

USE OF ZEIN POLYMORPHISM FOR ASSESSING THE GENETIC DIVERSITY OF MAIZE GERMPLASM

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At present, considerable attention is being paid to the study of differences between germplasm heterotic groups not only at the organismal level, but also at the molecular and protein levels. The aim of the present study was to apply new methodological approaches to investigate the potential use of polymorphism of alcohol-soluble storage proteins (zeins) in maize inbred lines belonging to different heterotic groups for the assessment of their genetic similarities and differences.

To achieve this goal, the following objectives were defined: 1) to study the characteristics of zein polymorphism (ZP) in maize inbred lines of two heterotic groups — BSSS-B37 and Iodent; 2) to investigate the genetic diversity of maize inbred lines carrying D27 and D29 germplasm on the basis of related test-crosses using zein protein markers.

The study included 22 electrophoretic (EP) profiles of zein proteins from self-pollinated maize lines obtained from the Bank of Electrophoretic Passports of maize seed storage proteins (zeins): 20 lines belonging to the BSSS-B37 and Iodent heterotic groups and 2 control lines (D27 and D29). The following methods were used in the experiments: electrophoresis of zein proteins and the digital software package FOREZ-2.

The study demonstrated that the investigation of genetic diversity in maize inbred lines carrying D27 and D29 germplasm at the protein-molecule level, based on related test-crosses, makes it possible to identify both the eliminating effect of tester lines and the enrichment effect in inbred lines. This approach allows: a) evaluation of differences between related reciprocal test-crosses within each heterotic group; b) utilization of the distinctive specificity of zein polymorphism expression between the studied maize heterotic groups.

Thus, the application of the FOREZ-2 program reveals new possibilities for manipulating zein protein polymorphism as an effective tool for assessing the genetic diversity of maize germplasm.

Keywords: *zein polymorphism, maize inbred lines, heterotic groups of germplasm.*