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Induced mutagenesis for generating bananas resistant to Fusarium wilt TR4

Cavendish bananas are sterile, parthenocarpic and an obligate vegetatively propagated crop. This makes them particularly susceptible to diseases including Fusarium wilt caused by *Fusarium oxysporum* f. sp. *cubense* (Foc) tropical race four (Foc TR4). Foc TR4 has been identified in nine countries and its recent spread is threatening global banana production. Previous experiments showed that when using the chemical mutagen EMS, mutations can be induced in the banana genome at a high density, and chimeric sectors rapidly dissolved. Further, induced point mutations were shown to be stably inherited in sibling lines through multiple generations. We combined this approach with a previously developed protocol for gamma treatment of meristematic tissue to increase the genetic diversity in Cavendish bananas. A large mutant population of the cultivar Grande Naine was produced. Following treatment, plantlets were allowed to recover and transferred to the screenhouse. Plants were screened for their response when challenged with fungal pathogen. To date, 19 banana plants showing no symptoms of pathogen attack have been recovered. Four percent of material treated with EMS showed no disease symptoms, whereby in gamma treated material, 18% was observed for 30 Gy treated material and 17% for 40 Gy. Plantlets were next re-established as *in vitro* cultures for multiplication and multilocational distribution. A subset of treated material was also used to develop a low-coverage whole genome copy number variation analysis for fast and efficient recovery of large induced mutations. Material showing no disease symptoms will be further analysed with the use of the established whole genome sequencing technique.

Country or International Organization

PBGL

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