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Center of Functional Genetics, Faculty of Biology and Geosciences
Doctoral School in Biological, Geonomic, Chemical and Technological Sciences
Scientific Association of Geneticists and Breeders of the Republic of Moldova

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THE INFLUENCE OF GENOTYPE ON THE GRAIN PROPERTIES OF DIFFERENT MAIZE HYBRIDS FROM SERBIA

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Together with rice and wheat, maize (*Zea mays* L.) is one of the most significant cereal crops worldwide. Dent, flint, floury, popping, and sweet maize are the five main categories of commercially available maize hybrids. Along with white, yellow, and orange, red, blue, purple, and brown are other possible grain colors. Grain quality is only of secondary value in the hybrid maize breeding process because the focus is mostly on raising the level and consistency of the yield. The genetic basis of commercial maize hybrids has significantly narrowed as a result of the hybrid breeding process itself, as well as economic factors and rivalry between breeding companies. On the market at the same time, there are often just a few closely related hybrids with comparable technological and nutrient standards.

The aim of this study was to analyze how 33 maize hybrids' physical characteristics and chemical composition were affected by genotype. The hybrids were grown in 2022 at Zemun Polje, Serbia, and evaluated in the laboratory of the Department of Food Technology and Biochemistry of the Maize Research Institute "Zemun Polje". Manual dissection of the grains revealed that the yellow dent genotype ZP 6066 had the lowest content of pericarp fraction (5.77%), the popcorn genotype ZP 611k had the highest content of pericarp fraction (10.38%), the sweet hybrid genotype ZP 504*su* had the highest content of germ fraction (16.09%), and the popcorn genotype ZP 6119k had the highest content of endosperm (84.13%). A crucial physical parameter of grain quality, the 1000-kernel weight ranged from 120.98 g (popcorn hybrid ZP 617k) to 398.13 g (yellow dent ZP 7072). The results showed that the starch, protein, oil, crude fiber, and ash contents of 33 different maize genotypes varied between intervals: from 56.79% (sweet hybrid ZP 504*su*) to 70.38% (yellow dent hybrid ZP 4123); from 10.95% (yellow dent ZP 6566) to 13.28% (ZP 504*su*); from 3.14% (yellow popcorn ZP 611k) to 7.37% (ZP 504*su*). Standard deviations of the respective chemical properties were: 2.45%, 0.62%, 0.68%, 0.31%, and 0.08%. Future breeding initiatives aimed at developing novel and enhanced genotypes of maize hybrids with higher grain quality attributes for various applications may find considerable value in our findings. It is crucial to create new breeding programs that use more focused methods to produce hybrids of maize that are meant to serve particular functions. Enabling the production of hybrids with improved nutritional and technological quality of both the starting material as well as the parental lines should receive special consideration.

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***Keywords*:** *maize hybrids, grain quality, physical properties, chemical composition*.