FOLIAR APPLICATIONS OF FUNGICIDES IN COTTON: A SUMMARY OF FIELD TRIALS ACROSS THE COTTON BELT

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Abstract

Several fungi, including *Alternaria* spp., *Cercospora* spp., and *Stemphyllium* spp., are known to cause leaf spot diseases of cotton (*Gossypium hirsutum* L.). Most of these are weak pathogens and are commonly associated with stress factors, such as potassium deficiencies, drought, and senescence. Epidemics are typically observed late in the season; however, premature defoliation can occur. Leaf spot diseases have been reported in all states where cotton is grown. Recently, the fungicides Headline (pyraclostrobin) and Quadris (azoxystrobin) have been registered for use in cotton. In addition to leaf spot, numerous fungi are associated with the boll rot complex. Topsin-M (thiophanate-methyl) has been evaluated for control of hardlock, which is thought to result from the interaction of *Fusarium* spp. and flower visiting thrips. The objective of this work was to summarize and report results from field trials in which foliar applied fungicides were evaluated. Replicated trials were conducted throughout the Cotton Belt from 2004-2008 evaluating various aspects of fungicide use in cotton including application timing, rate response, and the number of applications. Treatments were arranged in a randomized complete block with three to six replications. Trials were analyzed independently using Analysis of Variance. Differences in means were deemed significant at the $P \leq 0.05$ level. Various fungicides were evaluated in these studies; however, emphasis was placed on Headline, Quadris, and Topsin-M for continuity. In all, forty trials were conducted over the five year period in which leaf spot and hardlock were present in 28 and 35%, respectively. Overall, leaf spot pressure was light; however, severe defoliation was observed in one trial in Georgia in 2007. Defoliation was reduced by 80-85% with the use of fungicides; however, improved disease control did not significantly increase yields. A similar trend was observed in Tennessee in 2008; where the application of fungicides improved disease control without increasing yields. Significant differences in yield were observed in three trials from Florida (2003-2005) in which Topsin-M applied alone or in combination with an insecticide reduced hardlock severity; however, there did not appear to be any relationship between disease severity and yield. In another trial in Florida showed that two, three, or four applications of Topsin-M reduced hardlock by 15, 8, and 19%, respectively, and that decreasing hardlock severity generally improved yields. Differences in disease severity have been observed in hardlock fungicide trials conducted in Virginia; however, the results are inconsistent and there was no relationship between disease control and yield. Applications of fungicides in the absence of disease did not affect yield in any of the fifteen remaining trials. Foliar and boll rot diseases are experienced annually and producers are concerned when they occur. These results indicate that preventative fungicide applications can be effective at minimizing defoliation; however, this did not result in increased yields relative to the non-treated controls. Additional studies are needed to elucidate optimal application timings. Assessments of the impact of late-season disease epidemics on cotton yields also need to be addressed. Many of these fungicides evaluated in these studies play an important role in the management of diseases in other cropping systems. Furthermore, these compounds are at risk of resistance developing in pathogen populations; therefore, judicious use is imperative to preserve the utility of these products in the future.