RESULTS FROM THE 2021 CLRDV SENTINEL PLOTS IN AL, FL, GA, SC, NC, VA, MS, AR, LA, TN, AND TX AND RESISTANCE SCREENING EFFORTS AT AUBURN UNIVERSITY

M. Zaccaron
J. Koebernick
D. Roark
Department of Crops, Soils, Environmental Science, Auburn University
Auburn, AL
S. Taylor
Department of Entomology, Virginia Tech University
Suffolk, VA
A. S. Huseth
Department of Entomology and Plant Pathology, North Carolina State University
Raleigh, NC
K. Conner
Alabama Cooperative Extension System
Auburn, AL
A. Strayer-Scherer
A. Hagan
K. Bowen
Department of Entomology and Plant Pathology, Auburn University
Auburn, AL
J. Greene
Plant and Environmental Sciences Department, Clemson University
Edisto, SC
R. Kemerait
Department of Plant Pathology, University of Georgia
Tifton, GA
I. Small
Department of Plant Pathology, University of Florida
Quincy, FL
P. Price
Department of Plant Pathology and Crop Physiology, Louisiana State University
Winnsboro, LA
T. Allen
Mississippi State University
Stoneville, MS
T. R. Faske
Department of Plant Pathology, University of Arkansas
Lonoke, AR
D. Kerns
Department of Entomology, Texas A&M University
College Station, TX

Abstract

Cotton Leaf Roll Dwarf Virus (CLRDV), an aphid transmitted *Polerovirus,* is the causal agent of cotton leafroll dwarf disease (CLRDD), an emergent threat to the US cotton industry. The overarching goal of this project was to determine the distribution and occurrence of CLRDV in the cotton belt along with better understand its symptomology in different cultivars under diverse environmental conditions and identify genetic resistance. To this end, sentinel plots were planted during the 2019, 2020, and 2021 growing seasons in AL, FL, GA, SC, NC, VA, MS, AR, LA, TN, and TX. Sentinel plot establishment was between May 6 and June 21 and contained four to six selected cotton lines, including those with resistance to the typical and atypical CLRDV strains that cause Cotton Blue Disease in Brazil in 2019. Over 1000 genetically diverse lines have been screened for resistance by the Auburn Cotton Breeding program. Trials were arranged in a randomized complete block design with four replications. Visual assessments of disease incidence were recorded at 90 days after planting based on the proportion of plants displaying characteristic CLRDD symptoms. Furthermore, a composite leaf sample was collected from every plot in all locations approximately 90

days after planting during cotton reproductive stages, late August to mid-September, for CLRDV detection. Petiole samples were processed for CLRDV detection by the Plant Diagnostic Lab at Auburn University using a nested-PCR assay targeting the P0 open reading frame on the CLRDV genome. CLRDD symptoms were observed in all locations and cultivars, except for Jackson, TN. The Blackville, SC site had a significantly higher proportion of plots with PCR positive CLRDV detection with 100% on both years. Overall, CLRDD incidence was equally high over the study period at the AL, FL, SC, and to a lesser extent GA sentinel sites, while CLRDV positive plants were not recorded at either the AK or TN sites. Disease incidence was similarly low at the LA, MS, TX, and VA sites. PhytoGen 480 presented the highest CLRDV symptom incidence overall locations, with rugosity being the predominant symptom, while DynaGro 3615 had the lowest CLRDD incidence. Most common symptoms overall included leaf rugosity, leaf drooping, bronzing of upper-canopy leaves, and increased vegetative growth with small leaves on plant apex. Field screening efforts in Alabama yielded six breeding lines with potential for resistance breeding for CLRDV.