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POLYPLOIDY IN MAIZE BREEDING FOR GRAIN QUALITY

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Polyploidy is one of the most promising synthetic breeding methods. It provides genome buffering, increases allelic diversity and heterozygosity and allows the generation of new phenotypic variations. The aim of this paper is to present the results of experiments on tetraploid maize, following the phenotypic manifestation and expression of specific endosperm genes and their biochemical effects.

The experiments started in 2009 at the State Agrarian University of Moldova and continues today at the Department of Agronomy and Environment, Faculty of Agronomy.

In the initial stages, two special maize hybrids (Chisiniovschi 307 PL and Chisiniovschi 401 L) approved in the Republic of Moldova, with *opaque2 (o2)* gene that increases the lysine content in the grain protein, were used as biological material. Subsequently, the genetic base was expanded with other sources of germplasm with endosperm genes and common grain hybrids created at the Institute of Crop Science „Porumbeni". Colchicine was used to generate tetraploids. Currently the tetraploid collection consists of more than 40 genotypes with wild type grains, with mutant genes *o2*, *floury2 (fl2)*, *sugary1(su1)* and a double recessive population *su1o2*.

Morphologically, tetraploids are generally shorter than their diploid analogues, with some pronounced features such as leaf width and thickness, stem thickness, length of the central branch of the panicle, smaller number of branches. Tetraploid cobs are smaller, have erratic rows, larger grains, lower kernel set, the presence of grains without or defective endosperm (triploids, aneuploids). The tetraploid populations are highly heterozygous, which allowed the highlighting of transgressive forms superior to diploids by habitus and size of the cobs.

The biochemical effect study of tetraploid grains has been specifically focused on the o2 gene. Different populations with the *o2* gene showed an increase with 1-3% absolute values in protein content and by 7-12% relative values of lysine in the grain protein.

Thus, the research results deepen the knowledge regarding the action of polyploidy on the phenotype and expression of specific genes in the grain, and the germplasm created is a valuable material from a scientific and practical point of view.