

ZEIN POLYMORPHISM IN THE AID OF MAIZE SEED CERTIFICATION

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The Republic of Moldova annually exports more than 3 thousand tons of domestically selected maize seeds, mainly to countries such as Belarus, Kazakhstan and others. In addition to high cultural value indices, the exported seeds must also have a high varietal purity (at least 95%) determined by the electrophoresis method.

To facilitate this process, a research project was initiated in 2020 with the aim of molecular passporting of domestic maize hybrids that are certified for export, but also for the local market. The basis of the creation of these passports is the polymorphism of storage proteins from the maize grain (zeins) detected by electrophoresis on polyacrylamide gels in an acid environment, as well as the principle of co-dominance of the expression of the genes responsible for the synthesis of zeins when crossing the parental lines. Maize hybrids of domestic selection from different maturity groups were used as research material. The electrophoretic profiles of the parental lines and the hybrids resulting from their crossing were synthesized by the FOREZ 2 program in the following sequence of actions: 1) intensity binarization: band present (1) or band missing (0); 2) determining the border of the bands: rf_{in} and rf_{fin} ; 3) formation of a text file with EF band limits [$rf_{in} - rf_{fin}$] for each analyzed genotype.

The following characteristics were automatically identified on the computer generated arrays: a) the quantitative specificity of the zein polymorphism for each genotype according to the molecular forms of zein (FMZ), represented by groups (bands) of "zein peptide subunits" (SPZ) on the matrix of the synthesized spectrum of the hybrid; b) quantitative binary labeling specificity of the intensity of "molecular forms of zein" (FMZ) of maize hybrids, which are components of EF bands ("peptide subunits of zein"-PSZ)

Since the initiation of the project until now, more than 50 autochthonous hybrids and their parental forms have been electrophoretically passported. This year the project will be completed with the creation of a catalog of electrophoretic passports for these hybrids to be used by originators in the certification and export process of maize seeds.

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