IMPACT OF SEEDLING DISEASES AND PREEMERGENCE HERBICIDES ON COTTON STAND ESTABLISHMENT AND PLANT DEVELOPMENT C. S. Rothrock Dept. of Plant Pathology - University of Arkansas Favetteville, AR T. W. Allen Delta Research and Extension Center - Mississippi State University Stoneville, MS H. M. Kelly WTREC - The University of Tennessee Institute of Agriculture Jackson, TN R. C. Kemerait **Department of Plant Pathology - University of Georgia** Tifton, GA G. W. Lawrence Mississippi State University **Mississippi State, MS** K. S. Lawrence **Auburn University** Auburn, AL H. Mehl Tidewater Ag Res & Ext Ctr - Virginia Tech Suffolk, VA R. Norton Safford Agric. Center, University of Arizona Safford, AZ P. Price LSU AgCenter- Northeast Region Winnsboro, LA J. E. Woodward Texas A&M AgriLife Extension Service Lubbock, TX

Abstract

Seedling diseases are one of the critical factors limiting stand establishment and early-season development of cotton by reducing seed germination, plant emergence, and seedling vigor resulting in poor stands or stand failures. Environment, especially cool temperatures and wet soils, increase seedling disease severity and stand losses in large part by placing stress on the germinating seed and developing seedling. It is assumed that other factors that place stress on the plant also may increase seedling diseases by similar mechanisms. Factors that have been suggested as increasing plant stress and seedling diseases include low seed quality, planting depth, soil crusting, and herbicides. Historically there are many examples of herbicides interacting with soilborne pathogens or influencing plant disease severity. Less attention has been payed to disease by herbicide interactions with the introduction of herbicide resistance traits in genetically modified cultivars because of reduced reliance on preemergence herbicides in weed management. With the development of herbicide resistance in a number of weed species, producers are once again using preemergence herbicides in cotton production. As a result, there has been observational data suggesting these preemergence herbicides are contributing to stand losses by increasing seedling diseases. A uniform trial was developed as part of the Seedling Disease Research and Education Program to test the hypothesis that the use of preemergence herbicides increase the losses from seedling diseases. The experimental design main plots were the use or no use of preemergence herbicides. Preemergence herbicide programs were labeled rates of products appropriate for each location. Assessment of seedling disease pressure was by the use of different fungicide seed treatments. All seed were treated with the seed treatment insecticide Gaucho (Imidacloprid). Fungicide seed treatments included a base seed treatment of Spera (Myclobutanil) + Vortex (Ipconazole) + Allegiance (Metalaxyl) + Evergol Prime (Penflufen), the base fungicide package plus Evergol Extend (Penflufen + Trifloxistrobin) or Evergol Extend + Aeris (Imidacloprid + Thiodicarb). The study was conducted at nine locations in 2014 across the cotton belt. A fungicide seed treatment response was found at six of nine locations for stand compared to no

fungicide treatment. No effect for seed treatment was observed for early-season vigor and yield, except for yield in Alabama. For the preemergence herbicide treatment main effect, a response was found for stand and early-season vigor at two of nine sites, with yield being affected at one site. An interaction between seed treatment and herbicide was found at two sites. However, in none of these interactions did the data support the observational data from producers' field. In conclusion, for the range of environments examined in 2014 with the majority of sites having seedling disease losses, no evidence was found to support an interaction between preemergence herbicide use and seedling disease pressure. These results suggest that when reductions in stand or vigor occur by the use of preemergence herbicides the losses are additive and independent of the seedling disease complex.