Sustainable agriculture for the future

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Sweet potato is a popular food security crop in South Africa and has considerable commercial value. It is recognized for its contribution to food and nutrition security and has the potential for being processed into various products, such as biscuits, doughnuts, juice, and chips, all of which that can be produced in household kitchens.

The Agricultural Research Council - Vegetable, Industrial and Medicinal Plants (ARC-VIMP) is renowned for its research on sweet potato and has an excellent history in sweet potato breeding since 1952. To date, 25 cultivars have been released from the breeding program. Most of these cultivars are cream-fleshed and three of these are the main commercialized cultivars currently planted in South Africa, namely, Blesbok, Bosbok and Ribbok. For the informal market, the leading cultivars are Ndou (cream-fleshed) and Bophelo (orange-fleshed). The ARC-VIMP maintains the only disease-indexed collection (gene bank) of sweet potato in South Africa. The ARC-VIMP also has several programs aimed at dissemination of new cultivars to small-holder farmers, promoting

cultivation of new cultivars for food security, nutrition, and income generation. The campus also provides training in production practices of sweet potato.

Sweet potato production can be severely limited by numerous fungal diseases. Fusarium wilt (FW) is one of the economically important fungal diseases that occurs worldwide. The causal agents of FW are part of the *Fusarium oxysporum* species complex (FOSC). This is a group of soil-borne pathogens that cause severe diseases on more than 100 plant hosts, including sweet potato. FW infection on sweet potatoes display one or more of the following symptoms: yellowing of leaves with dark brown, marginal, or interveinal browning and wilting of the plants (Figure 1), stunted growth, and a dark to reddish brown discoloration of the vascular tissue in the lower stem when cut open longitudinally (Figure 2).

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focus of the study was on characterising FOSC strains associated with sweet potato. This was achieved by conducting a field survey to collect diseased sweet potato plant material from which to isolate plant pathogens associated with the FOSC. Molecular methods, like DNA extraction and polymerase chain reaction (PCR), and phylogenetic analyses using computer software, as well as the observation of morphological characteristics were used to identify FOSC strains. This study revealed that apart from F. *oxysporum f. sp. batatas,* two other formae speciales strains, namely, *F. oxysporum f. sp. tuberosi* and *F. oxysporum f. sp. vanillae* are associated with FW of sweet potato in South Africa.

The identification of FOSC strains can have an impact on South African agriculture as it should be considered in determining risk evaluation approaches, the development of control measures for farmers, and in assisting breeders. This study highlighted the importance of identifying FOSC strains associated with sweet potato in South Africa.

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Figure 1: Symptomatic sweet potato plant showing wilting, and the yellowing of leaves with dark brown and dead leaves.

Figure 2: Symptoms of Fusarium wilt on a sweet potato plant showing browning of the vascular tissues in a stem.