

ADAPTABILITY OF SOYBEAN GENOTYPES OBTAINED THROUGH EXPERIMENTAL MUTAGENESIS

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Soybean is one of the most important leguminous crops due to its high nutritional value and wide use in food, feed, and agriculture. In the context of climate change, drought and temperature fluctuations are major constraints affecting soybean productivity. Therefore, the development of soybean genotypes with improved adaptability and tolerance to abiotic stress is an important objective in breeding and plant protection. Experimental mutagenesis is an effective approach for generating genetic variability and identifying valuable forms with improved agronomic performance.

The aim of the study was to evaluate the adaptability of soybean genotypes obtained through experimental mutagenesis in order to identify forms with high yield potential and improved tolerance to unfavorable environmental conditions.

The biological material included the soybean genotypes Clavera, Lăduța, and the experimental line Z3M₁₀ 100, subjected to X-ray irradiation at doses of 100, 150, 200, and 250 Gy. Field experiments were conducted in 2025 on the experimental plots of IGFPP, MSU. Plant height, number of nodes, number of pods per plant, seed weight, and plant productivity were evaluated, while trait variability was assessed using the coefficient of variation.

The results revealed a differentiated effect of irradiation doses on the expression of the studied traits. Moderate doses promoted useful variability while maintaining plant viability, whereas higher doses exerted an inhibitory effect on plant growth and productivity. Several experimental genotypes showed a more uniform expression of morpho-productive traits, characterized by lower coefficients of variation and better adaptation to field conditions. At the same time, some mutant lines were distinguished by superior productive potential, expressed through a higher number of pods per plant, increased seed weight, and better overall plant productivity compared with

the initial forms. The analysis also showed that the response of soybean genotypes to mutagenic treatment depended on both the irradiation dose and the genetic background of the biological material, highlighting the importance of genotype-specific evaluation in mutagenesis-based breeding programs.

In conclusion, experimental mutagenesis proved to be an efficient approach for creating genetic variability in soybean and for selecting valuable genotypes for breeding. The identified genotypes may serve as promising sources for the development of new soybean varieties with improved tolerance to abiotic stress and enhanced resilience under variable climatic conditions.

Keywords: soybean, mutagenesis, adaptability, X-rays, abiotic stress.

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