Mite Management in Corn and Dry Beans in the Panhandle
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Crop Production Clinics

In this session, you will ...

• Learn to identify common mites in corn and dry bean
• Recognize the conditions that favor pest mite outbreaks
• Understand tools, tactics, & strategies for pest mites IPM in corn and dry bean
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Two-spotted spider mite ~ 20 X magnification Banks grass mite

Note that after molt, both mites can be found without spots for a while.
The two-spotted spider mite is a minute arthropod found in colonies under webbing on the lower surface of leaves. Infestations are often associated with drought stress and hot, dry weather conditions.

Overwintering female two-spotted spider mites are orange to orange-red in color.

Newly-molted mites (from nymph to adult, for example) may lack spots.

Damaged leaves will have a silvery or bronzed look. Little is known about the effect of spider mite feeding on dry bean yield and quality, but the earlier in crop development that infestation starts, the more likely it is that significant losses can occur.
TSSM Biology

- Hosts; are *many*
- Disperse from overwintering sites in mid-summer
TSSM Life Stages

- Egg; oval and translucent
- Larvae; six-legged, translucent stage
- Protonymph; eight-legged stage
- Deutonymph; eight-legged stage
- Adult; eight-legged stage
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TSSM Development

- Development time is dependent on many factors, but temperature is most important
  - Development threshold range: ~53.6°F to 104°F
  - Female TSSM can lay a maximum of 12 eggs/day at 77°F

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>36.3</td>
</tr>
<tr>
<td>68</td>
<td>16.6</td>
</tr>
<tr>
<td>86</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Relationship between temperature and development time (egg to adult) for two-spotted spider mite. (Sebelis 1981)
The banks grass mite is also a minute arthropod that is also found in colonies under webbing on the lower surface of leaves. Infestations are often associated with drought stress and hot, dry weather conditions.

Overwintering female banks grass mites are also orange to orange-red in color and can be commonly found overwintering in winter wheat.

Newly-molted mites (from nymph to adult, for example) may lack spots

BGM are not known to attack dry beans, but in corn typically infest from the bottom of the canopy to the top; therefore, severe injury in corn can appear that the crop is desiccating from the bottom up.
BGM Biology

- Hosts are primarily grasses: corn, sorghum, wheat and sugar cane
- Overwinter in late-season grasses such as winter wheat or grassy alternate hosts around fields
- Disperse in the spring and can build by late summer if conditions allow
BGM Life Stages (same as TSSM)

- Egg; oval and translucent
- Larvae; six-legged, translucent stage
- Protonymph; eight-legged stage
- Deutonymph; eight-legged stage
- Adult; eight-legged stage
BGM Development

- Development time for BGM is roughly 7-14 days @ 70°F from egg to adult
- BGM emerge from overwintering sights earlier than TSSM

Development of the BGM through its stages is similar to TSSM. However, BGM emerges earlier in the season. For example, it would not be unusual to find BGM infestations before corn begins to silk.
Pest Mite IPM

Biological Control

- Know the good from bad mites
- There are *many* species, but TSSM & BGM are unique looking
- Some predatory mites are less productive under low humidity than TSSM
- *Neoseiulus fallacis* is a common predatory mite throughout the high plains; capable of reproducing at lower temperatures

**Important note for dry bean growers** **As ALS-resistant pigweeds cause us to shift weed-management plans, note that some ALS herbicides (such as Basagran) may be less toxic to mite predators such as *Neoseiulus fallacis*. This could facilitate late-season mite outbreaks in the future.**
Pest Mite IPM

When is pest mite risk high?

- If temps are high ...
  - For example, August 2020 was the 2nd highest average mean temp on record at SCB airport station (76.5°F)
- ... and precipitation low
  - For example, August 2020 recorded 0 inches at SCB airport station
- *Drought stress*

http://scacis.rcc-acis.org/
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Pest Mite IPM

When to act?

- **BGM and TSSM in corn**
  - Treat when injury to the lower 1/3 of canopy or small colonies in the middle canopy before hard dough stage

- **TSSM in dry bean**
  - No thresholds developed; consider treatment when stippling found in middle canopy or scattered colonies in the upper canopy

### Products for spider mite control in corn and dry bean
(adapted from Wright, Peterson, and Hunt; CropWatch, July 22, 2020)

<table>
<thead>
<tr>
<th>MOA Class</th>
<th>Chemical</th>
<th>Crop</th>
<th>Target stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organophosphate (1B)</td>
<td>Dimethoate</td>
<td>Corn &amp; dry bean</td>
<td>Adults/ nymphs</td>
</tr>
<tr>
<td>Pyrethroid (3A)</td>
<td>Bifenthrin</td>
<td>Corn &amp; dry bean</td>
<td>Adults/ nymphs</td>
</tr>
<tr>
<td>Chloride channel activators (6)</td>
<td>Abamectin</td>
<td>Dry bean only</td>
<td>Adults/ nymphs</td>
</tr>
<tr>
<td>Chitin synthase inhibitor (CHS1) (10B)</td>
<td>Etiozole</td>
<td>Corn only</td>
<td>Nymphs/ eggs</td>
</tr>
<tr>
<td>Mitochondrial ATP synthase inhibitor (12C)</td>
<td>Propargite (Comite)</td>
<td>Corn only</td>
<td>Adults/ nymphs</td>
</tr>
<tr>
<td>Tetrac and tetramic acid derivatives (23)</td>
<td>Spiromesifen (Oberon)</td>
<td>Corn only</td>
<td>Nymphs/ eggs</td>
</tr>
<tr>
<td>Combination Products</td>
<td>Hexythiazox (Onager)</td>
<td>Corn &amp; dry bean*</td>
<td>Nymphs/ eggs</td>
</tr>
</tbody>
</table>

*Only labeled for dry bean use in Nebraska west of US 281.
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Pest Mite IPM

How to take action?

1. Limit drought stress if you have irrigation
2. Cautious use of Pyrethroids and organophosphates
3. Products that control nymph and egg stages may be better control options
4. Cold weather fronts can reduce spider mite population growth

1. Irrigation will not control mite populations; however, limiting drought stress through irrigation can slow spider mite population development
2. Pyrethroids and organophosphates are ineffective on eggs AND are detrimental to natural enemies (flare mite populations)
3. Products that are specifically labeled as “miticides” that target nymphs/eggs may not have as immediate “knock-down”, but but may provide better long-term control of the spider mite population (e.g., Oberon and Onager). Since mites generally spread from field corners or edges, there is often time to act if the field infestation is identified early.
4. Cold weather fronts in the summer bring two things that work against spider mite population growth – rain and cooler temps. Cooler temps may more greatly slow spider mites relative to their natural enemies.
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What’s New in Insect Management in the Panhandle?
Jeff Bradshaw
Entomology Specialist
Conserving Beneficial Insects in Panhandle Cropping Systems

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Entomology Specialist
Crop Production Clinics

What are your most important crop insect management concerns that Nebraska Extension should address
1.
2.
3.

What are your most important crop weed management concerns that Nebraska Extension should address
1.
2.
3.

What are your most important crop disease management concerns that Nebraska Extension should address
1.
2.
3.
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Session Goals

• Include 1-2 learning objectives (session goals) (what will participants be able to do or how might they apply information in the coming year)

• E.g. At the end of this session participants will be able to identify the ideal environmental conditions necessary to safely spray 2, 4-D.

• Helpful tips on writing session goals
  (http://www.bu.edu/cme/forms/RSS_forms/tips_for_writing_objectives.pdf)
  • Step 1: Learning objectives begin with the phrase: “At the conclusion of this activity, participants will be able to...”
  • Step 2: Connect step one with an action verb which communicates the performance by the learner. Use verbs which describe an action that can be observed and that are measurable.
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Presentation Content

• Limit word content on slides (~3 bullets)
• Large pictures and figures
  • Simplify figures for ease of reading
  • Provide summary notes for printout below in notes section (may be bulleted)

• Add presentation notes here.
• Provide information that is not obvious or easily understood from slide content
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Take Home Points

• You should include 3-5 take home points at the end of your presentation.
Frequently Asked Questions

• Include 2-4 FAQs with answers for your presentation. These will help moderators facilitate discussion.
• These can be provided separate from presentation