



Viral diseases are among the main factors limiting sweet potato production worldwide. The diseases cause not only reduction in yield, but also poor quality of the storage roots. Farmers in the United States have reported yield losses of up to 30 to 50 percent. Viral infections significantly reduce marketable amounts of the important United States No.1 grade potato by up to at least 26 percent.

Sustainable Sweet Potato Production

Who cares and why?

Viral diseases decolorize the red skin and yellow flesh of sweet potatoes and increase the length and diameter ratios of the storage roots, further detracting from overall appearance. Twenty sweet potato viruses have been characterized worldwide. Among them, five viruses have been detected in sweet potatoes in the United States and more are expected to be identified.

Sweet potato leaf curl begomovirus (SPLCV) and *Sweet potato feathery mottle potyvirus* (SPFMV) are considered to be the most detrimental viruses to sweet potato production in the United States. The

SPLCV negatively affected the cultivar 'Beauregard', reportedly resulting in 25 to 30 percent yield losses as well as affecting the quality of the grooving and ribs of storage roots, in a crop that accounts for 80 percent of the United States production. Both viral diseases have dramatically expanded in recent years and the risk of pandemics is increasing because of growing vector population, vegetative propagation and the absence of resistance lines. Research is needed to identify resistant lines, develop integrated pest management strategies, and develop studies of functional genomics for genetic improvement.

What has the project done so far?

The project has forged a team of scientists from different disciplines and institutions. For several years, scientists and Extension educators have collected multiple field samples, as well as conducted sequencing, molecular disease diagnosis and viral full genomic cloning. Educational materials were distributed to growers for diagnosis and management. Researchers cloned multiple

SPLCV and SPFMV isolates and the whole viral genomes were sequenced. . Furthermore, SPLCV and SPFMV based viral gene expression and silencing functional genomics platforms were developed for gene functional evaluation.

Impact Statement

Alcorn researchers have:

Helped small farmers diagnose and manage disease, leading to sustainable and profitable production.

Developed novel functional genomics platforms that provided genetic information for the genetic improvement of important sweet potato cultivars.

Increased the knowledge and skills of researchers, farmers, and other stakeholders, leading to more successful adoption of sustainable sweet potato farming practices and technologies.

What research is needed?

More research is needed for the development of simple, effective and reliable detection methods for SPLCV and SPFMV. detection and diagnostics. Researchers are also looking for ways to develop effective inoculation methods for efficiently high-throughput screening resistant germplasm and identification of naturally occurring virus resistant genes. Further modification and optimization of the newly developed SPLCV and SPFMV based functional genomics platforms.

Want to know more?

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Additional Links: <http://www.umes.edu/ard/Default.aspx?id=46285>

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