

Morpho-agronomic Characterization and Molecular Screening of Putative Mutants for Desired Agronomic Traits and Sucrose Content

Date of Completion of Study: November 2023

Date of Completion of Terminal Report: December 2023

The polyploid nature of the sugarcane makes breeding of new varieties challenging. One method to increase genetic variation is mutation breeding. Mutation breeding enhances genetic diversity leading to useful traits. It aims to improve and already elite genotype usually for a single trait such as improved yield, quality, stress resistance, agronomy, etc. (FAO/IAEA, 2018).

In this study, putative mutants from the SIDA-funded project, "Improvement of Recommended Sugarcane Varieties Using Nuclear Technology and Biotechnology" were screened for variation from the source varieties, disease-resistance and sucrose content thru different molecular markers. A total of 285 markers were detected with a mean value of 10.96 alleles per primer.

The genetic variability of the putative mutants and the source varieties were then evaluated. High dissimilarity values were observed between putative mutants and the source varieties. Alleles associated with smut resistance were present in Phil 99-1793-105-20GY, Phil 99-1793-93-25GY and Phil 2000-0791-114-30GY while downy mildew resistance- associated alleles were detected in Phil 7544-11-30GY, Phil 2000-0791-114-30GY, Phil 2000-0791-65-25GY, Phil 2000-0791-16-20GY, Phil 2000-0791-76-10GY, Phil 99-1793-105-20GY, Phil 99-1793-93-25GY, Phil 99-1793-99-43-25GY and Phil 99-1793-110-25GY and Phil 99-1793.

Sucrose markers, meanwhile were present in Phil 99-1793-105-20GY, Phil 2000-0791-8-25GY, Phil 2000-0791-112-30GY, Phil 2000-0791-25-10GY and 2000-0791-59-20GY.

Morpho-agronomic characterization also showed variations between the source varieties and the putative mutants. Mutation thru gamma irradiation has effectively induced variations on the clones of Phil 99-1793, Phil 7544 and Phil 2000-0791.

Quantitative PCR of the mutants for high sucrose genes before propagation of the selected clones for the Preliminary Yield Test (PYT) stage is recommended.

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