ABSTRACT

Studies on the *In-vitro* Propagation of Highgate (*Musa Acuminata*, AAA) with emphasis on Production of Mutants resistant to *Fusarium oxysporum* F. sp. *Cubense*

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The use of conventional breeding techniques utilising Gros Michel as the female parent has to date failed to produce a commercially acceptable plant resistant to *F.O. cubense.*

In the present study efforts were made to determine the level of 6 benzylaminopurine (6-BAP) which gave maximum shoot proliferation *in vitro* which could be treated with the mutagens gamma radiation, Sodium azide (NaN_3), Diethyl sulphate (DES) and Ethyl methanesulphonate (EMS); regenerate plantlets from treated propagules and screen these for tolerance to *F.O. cubense* race 1. Further, an *in vitro* method of screening for resistance was investigated.

It was found that maximal shoot proliferation occurred between 3.0 and 4.0 mg 6-BAP/litre. Calloid initiation and calloid 'bud' proliferation were maximal between 15.0 and 20.0 mg 6-BAP/litre. The hormone concentration appeared to be the more important factor in calloid initiation than damaging of the apical meristem. Regeneration of shoots from calloid occurred most easily when buds were dissected out and cultured in MS medium supplemented with 0.0 to 2.0 mg 6-BAP/litre. The use of the growth regulators N^6-(2-isopentyl) adenine and Zeatin in combination with 3-indole-acetic acid and high phosphate also promoted satisfactory shoot regeneration/growth from calloid.

For gamma radiation, meristems, shoots, and corms were treated with 0.2 to 5.0 kilorads (kR); with dose rates of 100.82, 177.37 and 256.8 rads/minute. For the chemical mutagens meristems were treated for 0.5 and 1.0 hour periods at the following concentrations: 0.0011 M, 0.0023 M and 0.0046 M for NaN_3; 0.01 M; 0.02 M and 0.025 M for DES; and 0.1 M, 0.2 M and 0.3 M for EMS.

Gamma irradiation of corms and meristems produced the highest FE followed by DES, NaN_3 and EMS. For all mutagens, except DES, a similar percentage of regenerated plantlets was selected for tolerance to the pathogen.

For *in-vitro* screening for tolerance, the selection agents used were fusaric acid at 15, 25 and 35 mg/litre; culture filtrate at 50, 100, 200 and 500 ml/litre; and the live organism. A comparison of symptoms produced in Highgate, Robusta and Horse plantain revealed that differences were not large enough to allow a clear-cut classification of plants as tolerant or susceptible.