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Development of virus resistant sweetpotato using biotechnological approaches in Kenya

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Abstract. The sweetpotato virus disease (SPVD) is one of the main constraints to sweetpotato production in Africa. It is caused by a number of sweetpotato viruses. The sweetpotato feathery mottle virus (SPFMV) is the most widespread of those viruses. Transformation of sweetpotato plants with viral coat protein genes may impart a coat protein-mediated resistance to SPVD. In 2001 twelve lines of sweetpotato variety CPT 560 transformed with the SPFMV coat protein gene were field tested under controlled conditions in four important sweetpotato growing agro-ecologies in Kenya. Based on virus resistance, yields of storage roots and vines, four transgenic lines were selected and evaluated further in 2002. Results from these field trials did not provide an adequate level of SPVD resistance as expected based on visual assessment of symptoms and tissue printing bioassays. Possible explanations for this unsatisfactory level of protection may be due to synergistic effects of other sweetpotato viruses in the environments where the lines were tested. Secondly it is possible that the first generation gene constructs were not efficient against the Kenyan strains of the virus since they were developed based on American strains of the virus. The second generations of transgenic plants are currently being developed at the Kenya Agricultural Research Institute (KARI) Biotechnology centre and are at various stages of development. These have improved gene constructs developed using Kenyan isolates of SPFMV. This project has been instrumental in development of the biotechnology framework in Kenya and capacity building in biotechnology.