

Rating Infestations of Spider Mite in Soybean



CDD #16

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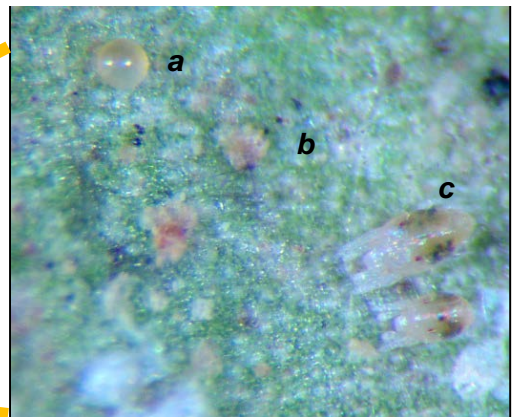
Spider mites are perhaps the most difficult arthropod pest to manage in Michigan field crops. Judging the need to treat an infested field is difficult, and spraying can actually flare mite populations. A descriptive rating system is included in this bulletin to help with treatment decisions.

Spider mite infestations are favored by hot, dry weather conditions. Mites move into fields from the edge, often by passive airborne movement. They feed with a piercing mouthpart, inserting it directly into plant cells and sucking out the contents. This type of feeding not only injures or kills plant cells, but results in water loss through the feeding wounds. Feeding results in tiny yellow spots, called stippling, where small groups of cells have been damaged. Damage is often noticed first near an obstacle, such as a tree-line or power pole, that disrupts wind movement near the edge of the field (a Level 2 infestation). As mite numbers and feeding increase, the yellowing becomes more generalized across the leaf surface (a Level 3 infestation). Cells are disrupted, water is lost, and plant tissue begins to die. Under severe infestation, leaves turn brown and eventually drop off the plant (a Level 4 infestation).

Mites are best seen with a hand lens after shaking plant foliage 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. Treatment options include the OP insecticide chlorpyrifos (Lorsban & others) or the pyrethroid bifenthrin (for example Brigade, Capture, Hero). Some products combine an OP and bifenthrin.



*Two-spotted spider mites as seen by the naked eye (left) and close-up (below).
a. egg; b. juvenile; c. adult*



If you do plan to treat, check fields before you spray to make sure mites are still present, as populations can crash quickly. Rainfall and irrigation reduces plant stress and replaces water lost to mite feeding. But more importantly, high humidity is critical to promote the growth of fungi that naturally infest and kill mites. Humidity must be elevated for an extended time, 48 hours or more, before naturally-occurring fungi are active. Mite populations can crash in a matter of days once fungal pathogens become active.



1 No symptoms

---- 2 Leaf stippling ----

---- 3 Severe yellowing ----

4 Browning; leaf drop

Rating Soybean Fields for Mite Infestation and Spray Applications

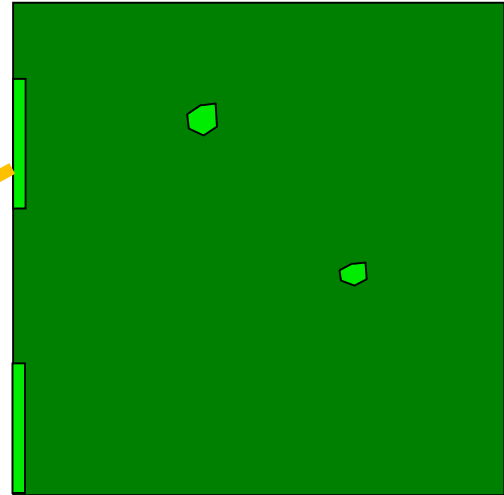
Level 1: Leaves green; mites are present, but barely detected. **Not of concern.**

Level 2: Mite stippling on leaves. Damage on field edges, near obstacles such as power poles, or on dry sandy knolls. Mites can be seen by tapping leaves over white paper.

Watch population & weather forecast, but do not treat.



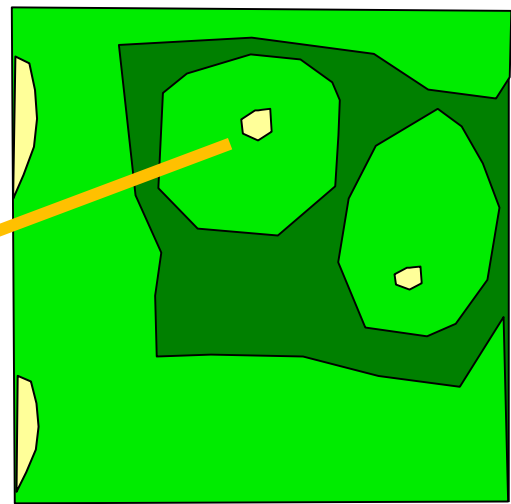
Mite infestation on edge of field



Level 3: All plants infested. Stippling on most leaves; lower leaves yellow or brown. Severe damage on field edges & dry areas.



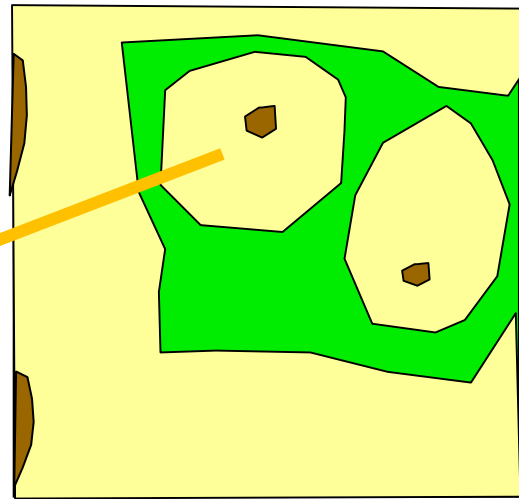
Rescue treatment is warranted



Level 4: Heavy infestation and severe damage. Leaves yellow or brown, wilted, crispy, dropping off plant. Initially-infested areas now defoliated or dead.

Yield has been lost, but a rescue treatment can protect what is left.

This may be a difficult decision - treatment cost must be balanced by the yield potential left in the field and the weather forecast (will it rain?), given that this level of infestation usually occurs late in the season in severe drought years.



Level 5: Field-wide defoliation and plant death. Bare ground, weeds. (for example, this mite-killed field in SW Michigan during the 2012 drought)

*Do not spray.
No yield to protect.*

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

- **Egg hatch:** Mites lay eggs on the leaf surface. Insecticides kill adults and nymphs, but do not kill eggs. Since OPs have a short residual, newly hatched nymphs survive and repopulate the plants. Using a combo OP/bifenthrin insecticide may improve control by increasing residual.
- **Rebound or flaring:** Insecticides kill beneficial insects, but rarely take out 100% of the mites. Since mites reproduce rapidly in the absence of predators, populations can 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 for mites as well as soybean aphid.
- **Resistance:** Spider mites do become resistant to insecticides. 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 soybean aphids.