Plant Path

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7. Title

Biology and Management of Economically Important Sweetpotato Diseases

12. Investigator Name(s) (Last Name and Initials)

Clark, C. A.

20. Termination Date 12/31/2014	40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011

Outputs:

A feature article was published in Plant Disease describing the progress of collaboration of 11 authors on identifying, detecting, and managing sweet potato viruses that provides the first comprehensive summary of the complex of viruses affecting this crop. An annual output of this project is production of virus-tested tissue cultures that are provided directly or indirectly through Certis, USA to the LSU AgCenter sweet potato foundation seed program and the Auburn University sweet potato foundation seed program. These cultures serve as the nuclear stock for production of virus-tested foundation seed sold to Louisiana growers and those in other states. Information on managing viruses and postharvest diseases was extended to growers and other stakeholders at the National Sweet Potato Convention, the Louisiana Sweet Potato Association Annual Meeting, and a field day held in a grower's field in West Carroll parish. Efforts to improve disease resistance in sweet potato cultivars have contributed to the development by the LSU AgCenter sweet potato breeding team of two advanced breeding lines (L05-111 and L07-146) with multiple disease resistance that will be considered for release in 2012.

Outcomes/Impacts:

Fungicides and presprouting were evaluated for effects on sweet potato plant production, sclerotial blight incidence, and subsequent yield when cuttings from beds were transplanted to the field. There were no significant differences among fungicide or pre-sprouting treatments for any of the parameters measured. When seed roots were observed at the time of plant emergence from the soil, many seed roots were apparently sound but none had not produced feeder roots or sprouts. Bacterial soft rot problems were observed in fields during 2010, and samples of seed roots were collected from different growers and tested to determine if they had latent populations of Dickeya dadantii. Soft rot did not develop in any samples of Beauregard, but developed in one of four Covington samples and seven of thirteen Evangeline samples. Transplants of Beauregard, Covington, Evangeline, L05-111, and L07-146 were dipped in a suspension of D. dadantii immediately prior to transplanting. None of the plants developed stem rot, and harvested storage roots will be tested in early 2012 to determine if the bacteria persist more in some genotypes of sweetpotato than others. Fungi that cause end rots on storage roots during storage, especially Macrophomina phaseolina (Mp) and Fusarium solani (Fs), have been isolated from symptomless storage roots, but the roots can be induced to develop end rots by placing them at 32 degrees C in plastic bags. Storage roots of Beauregard, Covington, and Evangeline were removed from storage and either dipped in water or a suspension of the fungicide dicloran and placed in end rot-inducing conditions. Although dicloran inhibited both fungi in vitro, it did not affect end rot development on these roots. In a greenhouse test, tissue culture-derived plants free of the pathogens were planted in autoclaved soil or soil infested with Mp, Fs, or Mp and Fs and isolations were conducted at different time intervals after planting. Fs, Mp and other fusaria were recovered from roots and stems below the soil surface and stems up to 5 cm above the soil, suggesting that these fungi invade and systemically colonize sweetpotato plants prior to harvest without necessarily inducing symptoms. Aphid populations and spread of potyviruses were monitored in four fields and revealed a trend similar to that previously observed. Aphids were present in varying numbers throughout the growing season, but potyvirus spread occurred mostly in late June through July. Two advanced breeding lines from the LSU AgCenter program, L05-111 and L07-146, share multiple disease resistance to Streptomyces soil rot, Fusarium wilt, and Rhizopus soft rot, and are both susceptible to bacterial root rot, similar to Beauregard. L07-146 has moderate resistance to root-knot nematode while L05-111 is susceptible as is Beauregard.

Publications:

Clark, C. A., Davis, J. A., Abad, J. A., Cuellar, W., Fuentes, S., Kreuze, J., Gibson, R., Mukasa, S. B., Tugume, A. K., Tairo, F., and Valkonen, J. P. T. 2011. Sweet potato viruses: 15 years of progress on understanding and managing complex

diseases. Plant Dis. doi/pdfplus/10.1094/PDIS-07-11-0550.

Guan, D., Grau, B. L., Clark, C. A., Taylor, C. M., Loria, R., and Pettis, G. S. 2011. Evidence that thaxtomin C is a pathogenicity determinant of Streptomyces ipomoeae, the causative agent of Streptomyces soil rot disease of sweet potato. MPMI doi/abs/10.1094/MPMI-03-11-0073

Wosula, E., Clark, C. A., and Davis, J. A. 2011. Potyvirus and insect vector movement in Louisiana sweet potato fields. Phytopathology 91:S270.

Villordon, A., Solis, J., LaBonte, D., Clark, C., and Sheffield, R. 2011. Further calibration of a Bayesian belief network model representing the relationship between fresh market yield and agroclimatic variables known to influence storage root initiation in Beauregard sweet potato: soil moisture and planting density. National Sweetpotato Collaborators Group Progress Report, 2010:9.

Clark, C., Sweany, R., and Silva, W. da. 2011. Stress effects on sweet potato storage root rots, some preliminary observations. National Sweetpotato Collaborators Group Progress Report, 2010:12.

Clark, C. A., Ferrin, D. M., Sweany, R., and Hoy, M. W. 2011. Evaluation of application timings of Quadris and a biological agent for control of sclerotial blight on sweet potato, 2010. Plant Dis. Manag. Rep. 5:V078.

Clark, C. A., Sweany, R., and Hoy, M. W. 2011. Evaluation of fungicide dips for post-harvest control of Rhizopus soft rot of sweet potato, 2010. Plant Dis. Manag. Rep. 5:V077.

Participants:

C.A. Clark (PI), M.W. Hoy, R. Sweany, E. Wosula, W. daSilva, LSU AgCenter.

Target Audiences:

Sweet potato growers, packers, and consumers.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date