

# Science Meets Spider Mites

Project Aims To Make Spider Mite Management More Science Than Art

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Managing spider mites in cotton was the topic of a presentation recently by Dr. Scott Stewart, IPM Extension Specialist, University of Tennessee.

"That's an issue that's become more problematic in the last few years and I think there are several reasons for that," he said. "We're not using Temik any longer which was providing some early season control. Weeds that are in the field serve as hosts to spider mites, and if we don't clean them up prior to planting, the mites move onto the crop, and there are some things we just don't understand."

Some of the other cotton pests have actually been eliminated. Eradication efforts have taken out the boll weevil. Bt cotton has greatly reduced problems with tobacco budworm, bollworm and some other caterpillar pests. Thus, researchers are concentrating on what's left, including spider mites. They've become a problem, they're difficult to manage and it's hard to make decisions about whether or not treatment is needed.

"This is the second year of our part of a regional project that's being done throughout the Midsouth by myself and my colleagues in Louisiana, Arkansas, Missouri and Mississippi, all of whom are working cooperatively," Stewart said. "The project includes the efforts of Jeff Gore and Angus Cachot, who are leading the way. Both work for Mississippi State University. I want to make sure I give them credit. It's an interesting project; I'm hoping we can refine and come up with better thresholds and better guidelines of when to treat and when not to treat. I think we will, but I don't expect any magic answers. Sometimes the answer is that there are no easy answers. By nature, spider mites are unpredictable."

Some of that work involves standardized evaluation of the different miticides that are out there to see what controls the mites, and following that through to see what impact that has on yield.

"Another experiment that we're doing is we're actually infesting mites at different growth stages on the cotton plant, so we're trying to figure out when the plant is most sensitive to spider mites and when we can quit spraying for spider mites as we get towards the end of the year," he explained.

"Working with spider mites is really, really challenging. In 2009 we had one of the wettest coolest seasons on record so, for the most part, our research tanked because that's not spider mite conditions," Stewart continued. "Mites can be here today and gone tomorrow and that's hard to predict; that makes a lot of this research challenging, and that's also why the decision making is so challenging."

Detecting the presence of spider mites can be done during regular scouting. There will be white or yellow speckling on the tops of the leaves. The mites are actually very small and gather on the bottom of the leaves. Normally, a scout checking a field will notice speckling on the leaves, look for the presence of mites on the bottom of the leaves, and assess how bad and how widespread the problem is.

"You want to catch them early on because they're actually easier to control early, but you don't want to be so early that you've made a treatment unnecessarily; they don't always get worse," he said.

The difficulty researchers are having is in coming up with good thresholds. Even weather can change things. If it is a hot, dry year the same population of mites can really ravage the plant, cause a lot of defoliation that ultimately reduces yield.

"However, if you're irrigating or you have a very wet year like we did in 2009, that population of mites has much less impact on the plant. So it's kind of stress on stress. If you have stress on stress that's worse than having a good healthy plant that has mites on it. We're trying to tease all that apart; we haven't done it yet but we're continuing to work on it," Stewart said.

The treatment at this point is using miticides. There are a few insecticides that have mite activity but they are not very consistent in performance. When there are serious mite infestations there are many good true miticides. The problem is most of them are very expensive.

A common one used is Dicofol, a generic version of the old Kelthane, and it seems to work especially well during early season. That can cost \$8 to \$10 an acre.

"Another product very extensively in use this year was Agri-Mek or other brands of abamectin," he continued. "Abamectin is a good miticide and the price has come down a lot and that's why we're using it. It's also in that \$8 to \$10 per acre range. There are three or four other products I could list, and they're very good, the problem is they're twice as expensive so we're not using them very much."

There's another problem with these miticides; people drag their feet spraying sometimes too long because they are expensive. Another downside is miticides have very little activity on other pests. Farmers hesitate to spend \$10 or \$15 just to kill mites. They prefer something that will kill plant bugs, stink bugs or bollworms too. Sometimes it's beneficial not to spray if you can get a good rain. Other times, farmers wait too long and all of a sudden there are spots in a field that are defoliated and there's a significant



Dr. Scott Stewart, IPM Extension Specialist, University of Tennessee talks about managing spider mites in cotton.

Photo by John LaRose, Jr.

yield loss.

Mites were traditionally more of a late season pest and they would show up when you're thinking about putting the sprayer in the shed for a while. You often have hot spots in the field, which further complicates whether or not treatment is needed.

"I'd say the thing that has changed the most in the last four or five years is now we're starting to see mites show up more routinely earlier in the season, even third, fourth, fifth leaf cotton," Stewart said. "When they show up that early they're going to persist for awhile. Sometimes they'll do significant damage, sometimes they'll just persist and persist and persist; and you may need to treat them, and you may not, depending on weather conditions and other factors. Spraying insecticides for other pests can take out beneficial insects and make spider mite infestations worse. Because these early season mites tend to persist, we usually end up having to spray a miticide."

"We have areas of this state, areas of Mississippi, northeast Arkansas and the Bootheel of Missouri that traditionally get these early season mites; and then you'll have other areas where you almost never see them," he said. "We're not even really sure why that is. So there's a lot of things we don't understand."

"We have mite plots over here that we infested three weeks ago; we put the mites out, they started going really good, and then a fungus came through and wiped them out," Stewart said. "So when we thought we were ready to treat this, the disease wipes them out. That's really good, but again unpredictable. This can lead to unnecessary applications. This is real world stuff. Sometimes, you treat spider mites and they would have crashed anyhow; or you don't treat them believing they're going to go away, and boom, they hammer the cotton. As I said before, They're very seldom uniform across a field. You'll have edges of fields, spots in the middle of the field, and nobody wants to spend all that money on the whole field when only parts are seriously infested, so you end up having some parts of the field with significant yield loss. It's hard for a grower to assess how much damage it really caused."

"Mites can cause 50 percent yield loss in some cases, sometimes more in these hot spots. You can go 20 feet to the right where the mites weren't that heavy and have twice the yield. So then it becomes a question of whether 2 percent of the field is infested, or is 20 percent infested?"

The take home message may be that there is no normal and scouting is important.

"That's exactly right! I mean you just have to be on top, you have to use a little professional judgment," Stewart said. "I've heard a lot of people say it's an art to manage spider mites. A colleague of mine once told me that when someone claims there is an 'art' to something that means we need to do a better job with the science. We're trying to learn a little bit more so we can make our decision making more of a science than an art. It is not enough that I know when a field requires treatment, the challenge is to develop treatment thresholds so that everyone can make a good decision."  $\Delta$

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