

**THE TARGET SPOT REGIONAL PROJECT: WHAT HAVE WE LEARNED?****H. L. Mehl****Virginia Tech Tidewater AREC****Suffolk, VA****N. Dufault****M. Mulvaney****University of Florida****Gainesville, FL****A.K. Hagan****Auburn University****Auburn, AL****H. Kelly****University of Tennessee - West Tennessee Research & Education Center****Jackson, TN****R.C. Kemera****University of Georgia****Tifton, GA****P. P. Price****LSU AgCenter - Macon Ridge Research Station****Winnsboro, LA****T.W. Allen****Mississippi State University - Delta Research and Extension Center****Stoneville, MS****R.L. Nichols****Cotton Incorporated****Cary, NC****Abstract**

Target spot of cotton, caused by *Corynespora cassiicola*, occurs in the mid- and southeastern United States. Variability in incidence and severity among years and geographic locations suggests that disease development is driven by extended periods of rainfall, high humidity, and warm temperatures. Leaf drop rapidly follows lesion development, both of which spread upward throughout the canopy, resulting in yield losses when high levels of premature defoliation occur. The objective of this multi-year regional project was to evaluate the effectiveness of one and two application programs of different fungicides for managing target spot and protecting cotton yields. Trials were conducted from 2014-2016 with a total of 18 site-years. Trials were established in four locations across four states (FL, GA, LA, and VA) in 2014, seven locations across six states (AL, FL, GA, LA, MS, and TN) in 2015, and seven locations across six states (AL, FL, GA, LA, MS, and TN) in 2016. Two varieties hypothesized to vary in susceptibility to target spot, (Phytogen 499 WRF [PHY499] and Delta & Pine Land 1137 B2RF [DPL1137]), and four fungicide treatments (Headline SC 6 fl oz/A, Priaxor 4 fl oz/A, Quadris 2.08 fl oz/A, and Topguard 7 fl oz/A) were evaluated, plus a non-treated control. Fungicide treatments consisted of 1) a single application at disease onset, but no later than five weeks after first bloom, or 2) an application at disease onset followed by a second spray 14 days later. Treatments were applied to field plots in a full factorial, randomized complete block design with two varieties, two application treatments (one or two applications), and five fungicide treatments (four fungicide products plus a non-treated control). Disease onset, severity, and defoliation were evaluated bi-weekly following the first observations of lesions, and seed and lint yield were determined following harvest. Varieties differed in disease severity and defoliation at 14 and 15 of the 18 site-years, respectively, with higher levels of both occurring on PHY499 compared to DPL1137. Fungicides reduced defoliation in 10 of the trials, but severity was reduced in only 5 of the trials. Two applications reduced severity and defoliation more than one application at 6 and 7 site-years with average reductions of 1.5 and 4.4 percent, respectively. Based on a meta-analysis of all site-years, all fungicides evaluated in the study had a significant effect on defoliation of PHY499 and both Priaxor and Quadris had a significant effect on DPL1137. However, reductions in defoliation ranged from 8.79 to 25.4 percent with only Priaxor reducing defoliation more than 20 percent. Yield differed among varieties (9 site-years), fungicides (4 site-years), and the number of applications (2 site-years). The best-yielding variety varied among site-years, but on average PHY499 had 103 lb/A higher seed yield compared to DPL1137 despite being more susceptible to target spot. At the two locations where number of applications impacted yield, seed cotton yields with

two fungicide applications were 126 and 326 lb/A higher than with one application. However, when averaged across all trials, two applications only yielded 15 lb/A higher. Based on a meta-analysis, only Headline and Priaxor resulted in significant yield increases compared to the untreated control, with a 4.29 (Headline) and 4.81 (Priaxor) percent increase for DPL1137 and a 5.02 (Headline) to 5.76 (Priaxor) percent increase for PHY499. Results indicate that Priaxor and Headline can slow down defoliation caused by target spot and protect yields at some locations, but yield responses to fungicides are inconsistent. Two fungicide applications rarely provide a benefit over a single well-timed application, and based on the yield responses observed in this study are unlikely to be profitable. The maximum increase in lint yield from a fungicide application in this study was 332 lb/A; assuming a price received of \$0.70/lb, the fungicide treatment would have a value of \$232/A. However, the average increase in lint was 95 lb/A which would only have a value of \$66/A. This study provides some insight into the management of target spot, but additional studies are needed to better understand the relationship between timing of disease development and yield loss, to characterize differences in target spot susceptibility of cotton varieties, to elucidate the role of canopy architecture in disease development, and to improve the efficacy of disease control with fungicides based on application timing, placement, and selection of the most effective chemistries.