate change observed today, early varieties of wheat are of great importance, which allow reducing their cultivation, reducing the impact of various external factors - drought, high temperatures, and other natural conditions. In addition, high and quality harvests can be obtained in the adjacent districts due to the early ripening and lack of grain. In particular, its role in crop rotation is invaluable, contributing to more flexible use and faster clearing of fields for subsequent crops, which is of great importance in changing climatic conditions.

Wheat is currently cultivated on more than 213 million hectares worldwide (Triticum aestivum L) and ranks third after rice and corn in total area [1].

The microclimate within the canopy of wheat, integral to the growth and development of crops, mirrors fluctuations in the crop's microenvironment [2].

It is known that wheat is considered the main crop in the world as the main source of food. The productivity, high yield, and quality of wheat are determined by its genetic characteristics [3], climatic conditions and environment [4], and agrotechnical methods of cultivation [5]. One of the important agrotechnical measures is the sowing date, which is one of the main factors influencing the wheat's growth cycle [6.7].

Due to prolonged exposure to high temperatures, heat circulation is disrupted, leaves die, and physiological processes gradually cease, leading to plant drying.

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ISSN 2760-4969 (Online) Volume 2, Issue 1, January 2026

https://eurekaoa.com/index.php/7

High temperatures, especially during the tillering and stem elongation stages of wheat, lead to a decrease in ear weight.

For this purpose, in the experiments, when assessing the duration of the growing season of bread wheat varieties in the studied collection nurseries, the main attention was paid to the selection and evaluation of early-ripening samples with a short germination-earling period. In the years of the experiment, the duration of the growing season in all three nurseries was different.

In addition, we found that the heading stage has the greatest potential for predicting yields, which may be associated with the stabilization of the morphology of wheat plants and nutrient accumulation during this period. This result provides important information for the early allocation of agricultural resources, greatly contributing to the achievement of food security and precise agriculture [8].

Research on how to implement both phenomenonics and genomic data in breeding programs is still ongoing, and some studies have shown that PP based on umbrella reflectivity can be a promising substitute for trait prediction using genomic markers [9].

Primarily, features twisted in a polygenic fold not a phenotypic level threshold It is clearly visible in the F2 generation. So, Changes due to combination ability in F2 populations are continuously disappearing state [10].

In the experiments, work was carried out to assess the duration of the growing season of the studied varieties of world collections. According to the results of the analyses, it was observed that in most cases the air temperature varied depending on the biological lifestyle and genetic characteristics of the variety.

Materials and Methods

In the research, varietal samples available at the institute, as well as varieties and samples of world collection nurseries of bread wheat, imported from foreign scientific centers and the Research Institute of Genetic Resources, were planted

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Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)
ISSN 2760-4969 (Online) Volume 2, Issue 1, January 2026

https://eurekaoa.com/index.php/7

and studied. The placement of research experiments, conducting phenological observations in field and laboratory conditions were carried out according to the guidelines of the Center for Testing Varieties of Agricultural Crops and the International Classifier (type SEV Triticum).

During the growing season of bread wheat, a series of detailed biometric measurements were carried out to assess the varieties and samples. To ensure statistical reliability, these measurements were taken from a random sample of at least 10 plants from each plot. In the experimental plot, wheat samples were sown with a seeding depth of 3-5 cm, a seeding rate of 4.0-4.5 million germinating seeds per hectare, a sowing area of 10 m2, in 2 replications using the SKS-7-10 selection seeder.The sowing period was carried out in the second ten days of October, which is optimal for the region.

During phenological observations, the main periods (emergence, emergence, tillering, tubing, heading, milk, wax, full ripeness), the degree of resistance to overwintering, lodging, and diseases were assessed in field conditions. In the analyses, the total and productive stems, plant height, spike length, number of spikelets in the spike, number of grains in the spike, weight of one spike, weight of 1000 grains, bulk density of grains, as well as technological and physiological indicators in the physiology laboratory were determined.

Results and Discussion

Germination-heading. In the experiments, phenological observations, statistical analyses, and evaluation work were carried out on 171 bread wheat varieties and samples brought from this nursery. During the observations, the indicators of the germination-heading period of the variety samples in this nursery averaged 177.0 days, while in the standard variety Zamin-1 this indicator was 179.0 days.

According to the analysis, the average duration of the germination-spiking period of bread wheat varieties was 2 days earlier compared to the standard Zamin-1 variety (179 days). It was also observed that the coefficient of variation series was

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https://eurekaoa.com/index.php/7

1.30-4.20, the minimum values were 174-178 days, and the maximum values were 178-182 days. According to the statistical analysis of bread wheat variety samples, according to the Mode indicator of the program, the duration of the germination-heading period was the most observed - 177 days. Phenological observations and analyses have shown that compared to the standard variety, the germination-heading period of 2-5 days was the shortest. MAHON DEMIAS/3/HIM/CNDR TSI (CIM-ICAR) Sample 174 days, 7C/CNO//CAL/3/YMH/4/VP/5/AG, F00429GP1/7/FRET2*2/4/ SNI/TRAP, KS13DH0030-29 samples 175 days, UN-49/6/ATTILA/3*BCN//BAV92/3/, TOSUNBEY/5/LCR/SERI/3/MEX-D, NACIBEY, OK01307/DUSTER//OK06822W TSI (CIM-ICAR samples 176 days. In the experiment, 180 days were observed in the varieties and samples SHARP/3/PRL/SARA//TSI/VEE#5/5/, BEZOSTAYA TSI (CIM-ICAR), which had the longest germination-heading period compared to the standard variety.

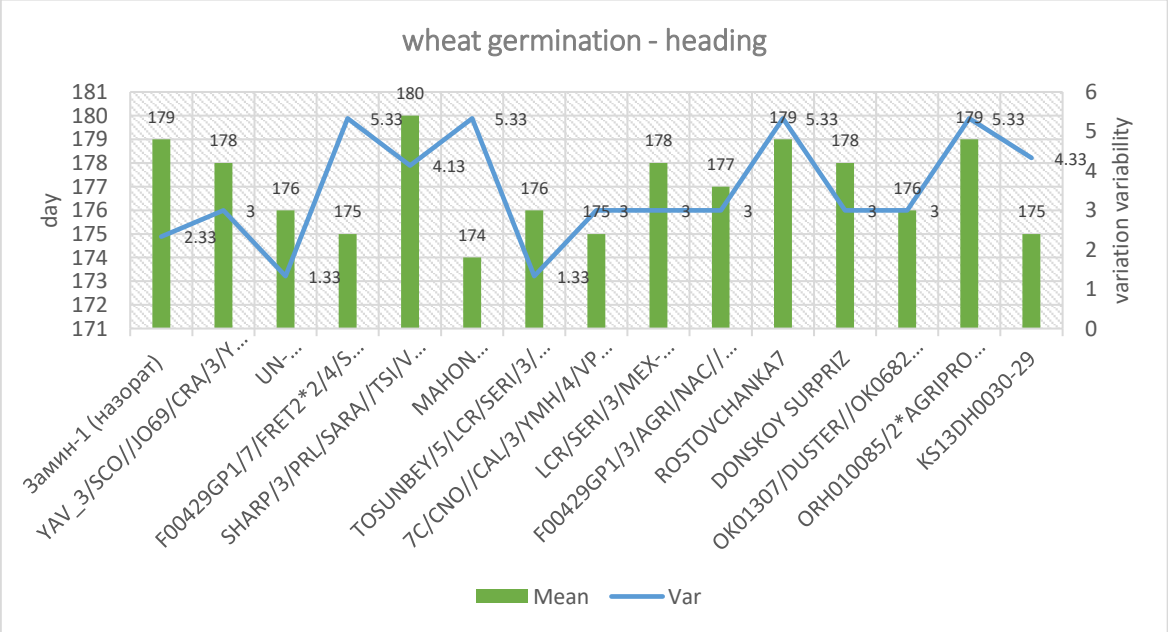

Figure 1. Duration of the growing season of bread wheat varieties and samples, Gallyaaral.

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The findings of the Granger causality test reported a bidirectional causality between rainfall and fertilizer use with wheat production in Hebei Province, while a unidirectional causality connection was revealed between wheat production and temperature **[11]**.

Heading-ripening period. According to the results of the experiment, the duration of the heading-ripening period of bread wheat samples in this nursery averaged 38.9 days, and this indicator was 41 days for the standard Zamin-1 variety. According to statistical analysis, the variation series coefficient in the experiments was 1.20-4.33, the minimum indicators were 36-40 days, and the maximum indicators were 39-42 days. According to statistical analysis, according to the Mode indicator of the program, the duration of the heading-ripening period was the most observed - 40 days.

Compared to the standard variety, samples TOSUNBEY/5/LCR/SERI/3/MEX-D (TSI (CIM-ICAR), OK01307/DUSTER//OK06822W (USA-OKSU), KS13DH0030-29 (USA-KSU) with the shortest heading-ripening period were 37 days, while samples F00429GP1/7/FRET2*-2/4/SNI/TRAP, F00429GP1/3/AGRI/NAC//ATTILA (TSI (CIM-ICAR), RH010085/2*AGRIPRO PALOMI (USA-WSU), KOPRU (TUR) were 38 days.

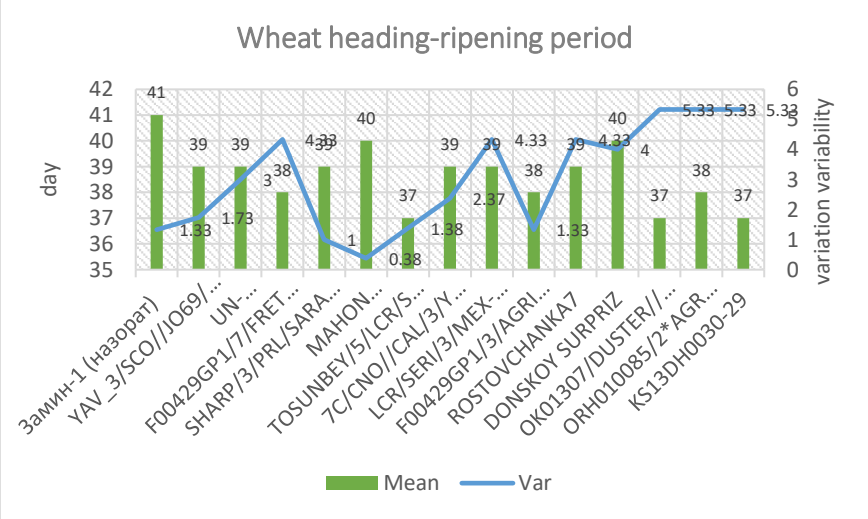

Figure 2. Duration of the growing season of bread wheat varieties and samples, Gallyaaral, 2022-2023.

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Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)
ISSN 2760-4969 (Online) Volume 2, Issue 1, January 2026

https://eurekaoa.com/index.php/7

Germination-ripening period. According to phenological observations and analyses conducted during the years of the experiment, the duration of the germination-ripening period in these seedling variety samples averaged 215.8 days, while in the standard variety this indicator was 220 days.

Research aimed at fine-mapping and identifying the causal gene(s) underlying qDH-3A will provide deeper insights into the genetic regulation of HD and facilitate the development of gene-based markers for more precise breeding. **[12].** The drought resistance characteristics of winter wheat varieties are as follows: high plant density, short growth period, robust root system, medium plant height, high internode of a long stem, small flag, leaf surface, round leaf, waxy patina, and physiological and biochemical reactions of plants during a drought conditions **[13]**.

As a result of statistical analysis in the experiments, the coefficient of variation series was 1.0-4.33, the minimum indicators were 211-219 days. It is known that intensive grain formation begins during the wax ripeness stage of wheat. In this regard, the proportion of organs in the accumulation of biomass also changes **[14].** According to statistical analysis, according to the Mode indicator of the program, the duration of the heading-ripening period was the most observed - 213 and 219 days.

Sample KS13DH0030-29 (USA-KSU) of soft wheat with the shortest germination-ripening period compared to the standard variety 212 days, samples TOSUNBEY/5/LCR/SERI/3/MEX-D (TSI (CIM-ICAR), OK01307/DUSTER//OK06822W (USA-OKSU) - 213 days, samples MAHON DEMIAS/3/HIM/CNDR//, 7C/CNO//CAL/3/YMH/4/VP (TSI (CIM-ICAR) - 14 days. As can be seen from the table, the average germination-ripening period of the studied winter bread wheat variety samples was 2-8 days shorter compared to the standard Zamin-1 variety.

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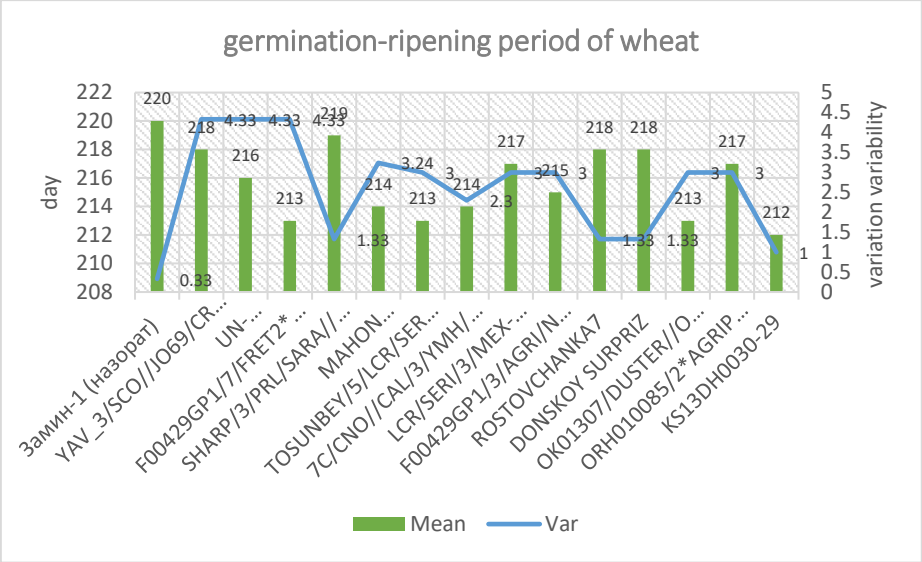

Figure 3. Duration of the growing season of bread wheat varieties and samples, Gallyaaral, 2022-2023.

In the experiments, according to the results of phenological observations and analyses of varieties and samples of the world collection, the "emergence-spiking" period of varieties and samples of the Facultative and Winter Wheat Observation Nurseries nursery was 177.0 days. The duration of the heading-ripening period in the varieties Facultative and Winter Wheat Observation Nurseries was 38.9 days.

Conclusion

In wheat, early maturity is determined by the short vegetation period of the variety. Early-ripening varieties enter the heading phase faster and manage to grow grain in a short time. This feature is especially important in low-water, hot, and arid regions. the important aspect of early-ripening wheat varieties is that they allow growing the crop before the onset of climatic stress factors in areas with limited water resources and the influence of high temperatures.

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https://eurekaoa.com/index.php/7

Analysis of the conducted experiments showed that the duration of the growing season of varieties and samples of the world collection of bread wheat in the optional and observation nurseries of winter wheat varieties and samples averaged 177.0 days, and the duration of the heading-ripening period of wheat in this nursery averaged 38.9 days.

In conclusion, the trait of early maturity in crops is considered one of the main criteria in the breeding process. In bread wheat, the heading stage is the decisive stage in growth and development, and this indicator is the main indicator when dividing varieties into early-ripening, mid-ripening, and late-ripening groups. Also, when assessing the early maturity of cereal grain varieties, the heading phase determines their agrobiological value. Early-ripening varieties created during the selection process are strategically important for regions with limited water and heat resources and are of great importance in selecting varieties suitable for various soil and climatic conditions. therefore, in-depth study and practical application of the early maturity trait in wheat breeding plays an important role in increasing yields. Varieties and samples selected during the evaluation process in experiments are important for future use as initial sources in the breeding process.

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