

## **PROJECTED RECOMMENDATIONS FOR USE OF TOPSIN M FOR HARDLOCK CONTROL**

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### **Abstract**

Results leading to specific recommendations for the use of Topsin-M for the management of Fusarium hardlock are speculative at this time. However, based on interpretation of data from five states collected during 2003, tentative recommendations for the use of Topsin-M for management of Fusarium hardlock are as follows. 1) Apply Topsin-M at a rate of ½ lb (formulated product) per acre. 2) Begin applying fungicide at full bloom, i.e. when 25-50% of the cotton plants have their first bloom. 3) If a grower plans to make two fungicide applications, the second spray should be made 14 days after the initial spray. If a grower plans to make three fungicide applications, the fungicide sprays should be timed seven days apart. 4) Spray volumes and spray pressures should be adequate to insure penetration of the foliar canopy and complete coverage of open blooms. Further application strategies and information on fungicide resistance management should be available in the future.

### **Discussion**

Research conducted at the University of Florida by Drs. Jim Marois and David Wright in 2002 suggests that the fungicide Topsin-M may be an important component of a management program for the control of a specific form of hardlock of cotton referred to as "Fusarium hardlock". These researchers found significant reductions in hardlock and increases in yield when weekly applications of Topsin-M were applied to cotton beginning at full bloom (approximately 25% of the crop was at first bloom) and continuing on a weekly basis for six weeks. Unfortunately, these results could not be corroborated in an extensive, multi-state study in 2003, perhaps because of a low incidence of the Fusarium hardlock due to excessive rainfall during the season.

In anticipation of results that are more supportive of findings from Florida in 2002, researchers from the University of Florida, University of Georgia, Clemson University, Auburn University, and Louisiana State University have begun to review data from 2003. Their intent is to determine how cotton growers may be able to use Topsin-M most effectively. Proper use of the product will not only require cost and yield-benefit considerations, but also will require the determination of rate, initiation of sprays, and spray intervals. Further information may also include application volumes, applications by aerial applicators, tractor mounted spray booms, or chemigation, and other factors.

### **Rate**

Although Marois and Wright applied Topsin-M at a rate of 1.0 lb (formulated product) per acre; it appears from results in 2003 that a rate of ½ lb (formulated product) per acre would be equally effective based upon final yields across state field trials. Typically, there was no significant difference in yield between treatments where the two rates of Topsin-M were applied on identical schedules. Further, there was no clear pattern that either the 1.0 lb per acre rate or the ½ lb per acre rate was numerically better across treatment or trials. Therefore, based upon cost to the grower, it is likely that the recommended rate of Topsin-M for management of Fusarium hardlock will be ½ lb/A. This recommendation could change if results from trials in 2004 show a clear economic advantage from the use of the higher rate, or if it can be shown that specific environmental conditions increase the severity of Fusarium hardlock and warrant the use of the higher rate of product.

### **Initiation of Fungicide Sprays**

From the studies completed at the University of Florida, it appears that cotton blooms are plausible sites of infection by *Fusarium verticillioides*, putative causal agent of Fusarium hardlock. Therefore, it is appears critical that any fungicide program should be designed to protect the open blooms. The earliest formed bolls are often considered to be more important for final yield than are later bolls. Therefore, it is believed that the most effective fungicide program for the control of Fusarium hardlock should be initiated very early in the bloom period. It is our interpretation of the results that such a fungicide program should be initiated at "full bloom", defined here as when 25% of the cotton plants in a field is at "first bloom".

### **Fungicide Application Intervals**

It is likely that cotton growers in the southeastern United States will be unwilling to make more than two or three fungicide applications for the future management of Fusarium hardlock. It is fortuitous that from results in 2003, two or three applications appear as effective as four, five, or six applications. The question now becomes, "Is it better to time these fungicide sprays for intensive bloom management or to extend the protection window by extending the spray interval?" From the data collected in 2003, it appears that the correct answer depends on whether a grower plans to use two fungicide applications, or three fungicide applications. If a grower plans to use only two applications of Topsin-M at ½ lb/A, yields were numerically (not typically statistically significant) if the fungicide applications were timed 14 days apart rather than 7 days apart (four out of five trials). However, if the grower planned to make three applications, yields were typically numerically greater (again typically not significant) if the fungicide applications were timed every 7 days rather than every 14 days (four out of five trials). From these results, one can conclude that if any real difference in yield occurs as a result of the fungicide spray interval, it has to do with the best protection of blooms within the first three-to-four weeks of full bloom. Where only two applications are made, it is important to spread the fungicide applications out over three weeks, understanding that some blooms that open will not be treated. However, if a grower chooses to make three applications, it is more important to protect the maximum number of blooms within the first three weeks of bloom rather than extending the protection window out to five or six weeks after first bloom. It should be noted that some growers might choose the timing of specific fungicide applications based on other pesticide applications that must be made. For example, if a grower needs to apply an insecticide during the same window that a fungicide application is to be made, he may choose to save "trips across the field" and tank-mix the fungicide with the insecticide where appropriate.

### **Other Factors**

Research remains to be done evaluating the impact of spray volumes and application techniques on the management of "Fusarium hardlock". Obviously, it is important that the spray volume used by the applicator is sufficient to thoroughly cover the open blooms that are present. Also, many blooms are likely to be shielded by a thick canopy of leaves. Therefore, the most effective coverage and penetration of the canopy will require not only sufficient volume, but sufficient spray pressure as well. This could have some impact on the efficacy of fungicide spray made with tractor-mounted spray booms versus aerial application. Also, the use of chemigation could be beneficial for management of hardlock in some situations.

### **Fungicide Resistance Management**

Topsin-M is a selective fungicide with a specific mode of action. Therefore, if used inappropriately, susceptible fungal pathogens are likely to develop resistance to this product. Therefore, efforts are currently underway to determine the best use patterns to optimize resistance management strategies.

### **Conclusions**

There remains a great deal of research to be done before final recommendations can be presented to growers for the management of Fusarium hardlock with Topsin-M. It is hoped that field trials to be conducted in 2004 across the southeastern United States will provide information to this end. If significant results are obtained in 2004, it is likely that growers at the 2005 Beltwide Cotton Conference will receive specific recommendations on the rate and spray intervals to be used with Topsin-M for the most effective control of Fusarium hardlock.