

Spider mites in corn and soybeans

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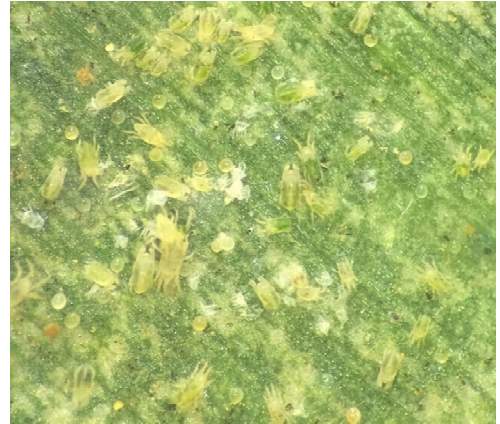
Nebraska Extension Entomology Specialists

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

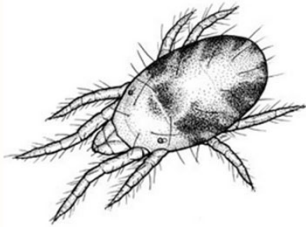
Spider mites in Nebraska

- 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)
 - Twospotted spider mite (corn + soy)

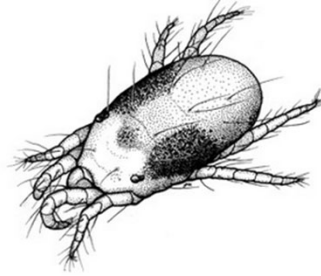


Banks grass vs. twospotted

Appearance
(adult females)
Drawings by Jim
Kalisch



Dark green pigment spots
extend down length of
body; body is more
elongate



Dark green pigment in two
distinct spots on front 1/2 of
body; body more rounded

Carmine mite



Banks grass vs. twospotted

Webbing	Produces spider-like silk webbing	Produces spider-like silk webbing; tends to produce more webbing than BGM
Host Range	Almost exclusively grasses, such as corn and sorghum	Many grass species (corn, sorghum) plus soybeans, fruit trees, vegetables, and ornamentals
Timing	Appears earlier in the season	Tends to appear mid- to late-season

Banks grass vs. twospotted

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

Corn-specific considerations

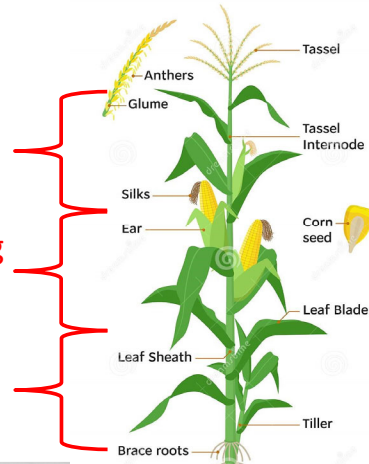
- Which mite species is present?
- Sandy pivot with history of WBC/WCR insecticides?
- First evidence = yellow/whitish spotting on the top of the leaf
- Confirm presence of mites on undersides of leaves
 - Drought and disease can cause similar discoloration



Economic threshold in corn

- In corn, ET = visible damage common in the lower third of the plant + 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



(Photo courtesy of Daren Mueller, Iowa State University, Bugwood.org)

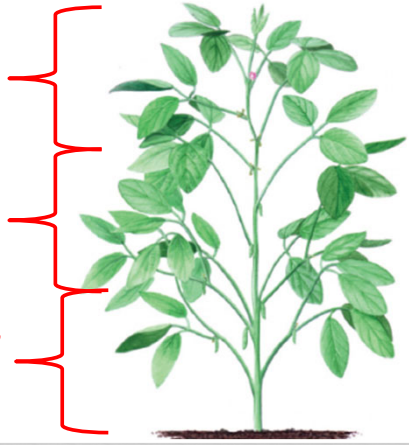
Economic threshold in soybeans

- 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



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.

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.

Miticide product options

Mode of Action	Active Ingredients	Product Names (examples)	Crops Labeled	Notes	Stages Targeted		
					Eggs	Immatures	Adults
1B: Organophosphates	Dimethoate	Dimethoate, Dimate	Corn + Soy	Difficult to kill mite eggs and removes natural enemies; infestations can recur in 7-10 days	X	✓	✓
	Chlorpyrifos	Lorsban*, Warhawk					
3A: Pyrethroids	Bifenthrin	Bifenture, Brigade, Sniper					
	Zeta-cypermethrin + bifenthrin	Hero					
1B + 3A combination products	Chlorpyrifos + gamma/lambda-cyhalothrin	Cobalt*, Cobalt Advanced*					
	Chlorpyrifos + bifenthrin	Tundra Supreme					

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

Chlorpyrifos: labeled for spider mite control in soybeans. Multiple products: Lorsban 4E, Lorsban Advanced, Chlorpyrifos 4E, Govern 4E, Hatchet 4E, NuFos 4E, Warhawk 4E, Yuma 4E

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; tetrone 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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6: Chloride channel activators	Abamectin	Agri-Mek	Soy	Targets active stages of mites	X	✓	✓
12C: Inhibitors of ATP synthesis	Propargite	Comite	Corn				
10B: Mite growth inhibitors	Etoxazole	Zeal	Corn + Soy	Active against eggs and immatures	✓	✓	X
23: Tetrionic/tetramic acid derivatives	Spiromesifen	Oberon	Corn				✓
	Hexythiazox	Onager	Corn				X

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Biological controls

- Many natural enemies prey on spider mites and play a major role in population suppression most years

Fungal disease



Predatory mites



Lady beetles



Six-spotted thrips



Minute pirate bugs



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