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**GERMINATION AND SURVIVAL UNDER
ETHYLMETHANSULFONATE ACTION AT THE FIRST WINTER
WHEAT PLANTS GENERATION**

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The use of chemical mutagenesis, in particular supermutagens – substances belonging to different types of compounds that can significantly (up to 60 times) increase the genetic activity of the plant genome without a significant decrease in viability comparable to the effect of ionizing radiation, help to significantly increase the rate of genetic improvement of the main agricultural crops. At the same time, supermutagens by their nature act for mainly site-specific changes, and do not have the character of a continuous action. This leads to several major consequences in terms of plant genetics and physiology. Firstly, a significant increase in the frequencies of certain types of hereditary changes, secondly, the possibility of the emergence of fundamentally new types of mutations, primarily complex ones, thirdly, specific evidence in mutagenic depression at the first generation, primarily in terms of fertility, depending on the plant genotype (in our case, the variety). The purpose of the conducted cycle of investigations was to determine the effect of one of the most common types of chemical site-specific substances on genotypes created in the domestic process of genetic improvement in terms of the evidence of various effects of mutagenic depression at the first generation according to the ontogenetic parameters of plant development.

The experiment has been conducted under the conditions of the experimental fields station of the Science-Education Center of the Dnipro State Agrarian Economic University during 2017–2021.

Winter wheat seeds (1000 grains for each concentration and water) were acted with a EMS (ethylmethanesulfonate) 0.025 %, 0.05 %, 0.1 %. Seeds has been treated with an exposition of 24 hours in order to with the generally recommended method for chemical mutagens actions protocol. These concentrations are trivial for mutagens (chemical supermutagens) of this group. The control was soaked in water.

Seeds samples were sown for 32 variants (in total) (10-rows plots for every variant, in water as control, interrow-spacing was 0.15 m, length of row was 1.5 m) by varieties Balaton, Borovytsia, Zeleny Gai, Zoloto Ukrainy, Kalancha, Niva Odeska, Polyanka, Pochayna. The genotypes were identified according to characterize winter wheat varieties variability for North Steppe subzone (Dnipro region). The agrotechnology of crop cultivation is trivial for the Steppe zone (semi-arid area).

The adverse effects of the action of supermutagens were evidence at the first generation through a decrease in germination, and, for winter crops, also in plant survival. It is also important to assess the condition of crops before leaving for the winter in terms of plant viability. It was statistically significant both for the variance in the change in mutagen concentration and for individual genotypes for the germination parameter, for the parameter of the number of living plants before the winter period by the change in mutagen concentration, for individual genotypes, for the survival rate after the winter period according to the change in mutagen concentration and for individual genotypes. The mutagen had a particularly strong effect on the varieties Balaton and Niva Odeska, for which the EMS concentration of 0.1% became semilethal.

The death of plants after germination before the beginning of the winter period was not always reliable, especially for an EMS concentration of 0.1%; apparently, under its action, the death was predominantly one-stage, however, the negative impact of the winter period was always significant, except for the steppe ecotype variety Zeleny Gai, which once again shows the significance of not only the concentration, but also how adaptive the material is used. At the same time, however, the variety Niva Odeska showed high death and low adaptability under the action of this factor. Perhaps the reason for this reaction was the individual sensitivity of the variety Niva Odeska to this type of site-specific EMS effect.

The second group of genotypes, which were noted as capable to stable high productivity under the conditions of all zones of Ukraine, in general, in their response to the action of EMS, in terms of germination and survival, are similar to the response of the variety Zeleny Gai. In general, according to the results of the factor analysis, a large

homogeneity of this group is already visible for the germination parameter, the variability in concentrations is quite high, but the genotype is statistically unreliable. For the parameter of plant death before leaving for winter, the concentration is again high. With the death rate after the winter period, the same pattern is again high in terms of concentrations, but for genotype is also statistically unreliable.

It is possible to single out two varieties Balaton and Niva Odeska highly sensitive to the action of EMS, the variety Zoloto Ukrainy occupies an intermediate significant position, but statistically significantly differs from the rest in its reaction. The varieties Zeleny Gai, Kalancha, Borovytsia, Polyanka, Pochayna are, on the whole, highly resistant and of the same type in response to all EMS concentrations. However, the differences within each parameter are statistically reliable, in some cases for some concentrations (EMS 0.05%, EMS 0.1%), the difference between the parameters can be statistically unreliable in the presence of a stable, ecologically adapted variety.