Agronomic Spotlight

Management of Spider Mites in Corn

- Outbreaks of spider mites are common in hot, dry conditions, particularly on drought-stressed corn.
- Spider mite feeding reduces the photosynthetic abilities of the leaf and can eventually kill the leaf.
- Prevention includes proper irrigation to avoid drought stress and removal of alternate grass hosts.
- Miticides, applied when economic thresholds are reached, can help to control infestations and protect yield potential.

Two Species Commonly Found on Corn

Banks grass mite (BGM) Oligonychus pratensis. Adult BGM males are dark green with a pointed abdomen, while adult BGM females are larger with a more rounded abdomen (Figure 1). Infestations often begin near the edges of the corn field adjacent to other grasses, such as wheat, where BGM overwinter. As these grasses start to dry down, BGM will relocate to the neighboring corn field. Generally, infestations start on the undersides of lower leaves along field edges and gradually move up the plant and deeper into the field. BGM is commonly found in corn from the mid-whorl through the grain-filling growth stages.

Two-spotted spider mite (TSM) Tetranychus urticae Koch. Adult TSM are yellow with two irregularly-shaped dark spots on the abdomen (Figure 2). TSM overwinter in sheltered areas such as field margins. Infestations usually occur sporadically throughout the field and are more common in humid areas like river bottoms. This species is often found in corn near a neighboring alfalfa field. Problems with TSM usually occur later in the growing season, rarely before flowering.

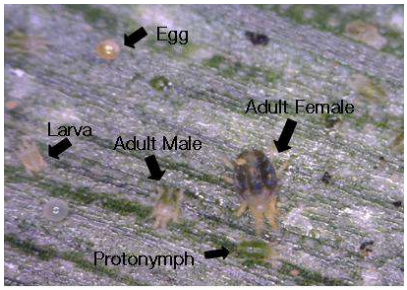

Figure 1. Banks grass mite egg, larva, protonymph, adult female, and adult male. Photo courtesy of Dr. Ed Bynum, Texas A&M Agrilife Extension.

Basic Life Cycle

Both species overwinter as females. When the weather warms, females lay pearly-white, spherical eggs. Mites have three immature stages followed by an adult stage. Generation times depend on temperature and can range from 4 to 20 days.[1,2] Under ideal conditions, spider mite populations can increase 70-fold in one generation.[2]

Figure 2. Two-spotted spider mite adults. Photo courtesy of David Cappaert, Michigan State University, Bugwood.org.

Feeding Damage

Spider mites feed on the undersides of leaves and damage corn by removing plant sap, resulting in leaf discoloration characterized by yellow or whitish spotting (stippling) across the surface of the corn leaf (Figure 3). This damage reduces the photosynthetic abilities of the leaf and increases water loss. Spider mite feeding can eventually kill the corn leaf, leaving it with a scorched or burned appearance.

Figure 3. Spider mite feeding damage (stippling). Photo courtesy of Dr. Pat Porter, Texas A&M Agrilife Extension.

Scouting

Scout field edges where mite outbreaks are most likely to begin. Continue in 5 to 10 locations throughout the field, examining lower, middle, and upper leaves for stippling. Spider mites produce a fine network of silken webs on the undersides of the leaves that can be easily seen under low magnification. Using a magnifying glass, check the undersides of leaves for adult mites and webbing.

Determine which species is present. Miticide resistance is widespread in both BGM and TSM populations, particularly in regions with long histories of miticide use. Resistance to specific miticides differs between the two species, so it is important to determine which species is present in the field prior to spraying. A grower's best option is to consult with an Extension entomologist and/or local agronomist before choosing a product to determine if resistance has developed to any of the commonly used miticides. In some fields, both species may be present at the same time, in which case, a treatment targeted towards BGM could result in a greater infestation of TSM due to reduced competition.

Prevention

Spider mite outbreaks can be common in hot, dry conditions, particularly on drought-stressed corn. Proper irrigation to help avoid drought stress and removal of alternate grass hosts are the key cultural practices to control or prevent outbreaks. Natural enemies, including predatory mites,

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lady beetles, minute pirate bugs, lacewing larvae, thrips, and fungal diseases, normally keep spider mite populations in check. However, when pesticides are applied for control of other pests or diseases the natural enemies of spider mites can be killed and populations can flare. If spider mite colonies are already present and an insecticide application is necessary for control of other pests, consider including a miticide in the application.

Treating an Established Infestation

Treatment of spider mites on corn is usually justified when the following conditions are met:

- The crop is in the early reproductive stages (R1-R4). Once the crop has reached the kernel dent stage (R5) there will likely be no economic benefit from treatment.
- Extensive colonies of live mites are present on the leaves throughout the field, not just along the edges or in dry locations.
- There is visible leaf damage near the ears.
- There is a good probability of continued water stress to the plants.

Economic thresholds (ET) for treatment based on the percentage of infested leaves per plant, the market value of the crop, and the costs associated with treatment are provided in Table 1. This is a simplified version of the ET table developed by Extension Entomologists Thomas L. Archer and Ed D.Bynum, Jr., at Texas A&M University and does not take into account percentage of leaf damage. Other guidelines for determining when to implement chemical control include:

- Treat if live mite colonies are found on 1/3 of the leaves of 50% of the plants.
- Treat if 15 to 20% of the leaf area is covered with mites and their damage.
- Treat if damage is visible in the lower 1/3 of the plant and mite colonies are present in the middle 1/3 of the plant.

Table 1. Economic thresholds for mites on corn, based on percentage of infested leaves per plant.

Control cost per acre	Market value per acre				
	$400	$600	$800	$1000	$1200
	Percentage infested leaves per plant				
$10	15	10	8	6	5
$20	29	20	15	12	10
$30	44	30	23	18	15

This table is modified from the original table for economic thresholds for spider mites in corn by T.L. Archer and E.D. Bynum, Jr., Texas A&M University.

A field survey should be conducted before and after a miticide is applied to evaluate the efficacy of a treatment. Closely examine 25 infested leaves and mark them so that the same leaves are reexamined after treatment. If a treatment is effective, no live adult mites should be found. However, eggs present during a treatment may not be killed (most miticides do not kill the eggs) and may begin to hatch, resulting in a new generation of immature mites. In some cases, retreatment may be necessary before immature mites become adults and begin laying eggs.

Preventative Treatment with Miticides

A pre-ventative pre-tassel miticide treatment may be beneficial if:

- The field has a history of spider mite problems.
- Temperatures are expected to exceed 95 °F.
- Plants are drought-stressed.
- The field has received previous insecticide applications that may have reduced natural enemy populations.
- Mites are being detected on a majority of the plants early in the growing season.

Sources

[1] Cullen, E. and Schramm, S. 2009. Two-spotted spider mite management in soybean and corn. University of Wisconsin Extension. A3890. http://corn.agronomy.wisc.edu/.

[2] Peairs, F. B. 2010. Spider mites in corn. Colorado State University Extension. 5.555. http://extension.colostate.edu/ .

[3] Porter, P., Cronholm, G.B., Parker, R.D., Troxclair, N., Bynum, E., Patrick, C.D., and Biles, S.P. 2010. Managing insect and mite pests of Texas corn, Texas A & M System. http://lubbock.tamu.edu/. Web sources verified 06/23/16. 140415023019