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## Marker assisted selection for $\beta$ -carotene rich maize: Validation of the gene-specific marker in BC<sub>1</sub> generation

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**W**orldwide, modern grain breeding programs widely implement Marker Assisted Selection (MAS). Molecular markers are being used in two ways: To control the target gene (foreground selection) and to accelerate the reconstruction of the recurrent parent genotype (background selection). Marker analysis allow breeders to discard plants without alleles of interest prior to pollination, reducing the size of breeding population. Marker assisted selection for the qualitative traits, which are regulated by the action of a single or several genes and are clearly phenotypically defined, achieved the best results. The improvement of  $\beta$ -carotene content using crtRB1-specific molecular marker is one of the successful examples of MAS. The introgressed inbreds possessing favourable allele of crtRB1 and improved hybrids with increased  $\beta$ -carotene can be used in the biofortification program.

The results presented herein are a part of the breeding program conducted at the Maize Research Institute "Zemun Polje", with the aim to convert the standard maize to  $\beta$ -carotene rich genotypes adapted to temperate regions. The utility of SSR marker specific to the crtRB1 gene in foreground selection has been already tested on parental lines and distinct marker polymorphism was observed between the donor and recurrent parents. The objective of this study was to validate the ability of

the same SSR marker to detect homozygous dominant and heterozygous plants separately in BC<sub>1</sub> generation. Heterozygous individuals were clearly distinguishable, therefore they will be selected and backcrossed with the recurrent parent to produce BC<sub>2</sub> generation. Percentage of heterozygous plants identified in BC<sub>1</sub> generation was approximately 50%, which is in accordance with the expected Mendelian ratio of 1 O<sub>2</sub>O<sub>2</sub> : 1 O<sub>2</sub>o<sub>2</sub>. The use of the crtRB1-specific marker will be extended in the next generation of MAS for  $\beta$ -carotene enriched lines for growing in temperate regions.

### Biography

Marija Kostadinovic has completed her PhD in Genetics at University of Belgrade, Serbia. At present, she is working as a Research associate in the Laboratory of Molecular Genetics and Physiology at the Maize Research Institute "Zemun Polje", where she is engaged in the project "Improving the quality of maize and soybean by conventional and molecular breeding" funded by the Ministry of Education, Science and Technological Development of Republic of Serbia. Her research focus is on the marker assisted selection for improvement of the maize protein quality. Also, she is included in genetic characterization of maize lines, hybrids and populations, as well as in biochemical testing of the grain quality.

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