

Two-spotted Spider Mites in Soybeans

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Two-spotted spider mites (TSM) are being found in many soybean fields across the upper midwestern US. Reports from MN, ND, SD and WI in late July indicate that this pest is at significant levels in the margins of many soybean fields. If the current hot, dry conditions persist, spider mites are likely to continue to expand across these areas during the next several weeks. This *Field Facts* explains the life cycle, damage and treatment options for two-spotted spider mites in soybeans.



Severe spider mite injury to soybeans.

Lifecycle

Two-spotted spider mites have four stages of development: egg, larva, nymph and adult. TSM overwinter as adults in field edges and roadsides bordering fields, feeding on weeds until spring. After early spring mating, female spider mites lay eggs on weeds that usually hatch to the larval stage in 3 to 5 days. Unlike most damaging insects in soybeans, TSM do little feeding during the larval stage of development.



TSM adult and nymph.

Nymphs are young eight-legged mites that resemble full-size adults but do not yet have reproduction capability. Adults are very small at only 1/60 (female) to 1/80 (male) inch in size when fully developed, with females laying an average of 50 to 100 eggs during their lifetime.

The entire life cycle of this pest can be completed within 5 to 14 days, depending on environmental conditions. During heavy outbreak years all stages of mites may be present in the

field at one time. TSM have the potential for up to 10 generations per year during the growing season.

Damage

Two-spotted spider mites damage crops by piercing plant leaves and feeding on the plant juices with their mouth parts. Mites suck on the bottom sides of soybean leaves and remove moisture and nutrient contents from plant cells, resulting in a yellow or whitish spotting on the top side of the leaf surface. In heavy infestations, a common visual symptom of spider mite feeding is leaf burning and stippling.

Hot spots will typically be noticed first on field margins, as infested plants take on a wilted appearance. Drought-prone fields or field areas that contain lighter soils or sands are often affected first by spider mites. As populations increase, TSM will move out across the entire field if left unchecked. Fields heavily infested by mites can cause premature leaf drop and significant reductions in yield.



Two-spotted spider mite damage on edge of soybean field.

Populations of spider mites increase significantly during extended hot, dry conditions. This is due to a reduction in predators and naturally occurring pathogenic fungi that keep populations at non-economic levels in normal years.

Scouting and Economic Thresholds

Look on the undersides of affected soybean plants and leaves for mites, eggs and webbing in the lower canopy. Mites are almost impossible to see with the naked eye, so doing a simple “paper test” is a quick and easy way to confirm their

presence. Shaking the plant onto a white piece of paper should allow you to see the tiny orange- to yellow-colored mites slowly moving on the paper.

Currently there has been no research conducted to allow for the calculation of an economic threshold for two-spotted spider mite infestations on soybeans. Some extension sources suggest treating for spider mites if 20 to 50 percent of the leaves are discolored before pod set. After pod set has begun, the suggested treatment threshold is 10 to 15 percent of the leaves discolored.

In current conditions, consideration for treatment of two-spotted spider mite should take into account several factors.

- Are there other insect pests present that cause economic injury (such as soybean aphids, bean leaf beetles, and grasshoppers?)
- What are the weather trends? If heavy rains and moderating temperatures occur, mite populations may be reduced or contained in the short term.
- Are there thrips, pirate bugs, mite destroyer beetles, and/or naturally occurring fungi in the field? Under proper conditions these beneficials can significantly reduce or limit populations of TSM.
- Is the outbreak confined to field edges or borders? If mite outbreaks are caught on outside field edges before they have a chance to move across the entire field, spot treatments or treating field margins might head off the need for whole field treatments. If scouting reveals that mites have spread across the field, then whole field protection will be necessary.

If hot/dry weather persists, spider mites will continue to build and it will be important to control them. Field scouting is necessary for detection of early outbreaks and for effective early treatments and control.

Treatment and Control

When a decision is made to spray for two-spotted spider mites the most consistent performance has been with a full rate of an organophosphate product like Lorsban and Dimethoate. While some pyrethroid products may suppress activity of spider mite, nearly all the synthetic pyrethroid products have a detrimental effect on TSM predators. The lack of full control by pyrethroids allows mite numbers to increase unchecked or “flare up” when conditions are favorable.

Spider mites, like other soybean insects, are found on the undersides of soybean leaves. For optimal control of spider mite populations, use high pressure and a high volume of carrier to achieve thorough coverage and penetration of the crop canopy. Using higher pressures, (40 to 60 psi) and increased gallonage (15 to 25 gpa) will improve overall performance.

Table 1. Commonly used insecticide treatments for two-spotted spider mite control.

Insecticide	Rate/A	Re-entry Interval	Pre-Harvest Interval
Dimethoate 4E	1 pt	24 hrs	21 days
Lorsban 4E	1/2 to 1 pt	12-48 hrs	28 days

Unfortunately, residual control of most treatments is short-lived and applications will only control adults and nymphs. Treated fields need to be re-scouted five to ten days following application. It is possible that a second application might be necessary to pick up any newly hatched spider mites, so be sure to scout treated fields about a week after application.

Reminder: Conditions can change quickly depending on environmental conditions. Heavy rainfall, or changes in temperature, humidity or crop conditions may warrant a re-evaluation of mite populations before treatments are made.

Two-spotted Spider Mites Facts and Summary

- Life cycle can be completed in 5 to 14 days.
- Fastest reproduction occurs when temperatures are over 85 degrees and weather conditions are dry.
- Females live 20 to 30 days and typically produce 50 to 100 eggs.
- There are no established economic thresholds for two-spotted spider mites.
- Natural predators, including fungi, can keep populations in check. Fungal infections are less frequent during hot, dry periods. Natural predator populations can be affected by spray applications of synthetic pyrethroids.
- Optimal control of mite populations with chemical applications is attained by using high pressure and a high volume of carrier.
- Scout fields 5 to 10 days after spray applications to check for re-infestations.

Reference Information

Purdue University Field Crops IPM Website. Two-spotted Spider Mite.

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