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SCREENING OF SELECTED CASSAVA CULTIVARS FOR SACMV RESISTANCE

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A research report submitted to the Faculty of Science, University of Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Science

Johannesburg, 2005

DECLARATION

I declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Science in Biotechnology in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

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(Signature of canditate)

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(Signature of Supervisor)

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(Head of School)

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(Head of Graduate Studies)

_____ day of March 2005

ABSTRACT

Cassava is one of the most important staple crops in the world and is consumed by over 700 million people around the globe and is a profitable product commercially due to the high starch content of its tubers. One of the future aims is to produce cassava that is high yielding, resistant to cassava mosaic geminiviruses (CMGs) and high in starch content. To be able to achieve commercially attractive cassava varieties, research need to be carried out to investigate the virus resistance status of different cassava cultivars, which can later be used in the future breeding programme.

In South Africa, cassava is used for commercial starch manufacturing purposes, as a cash crop and a food source by small-scale farmers. Cassava Mosaic Disease (CMD) is having a negative impact on yield of the crop globally and therefore dropping profitability of cassava on a commercial scale.

The aims of this research were to propagate thirteen cassava cultivars and then to test them for virus susceptibility or resistance.

Eleven cassava cultivars received from the International Institute of Tropical Agriculture (IITA) were tested for resistance or susceptibility against South African cassava mosaic virus (SACMV). Two local, commercial cultivars T200 and T400, were tested for East African cassava mosaic virus (EACMV) and African cassava mosaic virus (ACMV) resistance.

Cassava cultivars were successfully propagated *in vitro* and thereafter transferred into soil and acclimatized to adapt to environmental conditions. When the plantlets were three weeks old, the plantlets were infected with cassava mosaic viruses. Plants were infected with SACMV via *Agrobacterium*-mediated transfer and infectious EACMV and ACMV monomers were used to biolistically bombard the plantlets.

Resistance/susceptibility results of seven of the thirteen cultivars were obtained with SACMV, these cultivars being T200 (susceptible), T400 (susceptible),

TME3 (highly resistant), I30572 (susceptible), I420251 (highly susceptible), I60506 (susceptible) and TMS60444 (susceptible). Due to destruction by fungal gnats eating the roots of the plants, acclimatization of the remaining six cultivars was not possible. Also, due to the nature of the biolistic equipment, infection of the cultivars with EACMV and ACMV was not achieved as the plantlets were not robust enough to survive the pressure.

Dedicated to :

Parents, Sisters & Muhammed

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