EFFECT OF HEADLINE APPLICATIONS ON TARGET SPOT IN COTTON

Wade B. Parker
University of Georgia Cooperative Extension
Millen, GA
Robert C. Kemerait
Jared R. Whitaker
The University of Georgia
Tifton, GA
P. Mark Crosby
University of Georgia Cooperative Extension
Swainsboro, GA

Abstract

Extended periods of wet weather and high humidity often occur during the cotton growing season in Georgia. These conditions, especially in fields with a dense canopy, can lead to development and spread of leaf spot diseases, such as Target Leaf Spot caused by the pathogen *Corynespora cassiicola*, and can lead to premature defoliation and potentially reduce yield. A study, which consisted of four irrigated trials 2013 and 2014, was conducted to determine the effect Headline (pyraclostrobin) on Target Spot and cotton yield. Four treatments were utilized in all trials and included cotton treated season-long (Headline applications started at 1st bloom and repeated every 2 weeks), treated at the 1st and 3rd weeks of bloom, treated after initial presence of disease and left untreated. All Headline applications were made at 6 oz/A. Treatments were arranged in a randomized complete block with three replications. Disease assessments were made of disease severity and leaf defoliation and lint yields were determined. Data analysis revealed numerous location interactions, and analysis was conducted by location. Headline treatments reduced leaf defoliation and disease severity across locations. In three locations, cotton yields were not improved with any Headline treatment. In one location, where cotton was considerably more rank than the other locations, one Headline treatment (season-long applications) statistically increased cotton yields over the untreated check by 172 lbs/A. This work demonstrates that Headline applications can significantly impact cotton leaf defoliation and disease severity, yet the effect on yield is much more variable and less likely to occur.

Introduction

Extended periods of wet weather and high humidity often occur during the cotton growing season in Georgia. These conditions, especially in cotton fields with a dense canopy, can lead to development and spread of foliar diseases, such as Target Leaf Spot. Target Leaf Spot is caused by the pathogen *Corynespora cassiicola* and can lead to premature defoliation and potentially reduce yield. Target spot of cotton was first identified as a possible problem in Georgia in 2005 and has been an issue in many fields during the past few years. Target spot can be identified by its distinct chocolate brown spots on a leaf that frequently demonstrate a pattern of concentric rings. Lesions can also be found on boll bracts and cotton bolls. The affected leaves typically retain their green or green-yellow color, yet ultimately prematurely defoliate. Symptoms of this disease usually start in the lower canopy where warm temperatures and humid conditions favor development. Progression of symptoms moves up the canopy affecting progressively younger leaves and fruit. Target spot typically thrives in environments that have a thick crop canopy, often from irrigation or excessive rainfall, and optimum or excessive fertility. Management of this disease is related to reductions in defoliation and the fungicide Headline (pyraclostrobin) has been used to control target spot in cotton. Headline is a strobilurin type fungicide that can be applied topically to cotton and may provide suppression of target spot. This research investigated cotton response to Headline fungicide applications in areas with high potential for target spot.

Materials and Methods

Research was conducted at four locations in east Georgia during 2013 and 2014. Two locations consisted of on-farm sites utilizing large plots (eight rows, at least 500 feet long) in Jenkins County during 2013 and 2014. Two additional locations consisted of small-plot sites on the University of Georgia Southeast Georgia Research and Education Center in Midville. The variety PHY 499 WRF was used for all locations except in Jenkins County during 2013 where FM 1944 GLB2 was planted. In all locations four treatments were utilized and they included (1) cotton not treated any Headline [UNTREATED], (2) cotton treated with Headline applied at the 1st and 3rd week of bloom

[1st & 3rd], (3) cotton treated with Headline applied upon initial sign of Target Spot presence [INITIAL], (4) cotton with Headline applied to provide more extensive protection with applications made prior to bloom and at the 1st and 3rd weeks of bloom [SEASON-LONG]. All Headline applications were 6 oz/A. The experimental design was a randomized complete block with three or four replications, depending upon site. Cotton in all plots was managed similarly except for Headline applications. Plant growth regulators (PGRs) were used to control growth in all locations according to UGA extension recommendations, except in one Midville site. In this site, no PGRs were used and cotton was allowed to grow unregulated and ultimately to an excessive height. All plots were machine harvested and samples were sent to the University of Georgia Microgin for lint percentage and fiber quality. Disease ratings and other data was collected throughout the season. Data was analyzed using Proc Mixed in SAS 9.1. Significant effects were separated using Fisher's Protected LSD at P = 0.10.

Results and Discussion

Data was analyzed across locations and significant interactions between location and treatments were observed. Therefore, data was analyzed by location. In Jenkins County during 2013 and 2014 fungicide applications had some impact on disease severity and leaf defoliation (data not shown), but no significant differences in lint yield were observed. In Midville, where cotton was treated with PGRs as needed to control vegetative growth, all Headline treatments significantly reduced defoliation and disease severity, yet no fungicide treatment significantly improved cotton lint yield. In Midville where no PGRs were used to control growth a very dense canopy led to a more conducive environment for Target Spot development. In this location, the two more aggressive Headline treatments reduced defoliation but did not affect disease ratings and only the season-long treatment significantly increased lint yield over untreated cotton. Results from this study follow similar work with Headline and management of Target Spot in cotton. Often, Headline lowered disease severity and leaf defoliation, yet significant differences in yield were less often observed. More work is needed to further understand the effects of fungicides on the management of Target Spot in cotton.

Table 1. Effect of Headline fungicide applications on lint yield at the four locations.

Treatments[a]	Locations				Average
	Jenkins 2013 [c]	Jenkins 2014 [c]	Midville (No PGR)[b]	Midville (PGR)[c]	
Untreated	1243	1484	1495 bc	1726 ab	1486
Initial	1144	1612	1444 c	1669 bc	1464
1st & 3rd	1218	1687	1565 ab	1749 a	1552
Season-long	1107	1618	1667 a	1618 c	1503
P-value	0.23	0.41	0.02	0.05	0.48
LSD (P=0.10)	NS	NS	103	78	NS

[a]Treatments consisted of cotton not treated with fungicides (Untreated); cotton treated with Headline at 6 oz/A upon the initial presence of Target Spot (Initial); cotton treated at the 1st and 3rd weeks of bloom with Headline at 6 oz/A (1st and 3rd); cotton treated with Headline prior to bloom and at the 1st and 3rd weeks of bloom (Season-long).
[b]Cotton in this trial was not treated with plant growth regulators to manage crop growth.
[c]Cotton in this trial was managed normally with PGR application to manage crop growth.

Acknowledgements

Appreciation is expressed to Sandy Newell, Technical Service Representative with BASF Corporation, for financial and technical support. Also, a special thanks to the Georgia Cotton Commission for their continued support of this and other cotton research and extension projects conducted at The University of Georgia.