Spider mites in corn and soybeans

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Crop Production Clinics

Session Goals

1. Learn to identify spider mites found on Nebraska corn and soybeans
2. Recognize conditions that favor pest mite outbreaks
3. Understand management options for spider mites on Nebraska corn and soybeans
Spider mites in Nebraska

- Arachnids related to ticks and spiders
- Feed by piercing plant cells with their mouthparts and sucking the plant juices
- Infestations can be related to drought stress and pesticide use
- Two pest species found in NE:
  - Banks grass mite (corn)
  - Two-spotted spider mite (corn + soy)
Banks grass vs. two-spotted

<table>
<thead>
<tr>
<th>Appearance (adult females)</th>
<th>Dark green pigment spots extend down length of body; body is more elongate</th>
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<table>
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<tr>
<th>Carmine mite</th>
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Dark green pigment in two distinct spots on front 1/2 of body; body more rounded
Banks grass vs. two-spotted

<table>
<thead>
<tr>
<th></th>
<th>Banks grass</th>
<th>Two-spotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webbing</td>
<td>Produces spider-like silk webbing</td>
<td>Produces spider-like silk webbing; tends to produce more webbing than BGM</td>
</tr>
<tr>
<td>Host Range</td>
<td>Almost exclusively grasses, such as corn and sorghum</td>
<td>Many grass species (corn, sorghum) plus soybeans, fruit trees, vegetables, and ornamentals</td>
</tr>
<tr>
<td>Timing</td>
<td>Appears earlier in the season</td>
<td>Tends to appear mid- to late-season</td>
</tr>
</tbody>
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Banks grass vs. two-spotted

<table>
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<tr>
<th>Location on Crop</th>
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<th>Overwintering Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly lower leaves, moving upward as the infestation grows</td>
<td>Can feed over the entire plant</td>
<td>Primarily the crowns of winter wheat and native grasses</td>
</tr>
<tr>
<td>Overwintering Location</td>
<td>Primarily the crowns of winter wheat and native grasses</td>
<td>Primarily alfalfa and other broadleaf plants along crop field borders</td>
</tr>
<tr>
<td>Susceptibility to Insecticides</td>
<td>Moderately susceptible to many common miticides</td>
<td>Has developed resistance to some products; control is less consistent</td>
</tr>
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</table>
Corn-specific considerations

- Which mite species is present?
- Sandy pivot with history of WBC/WCR insecticides?
- First evidence = yellow/whitish spotting on the top of the leaf
- Confirm presence of mites on undersides of leaves
  - Drought and disease can cause similar discoloration
Economic threshold in corn

• In corn, ET = visible damage in the lower third of the plant with mite colonies present in the middle third

• Once the hard-dough (late R4) stage is reached, no economic benefit will result from treatment

Mites “pushing ear leaf”

Yellow/white stippling
Soybean-specific considerations

- Twospotted spider mites only species present
- Overwinter outside of field
- First colonize field on borders; watch south facing edges, water stressed areas of field for early damage symptoms and mites
- Damage produces yellow spots (stippling) on lower leaves, later moving higher up in canopy

(Photos courtesy of Daren Mueller, Iowa State University, Bugwood.org)
Economic threshold in soybeans

- In soybean, ET = heavy stippling on lower leaves with some stippling progressing into middle canopy; mites present in middle canopy with scattered colonies in upper canopy; lower leaf yellowing common and some lower leaf loss

Scattered mite colonies

Some stippling, mites present

Heavy stippling, leaf yellowing, some leaf loss
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Crop injury in soybeans

- Like corn, damage from mites may be confused with drought and foliar diseases; **base treatment decisions on the presence of mites**
- Spot treatment can work for localized infestations, but check other areas (especially downwind) and extend into these areas if present
- Although late-season infestations may accelerate soybean senescence and increase pod shattering, caution should be used in deciding to treat with pesticides because many have 21-28 day PHI

Damage from mites may be confused with that caused by drought and several foliar diseases, so be sure to **base treatment decisions on the presence of mites**, rather than just apparent injury symptoms.

Fields may be spot treated if the infestation is localized, but check other areas for mites (especially downwind of infestation) and extend treatments into these areas if large numbers of mites are found.

Although late-season infestations may accelerate soybean senescence and increase pod shattering, caution should be used in deciding to treat with pesticides because many of the pesticides used for mite control have 21-28 day preharvest intervals.
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**Chemical applications**

- Realistic goal is to slow the rate of population increase
- For effective control, spider mites must come into contact with the miticide
  - Since mites are found primarily on the underside of the leaves, they are difficult to reach with low volume applications
    - Using 3+ GPA by air and 15+ GPA by ground may increase effectiveness (check label!)
  - Applications are generally more effective very early morning/late evening to avoid the upward movement of sprays on hot rising air away from the plants

In many cases, especially with the twospotted spider mite, slowing the rate of population increase is all that can be accomplished with a miticide application.
Eggs are difficult to kill with pyrethroid or organophosphate miticides, so reinfestation is likely to occur seven to 10 days after treatment as a result of egg hatching. The reinfestation is frequently heavy because natural enemies have been reduced or eliminated. A second application may be necessary to kill newly hatched mites before they mature and deposit more eggs.

Miticides with activity against eggs and immature stages include Zeal.

### Mode of action class 1B; organophosphate
Dimethoate: labeled for use in soybean and corn. Multiple products: Dimethoate 4E, 4EC, 400, Dimate 4E, 4EC

### Mode of action class 3A; pyrethroid
Bifenthrin; labeled for use in soybean and corn. Multiple products: Bifenture 2E, Brigade 2E, Discipline 2E, Fanfare 2E, Sniper 2E, Tundra 2E

### Mode of action class 6; Chloride channel activators
Abamectin (Agri-Mek SC); labeled for use on soybeans; active against mite eggs. Agri-Mek SC.
Mode of action class 10B
Etoxazole (Zeal); labeled for use on corn and soybeans. Active against eggs and immature stages

Mode of action class 12C
Propargite (Comite); labeled for use in corn

Mode of action class 23; tetronic and tetramic acid derivatives
Spiromesifen (Oberon); labeled for corn; most effective against egg and immature stages. Hexythiazox (Onager); labeled for field corn. Does not control adult mites.

Combination Products
Hero (zeta-cypermethrin and bifenthrin); labeled for corn and soybeans
Cobalt (chlorpyrifos and gamma-cyhalothrin); labeled for soybeans
Swagger (bifenthrin and imidacloprid); labeled for soybeans
Tundra Supreme (chlorpyrifos and bifenthrin); labeled for corn and soybeans
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Many natural enemies prey on spider mites and play a major role in population suppression most years. The most important of these include a predatory spider mite, the mite destroyer beetle, six-spotted thrips, and the minute pirate bug. In addition to these predators, a fungal disease also may be important in reducing spider mite populations.
Flaring spider mites

- Many spider mite problems may be traced back to an earlier application of a broad-spectrum insecticide that reduced populations of these natural enemies.
- Many products targeting western bean cutworm, corn rootworm, soybean defoliators, or soybean aphid could lead to mite flare-ups by removing the beneficial insects and allowing the pests to thrive.
Take Home Points

• It is important to identify spider mite species in corn; management options differ depending on species.

• Pesticides differ in their activity against different spider mite stages; important to understand this in pesticide selection.

• Avoid unnecessary broad-spectrum insecticide applications early in the season which may encourage later season spider mite outbreaks by reducing natural enemy populations.