From Spider Mites To Plant Bugs Putting The Odds In Your Favor

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Introduction

Over the last decade we have seen dramatic shifts in the relative status of insect pests in cotton throughout the mid-south region. Two of the most notable events have been successful implementation of boll weevil eradication and the introduction of transgenic B.t. technology. These two events have eliminated insecticide sprays targeted for boll weevil and tobacco budworm. Prior to 1995, boll weevil and tobacco budworm were major pests of cotton in the mid-south. Since that time their status as major pests has been greatly reduced. In fact, 1999 was the last year that Mississippi documented any losses associated with boll weevils. Since it's introduction in 1996, producers throughout the mid-south region have readily adopted B.t. cotton. Most mid-south states have adoption levels of 85-95% over the last 5 years. While many acres still require at least one spray for cotton bollworm, the threat from tobacco budworm has been essentially removed, barring any future event of resistance.

As with most biological systems, when one factor is removed, others quickly fill the void. The same is generally true for pests attacking row crops. With reduced sprays coupled with increasing insecticide resistance we have seen tarnished plant bugs quickly move from secondary pest status to the new number one pest of cotton in the mid-south region. Also, in the last three years producers in the mid-south have seen increased spider mites in cotton, particularly early in the season. Spider mites have been infesting cotton in the mid-south as far back as records have been kept but their status was one of occasional pest and infestations were largely limited to late in the season.

Tarnished Plant Bug

Prior to 2007, the record average number of insecticide applications made in the Mississippi delta region was 5.2 in 2004. In 2007, the number is estimated at 7-8. In a recent survey that represented 35% of the cotton acres in the MS delta, 45% of the acres surveyed received 10 or more applications for TPB while another 37% received between 7-10. In a more recent survey 22,000 acres represented had between 14-16 applications. Given the events in 2007, many producers want answers to two questions: (1) why were TPB populations so high in 2007 and (2) What can we do reduce our risk of being in this situation again? Both questions are valid and need to be addressed but unfortunately there are no "clear" answers. However, these topics have been discussed at length through the mid-south entomology working group and plausible explanations are available.

Most believe one factor was the major increase in corn acres. In 2007, producers planted 980,000 acres of corn in MS, a 60% increase compared to 2006. While we know corn can serve as a host for TPB, it is a complex interaction not easily explained. Sampling corn for TPB often yields highly variable results, some fields have extremely high levels of TPB and others have none. The TPB increase is more likely attributed to several factors working together. In 2007 we saw unusually warm weather extended over a 3-week period during the month of March. Entomologists with USDA-ARS in Stoneville, MS reported extremely high levels of TPB reproduction occurring. Next we went through and early drought period that caused a reduction in wild hosts about the time cotton was beginning to square and corn and group IV soybeans were flowering and being irrigated. TPB simply utilized these hosts to sustain the large populations that reproduced in March and we saw continued emigration out of these alternate crops into a cotton crop that was reduced in acres by 46%.

What can we do to reduce our risk of being in this situation again? With very few new insecticides available to control TPB, entomologist are beginning to reach deep into the bag to make producers aware of management practices that could help reduce the number of insecticide sprays. Several methods include: treating only when threshold numbers are present, reducing the "edge effect" next to corn, manage broad leaf weeds in ditch banks, equip sprayers with correct nozzles for insecticides, utilize nectariless cotton when available, increase GPA, etc.

Spider Mites

Over the last three years, the frequency of spider mite treatments has greatly increased in the mid-south. Since treating spider mites is extremely expensive, producers are looking for ways to better manage this pest. Many have speculated as to why mite problems are increasing. Some believe that it is due to the switch from Temik to insecticide seed treatments. Preliminary data, from Mississippi State University shows that the risk of spider mites is slightly greater with a seed treatment, but the results are highly variable. While there are numerous factors likely involved, the single biggest factor is likely extended periods of drought during the growing season the last several years, which is favorable for spider mite development and reproduction.

A factor associated with early season spider mite infestations seems to be wild hosts either within or near fields. Delayed weed burndown greatly increases the risk for early season infestations of spider mites. If spider mites happen to be present on winter annuals and burndown is delayed, mites simply move off dying weeds onto the crop. Growers should try and have weeds dead at least 3 weeks prior to planting. Recent host plant work has found henbit to be one of the major early season hosts for spider mites. Other weeds include; honeyvine milkweed, vervain, white clover, and coneflower.

Summary

The first step in being able to reduce risk from a pest is a basic understanding of the biology and association of the pest with that crop and the environment. With some basic understanding of these concepts we can start removing requirements or introducing obstacles so that these pests are less likely to reach an economic threshold. An attempt has been made to introduce several of the factors that often play key roles in the likelihood of these pests reaching economic status in a given year. Furthermore, many of the concepts mentioned are cultural in nature, and require very little input on the part of the producer to implement, and enable the producer to minimize insecticidal inputs. Δ