



Maize Research Institute  
**ZEMUN POLJE**  
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# International Conference

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**03 - 04 Poster**

**SEVERAL GENES INVOLVED IN LOW TEMPERATURE RESPONSE IN MAIZE FOLLOW DIFFERENT EXPRESSION PATTERNS AT DIFFERENT DEVELOPMENTAL STAGES**

Manja Božić<sup>1\*</sup>, Bojana Banović Đeri<sup>2</sup>, Dragana Dudić<sup>3</sup>, Dragana Ignjatović-Mićić<sup>1</sup>, Jelena Vančetović<sup>1</sup>, Nenad Delić<sup>1</sup>, Ana Nikolić<sup>1</sup>

<sup>1</sup> Maize Research Institute, Zemun Polje, Slobodana Bajića 1, 11185 Belgrade, Serbia

<sup>2</sup> Institute of Molecular Genetics and Genetic Engineering, University of Belgrade, Belgrade, Serbia

<sup>3</sup> Faculty of Informatics, University Union-Nikola Tesla, Belgrade, Serbia

\*Corresponding author e-mail address: [mbozic@mrizp.rs](mailto:mbozic@mrizp.rs)

Earlier sowing is one of the most important strategies of ensuring good yield potential and crop quality under poor environmental conditions arising as consequences of climate changes. Sowing maize in early spring, when the temperatures are lower, enables avoidance of drought and high summer temperatures during the flowering and grain filling stages, but it also means that maize plants will be exposed to suboptimal temperatures during earlier developmental stages. Consequently, development of maize lines tolerant to low temperatures during those stages becomes precedence. An initial study encompassed whole transcriptome sequencing of 46 maize inbred lines at the V4 stage grown under optimal temperature conditions. Gene expression analysis of maize genotypes grouped as Lancaster and non-Lancaster (BSSS, Iowa dent, etc.) revealed a set of 77 differentially expressed genes (DEGs). Seven of these genes, related to abiotic stress response, were further characterized under low temperature conditions in eight inbred lines at the V4 stage. Their expression showed specific profiles depending on the duration of low temperature exposure and genetic background. To test if these genes follow the same expression patterns at earlier developmental stages, the experiment was performed with 5-day old maize seedlings of two inbred lines (tolerant and sensitive), under optimal (25°/20°C) and low (8°/10°C) temperature conditions, with a 12h photoperiod. Samples for RNA extraction, cDNA synthesis and qPCR expression analysis were taken after 6h and 24h exposure to experimental temperatures. Five analyzed genes showed different expression regulation dependent on cold exposure duration. Two genes showed regulation dependent both on cold exposure duration and genetic background. Additionally, three of five DEGs showed different expression patterns at 5-day old seedling stage than at the V4 stage. The results imply that processes underlying maize low temperature response are

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