EFFECT OF MUTAGENS ON THE PRODUCTIVITY OF WINTER WHEAT GENOTYPES

***I. Sidorova**, candidate of agricultural sciences, associate professor, associate professor of the department of genetics, breeding and seeds of crops*
***Yu. Kumanska**, candidate of agricultural sciences, associate professor, associate professor of the department of genetics, breeding and seeds of crops*
***V. Sabadyn**, candidate of agricultural sciences, associate professor, associate professor of the department of genetics, breeding and seeds of crops*
***N. Dubovyk**, candidate of agricultural sciences, associate professor of the department of genetics, breeding and seeds of crops*
Bila Tserkva National Agrarian University
E-mail: IrinaSidorova@i.ua

Mutational breeding is one of the most promising ways to increase the genetic diversity of source material in winter durum wheat breeding. Synthetic mutagens used by breeders and natural chemical mutagens in evolution increase the possibility of obtaining a wide potential of genetic diversity; mutations that arise in this process can be used in natural and artificial selection.

Improving the methods of induced mutagenesis is of particular importance in order to effectively use mutagenic factors to increase the frequency and range of variability of plant traits and to create genetic collections of mutants with useful traits.

To date, there are more than 4,200 plant varieties obtained by using various mutagenic factors (mostly physical), including about 270 mutant varieties of winter wheat. The most widespread is still the use of mainly physical mutagens, due to their action 88% of mutant varieties of cultivated plants were created, the use of chemical mutagenesis is more limited.

Using chemical mutagens, it is possible to predict the probability of certain types and groups of mutations with a higher level of confidence than when using physical mutagens.

The aim of the study was to investigate the effect of different concentrations of the mutagen phosphamide on winter durum wheat genotypes.

The material of our research was two winter wheat genotypes treated with the mutagen of different concentrations.

Dry winter wheat seeds were subjected to mutagen treatment. The mutagen was used in concentrations: 0.005 % and 0.0005 %. Winter wheat seeds were soaked in aqueous solutions of mutagens. The treatment exposure was 18 hours. Seeds of varieties soaked in water (18 hours) served as a control.

The mutagen phosphamide had a different effect on the number of grains per band in winter wheat genotypes. Treatment of seeds with 0.005 % of the mutagen in the genotype Smuhlianka led to an increase in the index - 23.2±0.9 pcs., which exceeded the control by 8.0 pcs. When treated with a lower concentration of mutagen, an increase in the value of this indicator was also observed.

In the Antonivka genotype, we observed a similar pattern, but with lower values. It should be noted that there was no significant difference between the concentrations of mutagen 0.005 % and 0.0005 % - 18.75±0.7 and 18.75±0.7 units, respectively. In the control, the value was 10.5±0.4 pcs.

In terms of the weight of grains per ear in the genotype Antonivka, when treated with 0.0005 % mutagen, an increase in this indicator was observed to 2.8±0.07 g, while in the water treatment - 1.0±0.03 g. The concentration of mutagen 0.005 % also positively influenced the index of grain weight per ear and on average it was at the level of 2.4±0.05 g.

In the genotype Smuhlianka, the highest weight of grains per ear was obtained when treated with a mutagen of 0.005 % concentration - 2.3±0.05 g, while a concentration of 0.0005 % negatively affected the index - 1.8±0.04 g, when treated with water - 2.0±0.05 g.

Mutagen phosphamide also had a significant effect on the weight of 1000 grains, winter wheat genotypes differed significantly in their response to the mutagen. In Antonivka genotype, treatment with 0.00054 % concentration of the mutagen increased this index to 149.3±5.8 g, while water treatment increased it to 95.2±4.6 g. Also, the treatment with the mutagen in 0.005 % concentration contributed to the increase in the weight of 1000 grains.

The Smuhlianka genotype had a specific response to the mutagen treatment in terms of 1000 grain weight. Mutagen concentrations of 0005 % and 0.0005 % contributed to a decrease in the weight of this indicator to 99.1±3.9 and 94.7±3.9 g, respectively. When treated with water - 131.6±4.9 g. Therefore, the mutagen had a suppressive effect on the indicator.

Therefore, we can conclude that the genotypes had a different response to the treatment of seeds with the mutagen phosphamide of different concentrations for the main indicators of productivity.