

PECULIARITIES OF STORAGE PROTEIN POLYMORPHISM IN THE ENDOSPERM OF MUTANT MAIZE LINES

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The scientific and research school of Professor Andrei Palii vividly illustrates the effectiveness of using endosperm genes in heterosis breeding of *Zea mays* L. that improve the quality of maize grain. The high-lysine hybrids obtained at the State Agrarian University of Moldova (SAUM) were the optimal model for the development of a new research vector related to the production of tetraploid maize forms containing the opaque-2 (*o2*) gene in their genotype. A new reserve for expanding the spectrum of genetic variability in terms of protein metabolites of maize grain quality was experimentally demonstrated. In the period of 2015-2018 a study was carried out at the heterozygous level of the effect of the influence of polyploidy on the phenotype and expression of specific genes in grain according to the end products of protein metabolism. However, for maize, the success of heterosis breeding for quality is determined primarily by the use of specific parental lines. In the direction under discussion, these are lines that combine gene and genomic mutations, the study of which requires the use of modern methodological tools. Therefore, the main goal of the presented work was to study the features of polymorphism of storage proteins (zeins) of gene (*o2* gene) and genomic mutant (tetraploid) maize lines. 32 maize genotypes, created on the basis of 10 maize lines according to the principle of "unity of differences" (*o2*/normal; 2n/4n), were used as germplasm. The studies were carried out using the storage protein electrophoresis method according to the national standard SM-2003, the FOREZ-2 computer program, the technique of direct and reverse marking of gene and genomic mutations, as well as the principles of quantitative analysis of the mutational effect on zein polymorphism. It has been established that the use of automatically synthesized electrophoretic (EF) spectra from matrices of protein profiles in reciprocal combinations makes it possible to study and interpret the effects of enrichment and elimination of the action of the *o2* gene and colchicine polyploidization on the molecular forms of zein (MPS). The predominant effect of the eliminating (reducing) action of the *o2* gene and the enriching effect of colchicine polyploidization on the zein polymorphism of the endosperm of the studied maize lines was revealed. The prevailing elimination effect of the *o2* gene on the zein fraction of the grain was established: it is most pronounced in the EF zone of medium migration. The elimination effect of colchicine polyploidization according to the protein profiles of the EF spectra is also most clearly manifested in the zone of average migration of molecular forms of zein (MFZs) markers. This fact is of considerable interest for future research in the field of selection at the level of protein marking of maize source material for mutational selection.

Keywords: *Zea mays* L., polymorphism, zein, *o2* gene, metabolism.