

# Rating Infestations of Spider Mite on Corn

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Spider mites are perhaps the most difficult arthropod pest to manage in Michigan field crops. Judging the need to treat an infested field is difficult, and spraying can actually flare mite populations. And mites are only a problem in drought years in Michigan, so most of us don't have a lot of experience in assessing populations or with the pesticides registered for their control in corn.

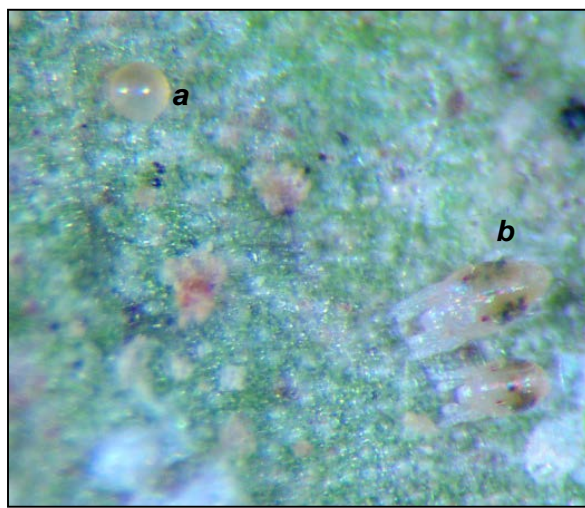
Spider mite infestations are favored by hot, dry weather. Mites move into fields from the edges, often by passive airborne movement. Thus damage is often noticed first near field edges, especially near an obstacle such as a tree-line or power pole, which disrupts wind movement. They feed on the underside of corn leaves using a piercing mouthpart, inserting it directly into plant cells and sucking out the contents. This type of feeding not only injures or kills cells, but results in water loss through the feeding wounds. Feeding results in tiny yellow and whitish speckles, called stippling, where small groups of cells have been damaged. As mite numbers increase, the yellowing and whitening becomes more generalized on leaf undersides. Cells are disrupted, water is lost, and plant cells begin to die. Under severe infestation, leaves turn brown and crispy, and webbing is obvious along the underside of leaves. The webbing acts like a superhighway, allowing the mites to travel above the leaf surface.

Mites are best seen with a hand lens after shaking leaves over white notebook paper or a paper plate. A heavy infestation, however, is fairly obvious to the naked eye, with leaf speckling and yellowing, obvious mite movement on the undersides of leaves, and webbing.



*Two-spotted spider mites as they would be seen on the underside of an infested corn leaf with a hand lens (left). Note the leaf midrib along the top of the picture for size comparison. The white stippling damage is obvious, effecting ~50% or more the leaf surface.*

*Close-ups (below) of an a. egg and b. adult on soybean. Mite eggs are relatively large compared to the adult size.*





*No symptoms*

*Stippling  
(= a bit of yellowing  
along midrib)*

*Stippling  
spreads  
across leaf*

*Increasing  
yellowing;  
webbing visible*

*>50% surface damaged;  
copious webbing traps sand &  
shed exoskeletons.*

**~threshold?**

### Spider mite spray timing

Mites are tiny and easy to miss. In humid place like Michigan, mites in corn are a side effect of drought. Thus we have less experience in scouting or spraying for mites compared to producers in the arid western states where mites are routinely managed. Mite thresholds in corn aren't based on number per leaf, but on a description of the infestation, for instance these label statements: "Apply when colonies first form prior to leaf damage or discoloration and before widespread mite dispersal throughout the canopy" (as in the leaf picture above) or "Best results are achieved when mite populations are below threshold or beginning to build up on plants". A general rule of thumb is to manage mites so that populations don't move above the ear zone. Mite infestation during pollination is of more concern than infestation later in August. There are more treatment options in corn than in soybean, including several specific miticides. Although resistance management is a major concern in arid western states where multiple applications may be made each season, in Michigan, it would be rare to make more than one application (perhaps in seed corn production?). If a field is sprayed twice, rotate to a different mode of action.

The reality is that in drought years, we often react to mites a bit later than the optimal timing given on labels, but it is very difficult to separate the impact of the drought from spider mite damage. Also, it can be difficult to find the ground equipment or an aircraft to spray tall corn in such years. When mites are sprayed, populations can resurge and lead to higher populations than before treatment (see page 4). The good news is that even in drought years, mite populations in Michigan usually crash on their own due to fungal infection by late-August when dewy mornings set in.

**Mite control options by active ingredient in corn:** Note the long preharvest intervals.

	<i>bifenthrin</i>	<i>bifenthrin + cypermethrin</i>	<i>bifenthrin + chlorpyrifos</i>	<i>dimethoate</i>	<i>etoxazole</i>	<i>spiromesifen</i>	<i>hexythiazox</i>
<b>Trade Names</b>	Many	Hero Hero EW	Tundra Supreme Match-Up	Many	Zeal Zeal WSP Zeal SC	Oberon 2SC	Onager
<b>Class</b>	pyrethroid	pyrethroids	pyrethroid + OP	OP	mite growth inhibitor	carboxylase inhibitor	mite growth inhibitor
<b>REI</b>	12 hrs	12 hrs	24 hrs	4 days	12 hrs	12 hrs	12 hrs
<b>PHI (Days)</b>	30	30 grain 60 silage	30	28 grain 14 forage	21	30 grain 5 silage	30
<b>Signal word</b>	warning	Hero-caution HeroEW-warning	Matchup-caution Tundra-warning	warning	caution	caution	caution
<b>RUP?</b>	Yes	Yes	Yes	No	No	No	No

**To Spray or Not to Spray: two examples from the 2012 drought**



Seed corn in Three Rivers, MI

This field had stippling injury into the ear zone and active mite population. It was previously treated with a pyrethroid + fungicide as part of a regular spray program, a mite-flaring combo.

The recommendation was to spray this field:

- pollination was in progress
- detasseling removed the upper canopy so it was too important to protect what foliage was left
- no canopy = low humidity, little chance of fungal infection crashing the mite population
- good spray coverage was possible because of the detasseling, plus equipment was available
- favorable economics of seed corn



Irrigated field corn in Entrican, MI

This field had severe stippling injury up to the ear zone, and a higher overall mite population than the seed corn field (the other pictures in this bulletin were taken in the Entrican field).

It was decided not to spray because:

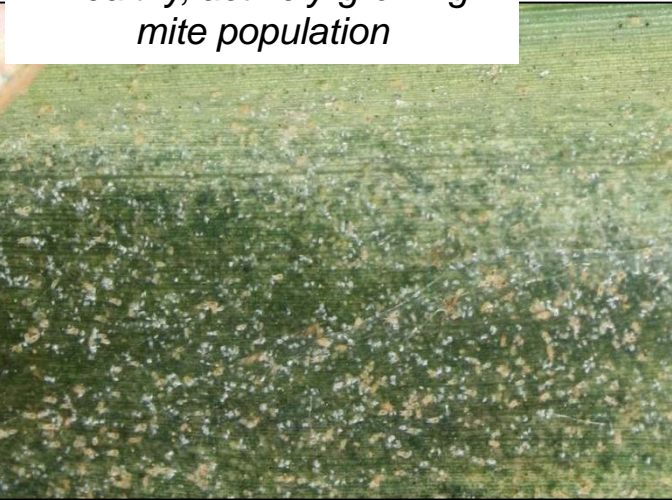
- pollination was done
- the upper canopy was intact & green
- it was irrigated, so plants were getting enough water
- good canopy + irrigation increased the chance of fungal infection crashing the mite population
- good spray coverage wasn't possible with the canopy
- equipment to spray tall corn was lacking

Not treating this field was the right call. Within days, the mite population did crash because of fungal infection.

See the next page for pictures,

It is worth checking fields before spraying to be sure mites are still present, as populations can crash quickly. Rainfall and irrigation reduce plant stress and replace water lost to mite feeding. But more importantly, high humidity promotes the growth of fungi that infest and kill mites. Humidity must be elevated for an extended time, 48 hours or more, before naturally-occurring fungi are active. But once infection starts, mite populations can crash in a matter of days.

*Healthy, actively-growing mite population*



*Left: Numerous live yellow mites are present on this corn leaf. The mites are actively growing, as evidenced by the large number of whitish shed exoskeletons on the leaf surface. Intact webbing also is an indication that the colony is thriving & maintaining its habitat.*

*Below: Leaf injury (stippling) is very apparent in this picture. However, live mites are not present. The brownish mites are actually dead, killed by fungal pathogens.*



*Crashed mite population*

**Note that spider mite populations can resurge quickly after treatment due to:**

- Egg hatch**: Mites lay eggs on the leaf surface. Most miticides kill adults and nymphs, but do not kill eggs. Newly hatched nymphs survive and repopulate the plants. This is especially an issue with Ops, which have a short residual. Using a combo OP/bifenthrin insecticide may improve control by increasing residual time.

- Rebound or flaring**: Miticides which are also insecticides (like bifenthrin and chlorpyrifos) kill beneficial insects, but rarely take out 100% of the mites. Since mites reproduce rapidly in the absence of predators, mite populations can quickly flare to levels higher than before treatment. This is why it is important to scout and treat only if needed, avoiding insurance applications of insecticide not only for mites, but for soybean aphid as well.

- Resistance**: Spider mites do become resistant to pesticides. In Minnesota and surrounding states, mite resistance to chlorpyrifos was recently documented after years of unnecessary sprays for soybean aphid. The chance for resistance increases with the number of applications. So again, scout and spray only when needed for both mites and aphids.