

**WISCONSIN CROP MANAGEMENT CONFERENCE
MADISON, WI
JANUARY 16, 2013**

**Recap on Twospotted Spider Mite Management,
2012 Drought – What should you remember?**

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Spider Mite Management



Spider mites and drought

- Spider mites are held in check by natural enemies, weather, and host plant quality.
- Drought upsets this balance in 4 ways:
 - 1 Accelerates mite movement to soybean and corn from surrounding vegetation dry-down or harvest
 - 2 Improves food quality of soybean for mites
 - 3 Diminishes or stops naturally-occurring fungal diseases that attack mites
 - 4 Speeds spider mite reproduction so predatory mites and insects can't keep up.

Twospotted spider mite

Tetranychus urticae



Photo: E. Cullen UW-Extension

- Adults <0.002 inch (*half the size of the smallest soybean aphid*).
- Green to yellow/orange
- Dark pigmentation on abdomen (*two-spotted*).
- 8 legs, not 6 like insects.
- Hosts: soybeans, dry beans, alfalfa, corn, vegetables, trees and ornamentals.

Twospotted spider mite

Tetranychus urticae



Photo: E. Cullen UW-Extension

- Egg, nymphs, adult.
- Eggs hatch in 2-4 days.
- Generation time 4-19 days, faster rates $>90^{\circ}\text{F}$.
- Cooler temps slow down reproduction.
- Several overlapping generations.
- Eggs, nymphs, adults on plant simultaneously

Spider mite damage

- Mouthparts extract contents of leaf cells. Injury diagnosed as “stippling” yellow-white specks.
- Feeding lowers chlorophyll content, causes water loss and reduced photosynthetic capacity.
- Corn silage yield loss (tonnage) potential 17%
- Grain yield reduction potential 23% corn
- Grain yield reduction potential 40-60% soybean



Photo: K. Ostlie and B. Potter Univ. of MN

Symptoms can be mistaken for drought stress.

Soybean damage progresses from green to yellow, leaf bronzing and eventually leaf drop.



Photo: M. Ballweg, UW-Extension

Scouting for Spider Mites - Soybean

- Infestations typically begin near field edges or where soybeans are stressed.
- Pull plants examine leaves from bottom up.
- Look at underside of leaves. Stippling? Webbing?
Use a 10X hand lens and/or tap foliage over a sheet of white paper.
- Determine how far mites and symptoms have progressed up the plant.
- If mites are verified, scout the field. Check a couple of plants at each of 20 locations throughout.

When should soybeans be treated?

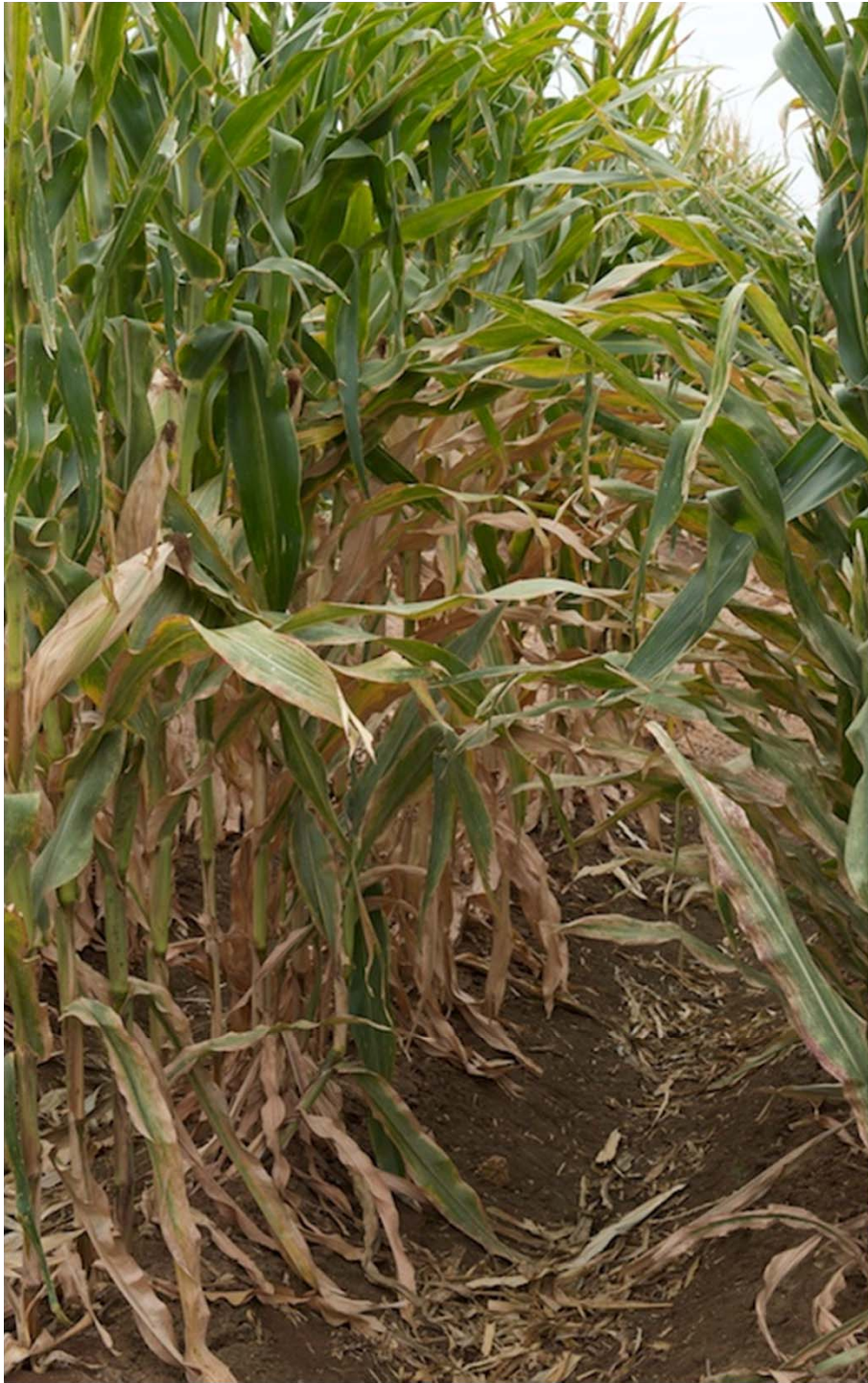
- In soybean, a 10-15% reduction in effective leaf area will justify insecticide/miticide treatment.
- Good news – you don't need to count mites. However, it's not easy to estimate 15% leaf discoloration (loss of effective leaf area).
- Use infestation scale on next slide (and in UWEX Publication A3890) to treat before stippling and yellowing progresses to mid-canopy.
- R1 through R5 (Full pod (R4) and beginning seed (R5) critical to determining yield).
- Do not treat after R7; will not impact yield.

Spider mite infestation scale for soybean

- 1 Minor stippling on lower leaves, no leaf yellowing
- 2 Stippling common on lower leaves, small areas or scattered plants with yellowing
- 3 Heavy stippling on lower leaves progressing to mid-canopy. Live mites present ***Spray threshold***
- 4 Lower leaf yellowing and leaf drop. Stippling, webbing and mites common in mid-canopy. Mites and minor stippling on upper canopy. ***Economic Loss***
- 5 Lower leaf loss common, yellowing and bronzing mid-canopy. Mite colonies at high levels at throughout canopy.

Insecticides/Miticides in Soybean

- For soybean spider mite applications, choices limited to chlorpyrifos, dimethoate, bifenthrin or mixtures containing these ingredients.
- Most pyrethroids used for soybean aphids perform poorly against spider mites.
- Older pyrethroids (ai permethrin) “flare” spider mites by indirectly increasing reproductive rate.
- Chlorpyrifos and dimethoate perform well on adults, but do not kill eggs. Under heavy infestations re-treatment may be needed.
- Bifenthrin has a longer residual and may control hatching eggs for a few days. Residual is shortened by high temperatures.



Scouting for Spider Mites - Corn

- **Effects on corn yield more severe when mites damage leaves at or above ear level.**
- **Grain corn only safe after full dent stage reached.**
 - Check leaves on corn plants along field edges first.
 - Examine leaves from the bottom upwards.
 - Look for stippling/webbing on underside of leaves.
 - 10X hand lens or shake leaves over white paper.
 - Move into field checking 2 plants at 20 locations.

When should corn be treated?

- Damage typically occurs after tasseling
- Loss of photosynthetic leaf surface
- Effects on corn yield are more severe when mites damage leaves at or above the ear level
- A simple guideline is to treat when the lower one-fourth to one-third of the canopy is injured (stippling on most of the leaf surface area), mites are present in the mid-canopy and corn has not dented.

Insecticides/Miticides in Corn

- **Chlorpyrifos is not labeled for two-spotted spider mite in corn.**
- Dimethoate and bifenthrin are labeled.
- Corn has additional options including propargite and spiromesefin, (spiromesefin relatively “soft” on beneficials).

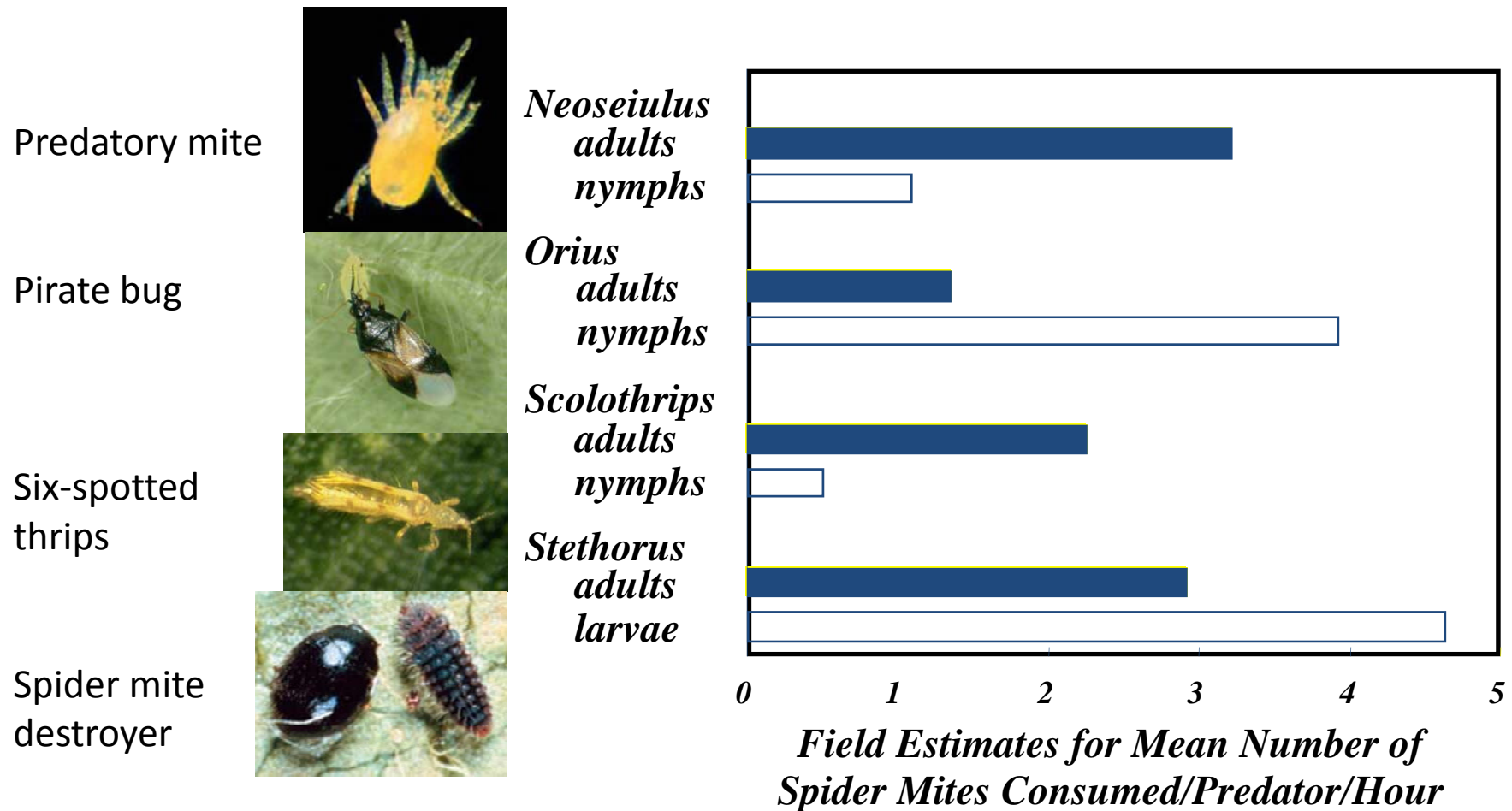
Impact of Biological Control is Significant

- Frequently prevents damaging populations during non-outbreak conditions
 - Can reduce mite populations in days
- Preserved by avoiding pyrethroid insecticides
 - Entomologists use pyrethroids to cause a mite outbreak in mite research trials

Specific mite predators

- Six-spotted thrips
- Minute pirate bugs
- Predatory mites
- Spider mite destroyer beetle
- Syrphid fly larvae

Biological Control – Predators feeding/hour



L. T. Wilson, T. Archer et al.

Saved by a Fungus?

Neozygites species

- Attack all life stages
- Mite death in 1-3 days
- Can clean up a field in 1 week
- Requires high humidity
 - Temperature < 85 degrees
 - Dew in the morning
- Have ruined many miticide trials
- Will foliar fungicides and glyphosate reduce neozygites? (Samac & Foster-Harnett, 2012)



Photo: Erling Floistad

***Neozygites* infection**

Mites appear fuzzy, waxy or discolored



Photo: T. Klubertanz

Pyrethroid uses in corn



- Check cornfields before 70% of field has silked, and count the number of rootworm beetles/plant on 10 plants in 5 areas of the field.

- Japanese Beetle Threshold:
 - 3 or more beetles/plant
 - Pollination <50% complete
 - Silks clipped to ½-inch
- Corn Rootworm Threshold:
 - 5 or more beetles/plant
 - Pollination <50% complete
 - Silks clipped to ½-inch

Secondary Mite Outbreak



Not Sprayed for WCR adults



Sprayed for WCR adults

Photos: courtesy of Monti Vandiver

Spider mite take-home points

- In soybean, a factor complicating spider mite management decisions is soybean aphid, and vice versa.
- If treating for both pests, dimethoate can be variable against soybean aphid. Given limited spider mite options, chlorpyrifos, bifenthrin and mixes containing these ingredients will work well against dual infestations of aphids and mites.
- During hot, dry conditions with spider mite potential, check fields (for mites) within 2 weeks if you sprayed for soybean aphid.

Spider mite take-home points

- ▣ Do not assume rainfall will eliminate aphid or mite problems. Heavy rainfall lessens drought stress on plants, but continue to monitor status of spider mites.
- Make treatment decision for the field, not just the edges.
- Cooler temps (<85 °F) and high humidity may delay the need for treatment. However, keep monitoring fields to make sure mite populations decline.

UW Extension Resources

- UW-Extension video on spider mites in soybean
Visit IPCM website <http://ipcm.wisc.edu/video/>
- UW Extension Publication A3890, Two-spotted Spider Mite Management in Soybean and Corn
<http://learningstore.uwex.edu>
- UW Extension Publication A3646 Pest Management in Wisconsin Field Crops
<http://learningstore.uwex.edu>
- Wisconsin Crop Manager Newsletter
<http://ipcm.wisc.edu/wcm/>



Check fields every 4-5 days when drought persists.
Under these conditions, infestations can develop quickly.

Acknowledgements

- ▣ Ed Bynum and Pat Porter, Texas A & M University ; Ken Ostlie and Bruce Potter, University of Minnesota (Two-spotted spider mite management).
- ▣ Roger Schmidt, University of Wisconsin, Wisconsin Crop Manager online newsletter, videos, ipmTool Kit Apps at <http://ipcm.wisc.edu>