

North Carolina

Management of Twospotted Spider Mite on Vegetables in a Multicrop Agroecosystem

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—James Walgenbach

As the first heat of summer begins to warm the North Carolina piedmont and mountains, an unwelcome guest creeps along many vegetable farms. This pest—a tiny eight-legged creature wearing two spots on its back—will cling to the leaves of tomatoes, peppers, eggplants and melons, draining the leaves of moisture until they fall off, or until the pest is killed. In recent years, this pest, the twospotted spider mite, has infested North Carolina mountain and piedmont vegetable farms, frustrating growers who have tried to rid it by using miticide treatments, only to find that it is often resistant.

The outcry of vegetable growers drew North Carolina State University entomologist James Walgenbach to dedicate a research project to managing the twospotted spider mite in vegetable farms. Based at the Agricultural Research Station in Fletcher, NC, Walgenbach sees firsthand the damage that the mite can cause and has followed the twospotted spider mite's progression from corn as a primary host to vegetables as a primary host.



The twospotted spider mite originally focused its attention on corn, but after turbophos ceased being used on corn in western and central North Carolina,

the mite shifted to vegetable crops. Turbophos, a soil insecticide, actually increases spider mite population, as documented by entomologist George Kennedy. In addition, because the mites attach themselves to the underside of the leaves, many topical miticide applications miss them completely.

With funding from a 2004 Cooperative State Research, Education and Extension Service Regional IPM grant, Walgenbach, George Kennedy and graduate research assistant Elijah Meck monitored the mites daily and observed their behavior as he tested different control methods. Their primary interest? Why some fields seemed to attract more mites than others. What Walgenbach discovered was that the mites gravitated more toward crops commonly sprayed with insecticides and toward fields where little rotation was occurring.

“They're highest in curcubit and tomato crops,” he said. “The only common link among fields with high mite populations is that in areas where vegetables

are growing on a regular basis, there is little crop rotation. So when the crop goes down, the mites move into the weeds.”

Although most twospotted spider mites die during the winter, some survive in nearby weeds. As the new crop is planted in the spring, their population grows and they begin migrating to the new crop. By July their characteristic webs are present if they have not been controlled.

Walgenbach also found that fields filled with soybeans or corn—although corn was a spider mite favorite at one time—had few twospotted spider mites. The difference between those fields and the ones infested with spider mites was that soybeans and corn were seldom sprayed, so natural enemies were controlling the mites. Because tomatoes and cucurbit crops are susceptible to several types of pests and have a low tolerance for damage, they are more typically treated with insecticides and fungicides, destroying many of the mites' natural enemies. And since the mites are resistant to many of the insecticides used on those crops, they were able to flourish with no predators or deterrent.

As a result, Walgenbach has devoted much of his time to establishing economic thresholds for twospotted spider mites on different crops, hoping to reduce miticide applications. In addition, he is working with growers to develop crop rotation schedules.

“Crop rotation is a potentially useful tool,” said Walgenbach. “We need to focus on miticide resistance management, and the use of threshold levels and crop rotation are two methods of minimizing mite exposure to miticides”

Although Walgenbach has already discovered management techniques that will help keep the twospotted spider mite population down to reasonable numbers, he is planning to continue working on this issue for the next few years. His ultimate goal is to develop a set of guidelines growers can use to ensure a healthy crop by reducing the number of miticide applications, using chemical control only when economic threshold is met or exceeded, and by following proper rotational sequence for their crops.

“We need to look at things from an area-wide perspective because these pests have several different hosts,” he said.