

## **Reaction of transgenic sweet potato (*Ipomoea batatas* L.) lines to virus challenge in the glasshouse**

### **Abstract:**

Objective: Sweet potato virus disease (SPVD) is highly devastating and diseased plants produce little or no yield. Efficient methods to control the disease are not available and conventional breeding for resistance has had limited success. Breeding for resistance through genetic engineering offers an alternative solution for the control of SPVD. The objective of this study was to select transformed sweet potato lines and evaluate their reaction to virus inoculation under controlled conditions. Methodology and results: Seven hundred and eight sweet potato lines that were putatively transformed with the coat protein (CP), replicase and inverted repeat of the CP genes of sweet potato feathery mottle virus (SPFMV) were characterized. Leaves of 597 (84.3%) were unbleached following treatment with 1% (w/v) kanamycin solution whereas those of 111 (15.7%) lines turned yellow. Kanamycin-resistant lines were graft-inoculated with sweet potato scions infected with SPVD and of the 597 lines, only 20 did not display symptoms. In PCR, amplified DNA fragments of 450 bp were realised in 7 out of the 20 transgenic lines tested using specific primers to the CP, replicase and inverted repeat of the CP genes. The confirmed transgenic lines were evaluated after inoculation with SPFMV, sweet potato chlorotic stunt virus (SPCSV) and a combination of the two under screen house conditions. Ten transgenic sweet potato lines remained symptomless and were virus-free when serologically tested by nitro-cellulose membrane (NCM) -ELISA. Results from triple antibody sandwich (TAS)-ELISA demonstrated that virus accumulation was suppressed in 7 transgenic lines as compared to the non-transgenic control plants two months after inoculation, indicating that the plants were relatively protected. Conclusion and application of findings: This study indicates some form of protection exists against SPVD in plants that were transformed with SPFMV-derived genes. Further experimentation in the field is needed to fully determine the efficacy of the transgenes in conferring resistance to SPVD.