

REALIZATION OF WINTER WHEAT VARIETIES POTENTIAL UNDER UNSTABLE MOISTURE CONDITIONS

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Wheat production estimates, despite geoclimatic conditions from 1839 to 2017, showed that producers were able to adapt to changing wheat conditions. Wheat production increased 26-fold between 1839 and 2019. Innovative technologies and adaptation strategies have allowed wheat to be grown in new conditions that were once considered too harsh. Varietal innovations are vital to facilitate the expansion of areas where climate change is negatively affecting [1, 3]. Climate change, such as precipitation, temperature, and increased atmospheric CO₂, affects crop production. Increasing temperature mainly negatively affects yields and leads to crop migration. Climate change is a continuous process and affects various industries, including agriculture[2].

The aim of the study was to establish the limits of variability in genotypic and environmental components of wheat for Steppe conditions in the implementation of economically valuable traits of productivity and quality.

In the conditions of the scientific and research field of the scientific and educational center of practical training of the Dnipro State Agrarian and Economic University, the varieties Rapsody Odesa, Udacha Odesa, Vyhoda Odessa, Maksima Odessa, Vagoma, Virnist, Velichava, Euphoria, Pleiade, PS TASHAN, Annabel, Balagura, Belinda, ZU Trasko, Yalita were evaluated. The experimental test plots were placed in a regular manner with a sowing scheme in three replications, an area of 10 m² each, sowing of the standard once per experiment. The sowing rate varied depending on the determined parameter of MTZ. Structural analysis was carried out by measuring and threshing 25-30 well-developed plants, determining such parameters as the percentage of grain in total productivity, plant height, weight and number of grains from the main spike, grain weight from the plant, weight of a thousand grains (hereinafter referred to as TGW). The protein content was determined on the Spectran-119R device. The repetition of the studies was threefold. Statistical processing was carried out using factorial analysis ANOVA, grouping and classification of data using the cluster analysis method. In all cases, the Statistic 10.0 program was used.

The yield of this set of varieties of different origins was estimated in 2021-2023. The data were analyzed for the economically valuable trait of the varieties Rapsodiya Odeska, Udacha Odeska, Vyhoda Odeska, Maksima Odeska, Vagoma, Virnist, Velichava (Ukraine, Odessa), Euphoria, Pleiade (Poland), PS TASHAN, Annabel (Germany), Balagura, Belinda (Ukraine, Luhansk), ZU Trasko, Yalita (Germany).

According to the results of the study, the varieties ZU Trasko, Yalita were more suitable in terms of high yield, the intermediate position was occupied by the varieties Vagoma, Euphoria, Balagura. The year 2022 was more contrasting for the trait, 2021 and 2023 were significantly different from each other, but they are characterized by lower differentiation by the trait of yield.

For grouping by yield and classification of varieties depending on variability by environmental and hereditary components, a classification was carried out by the method of cluster analysis. The first group includes the varieties Rhapsody Odesa, Udacha Odesa, Vyhoda Odesa, Maxima Odesa Virnist, Velichava, Euphoria, Pleiad, PS TASHAN, Annabel, Belinda, which generally demonstrate stable yield for the region, but are not the best by this trait. The

second group includes the varieties Balagura, Vagoma, which significantly slightly outperform the first in individual characteristics, but are not stable, occupying an intermediate position between the first and third groups, with individual peaks in productivity. The third variety ZU Trasko, Yalita, which significantly outperformed others, and the realization of their potential did not depend so much on natural conditions.

Thus, it is worth highlighting varieties such as ZU Trasko, Yalita Vagoma, Balagura in terms of yield, but Vagoma, Balagura are not completely stable in the manifestation of high yields.

To establish the mechanisms for obtaining higher yields, a structural analysis of the main components of this trait was conducted according to the following characteristics: the number and weight of grain from the main spike, the weight of grain from the plant, the mass of a thousand grains (hereinafter referred to as TGW). The indicator of the number of grains from the main spike is too much and its use does not provide additional information on the formation of yield.

The grain weight indicator from the main spike was more significant for the yield of the variety, identified as the best varieties of the ZU Trasko and Yalita. The plant productivity indicator was significant for exceeding the yield for the varieties Vagoma and Balagura. The next indicator of TGW clearly exceeded the standard in all high-yielding varieties, which indicates a significant role of this characteristic in the formation of the crop. Thus, the varieties of the ZU Trasko and Yalita form the yield due to a well-developed main spike, the varieties Vagoma and Balagura have an advantage due to higher productive bushiness. The mechanisms of high yield formation were established. Grain quality analysis was carried out according to the following characteristics: protein content in the grain, gluten content in the grain, the presence of high- and low-molecular glutenins in the proteins and the total content of gliadins. Strong wheat varieties include Udacha Odeska, Vyhoda Odeska, Maksima Odeska, Vagoma, Velichav, PS TASHAN, Annabel, Balagura, Belinda, ZU Trasko.

Balagura forms both high productivity and higher quality, Vagoma and ZU Trasko high productivity and satisfactory quality, and therefore generally fully meet the needs of the region. While the Yalina variety is generally high-yielding, but forms lower quality. The Balagura and Belinda varieties can be used as high-quality donors. In terms of components of grain reserve proteins, the Vagoma, Virnist, Euphoria, ZU Trasko, Yalita varieties stood out positively in terms of high-molecular glutenins (higher content), the Vyhoda Odeska, Euphoria varieties (lower content) in terms of low-molecular ones, and the Pleiada and PS TASHAN varieties (higher content) in terms of gliadins. That is, in terms of glutenins, the Euphoria variety is an interesting resource for improvement.

Thus, in terms of combining increased yield with high baking qualities, the varieties ZU Trasko, Vagoma stood out first of all, which form yield and quality at the required level. As a variety with a complex of high grain quality and yield, the Balagura variety can be used. The studied varieties showed rather mediocre stability in yield for the conditions of the Steppe of Ukraine. Two mechanisms of possible formation of higher yield due to higher productive bushiness and better main ear have been established. In both cases, a higher TGW was a mandatory component, which makes it a reliable complex parameter of high yield. By combining high yield and sufficient quality parameters, it is possible to grow the varieties Balagura, Vagoma, ZU Trasko. As a source of higher grain quality according to individual indicators, the varieties Balagura, Belinda (protein and gluten), Euphoria (successful composition of glutenins) can be used.

List of sources:

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PECULIARITIES OF IMPLEMENTATION OF STIMULATING ACTIVITY IN WINTER WHEAT

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The need to use new growth-stimulating substances and their interaction with various environmental factors determine the differences in the technology of growing different varieties. In this regard, a study was conducted on the main characteristics of laboratory germination under the action of various substances of tri- and tetrazole nature and their concentrations [1, 3]. Winter wheat (*Triticum aestivum* L.) is one of the key grain crops in the world, with an annual production of about 757 million tons. It plays an important role in general agriculture and is a determinant of the diet for millions of people[2].

In the conditions of the scientific research field of the scientific and educational center of practical training of the Dnipro State Agrarian and Economic University, the following varieties were identified as more promising as a result of the preliminary test: Pozytsiya Odeska, MIP Feeria, MV Nador, Tenor, MV Menrot, for which the next stage was carried out to determine the characteristics of germination energy (4 days) and laboratory germination (7 days) for treatment with an aqueous solution of promising growth-regulating substances CA-64 (potassium [1,2,4]triazolo[1,5-c]quinazoline-2-thiolate), CA-79 (potassium tetrazolo[1,5-c]quinazoline-5-thiolate), CA-67 (5-(2-aminophenyl)-1H-1,2,4-triazole-3-thiol). Distilled water was used as the control. The working solutions were used in concentrations of 0.01%, 0.02% and 0.04%. Germination was carried out in rolls of filter paper. Four working samples of 50 seeds each were selected from a batch of winter wheat seeds. The repetition of the studies was fourfold. Mathematical and statistical processing was carried out using factor analysis ANOVA, grouping and classification of data using the cluster analysis method. In all cases, the packages "basic statistics" and "multifactor analysis methods" of the Statistic 10.0 program were used.

Germination energy and germination did not depend on the variety factor, but only on the concentration of the factor, and the effect on the second parameter was relatively less clearly differentiated by concentrations than for energy. However, when comparing varieties in pairs, the variety MV Menrot stood out, the seeds of which had lower quality in the control, but the effect of the action of this substance was the best and led to an increase in germination to 6%, while in the others 3-3.5% due to the action of the best concentration of CA-64 0.02%.

Germination energy increased up to a concentration of 0.02% under the action of CA-64, except for the Tenor variety, after which a significant negative effect was felt at the action of 0.04% (compared to the control, the indicator decreased by 2–3.5%, which was statistically