Determining the Pan-African Sweetpotato virome: Understanding Virus Diversity, Distribution and Evolution and their Impacts on Sweetpotato production in Africa

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Abstract

Food security remains a huge challenge for the millions of Africans dependent on agriculture for their subsistence. A low-level agricultural productivity and a high percentage of poor and undernourished people are common in Africa, particularly in sub-Saharan Africa (SSA). Sweetpotato, *Ipomoea batatas* (L.) Lam. (Family *Convolvulaceae*), is among the most important food crops in the world and an extremely important food crop for subsistence farmers in SSA. It is grown throughout the African continent and currently around 34.5% of global sweetpotato area is in Africa. SSA produces approximately 7 million tons of sweetpotato annually, only about 5% of global production. One major limitation in sweetpotato production is cultivar decline, mostly due to the cumulative effect of virus infection on this vegetatively propagated crop. Thus, viral diseases are considered a major limiting factor in sweetpotato production worldwide, and particularly in SSA. However, there is a widespread lack of basic information and understanding of virus populations throughout Africa, even though such basic information is required to manage the spread and impact of these viral diseases. This project will focus on evaluating a novel approach, deep sequencing and assembly of small RNAs from field-grown sweetpotato samples collected throughout Africa, to systematically and efficiently identify virus genome. A Pan-African sweetpotato virome will be established, which will provide the scientific community and government unprecedented possibilities to understand sweetpotato virus distribution in Africa, guide phytosanitory requirements, predict risks of future epidemics, and suggest regional disease management strategies. In West-Africa the survey is expanded to include Cassava, Banana, Yams and Potato.

Key words: Pan-African sweetpotato virome, virus diversity, distribution, evolution, impacts, sweetpotato production