2013

South Dakota Crop Protection Guide

Soybeans

Common Insect and Mite Pests (text)

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Common Insect and Mite Pests of Soybean

Bean Leaf Beetle

Bean leaf beetles belong to a large family of leaf beetles, Chrysomelidae. They are small insects, approximately ¼" long, have yellow to light brown to red bodies with irregular black spots on their wings, and black margins on their bodies. Adult beetles feed on cotyledons, leaves, and pods of soybeans. Their chewing damage to leaves results in round holes that are distinct from the more irregular feeding damage caused by other chewing pests of soybeans such as grasshoppers.

Larvae of these beetles are mostly white with darker ends and have three pairs of legs near their heads. Larvae live in the soil and feed on soybean roots, but their economic significance has not been established. Because bean leaf beetles overwinter in South Dakota, mild winters may contribute to greater numbers of beetles the following spring. The preferred overwintering sites include leaf and plant debris in wooded areas. Beetles emerge in early April, and disperse to weedy areas or alfalfa fields. Planting soybeans as late as it is possible will protect the crop from the overwintering populations of these insects.

Thresholds for these beetles are based on their numbers or the percent damage to the soybean leaves. Scouting for beetles in the early soybean growth stages (seedling to V4) should be done by examining at least five sites across the soybean field. Count the bean leaf beetles and note the percent of defoliation of the leaves while slowly walking along 15–20 feet of a row. Divide the number of beetles per foot of row, and average across the field. Insecticide treatments should be considered if defoliation exceeds 35% and there are more than seven beetles per row-foot.

If the soybeans are too large to easily see the bean leaf beetles as you walk along the row, a white cloth measuring 36"x42" with two strips of wood attached to the long ends of the cloth can be used to estimate the number of beetles per foot of row. At least five sites should be selected across the field, and the rolled-up cloth should be placed under the soybean canopy at each sampling site. The drop cloth should be unrolled between the rows with as little disturbance to canopy as possible. Plants from both rows should then be vigorously shaken over the drop cloth using hands and arms, and bean leaf beetles should be counted as they land on the cloth. Beetles are agile and will disperse quickly.

If defoliation exceeds 25% during pod-set and pod-fill, and there are more than 50 beetles per row-foot, treatments should be considered. Bean leaf beetles can feed on pods as well, and the threshold of greater than 10% of pods damaged and more than 0.5 bean leaf beetle per plant during pod-fill stages should be used.

Sources: University of Nebraska, Extension; University of Minnesota, Extension; Kansas State University (Extension Publication MD2824); and Northern Plains IPM Guide.

Figure 1. Adult bean leaf beetle. Photo: Ada Szczepaniec, South Dakota State University.

Right: Figure 2. Adult bean leaf beetle feeding damage to soybeans. Photo: Ada Szczepaniec, South Dakota State University.

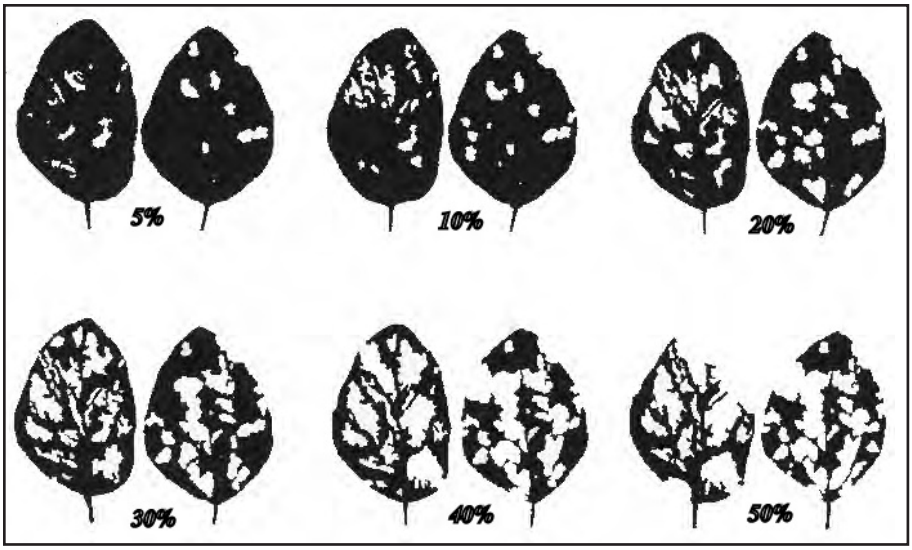

Figure 3. Chart representing percent defoliation. Because the percent of leaf removed tends to be overestimated, this chart provides an accurate representation to actual defoliation levels.

Grasshoppers

Grasshoppers (Orthoptera: Acrididae) are a large and diverse group of pests that can occasionally have significant impact on soybeans. Tillage can be used to manage populations of grasshoppers as tilling destroys egg pods and kills any overwintering grasshoppers. Grasshoppers, however, can lay their eggs in ditches and other untilled areas surrounding the fields, and sampling for these pests is necessary regardless of tilling practices.

Females deposit their eggs in a frothy substance that hardens around the eggs to form a protective case (referred to as an egg pod). Egg pods containing up to 30 eggs are laid in the fall and are buried approximately 2" under the soil surface. Eggs begin hatching in early spring and immature grasshoppers (nymphs) feed on green plant material near the field edges. Four to five weeks after hatching (about mid June), the nymphs reach their adult stage. The distinguishing features of adults are fully developed wings; otherwise, the nymphs and adults resemble each other closely.

Grasshoppers feeding on soybean leaves or pods mid to late summer can pose a risk to the yield of the crop. Soybean fields adjacent to weedy areas, small grains, or alfalfa fields, and roadside ditches may be more prone to grasshopper infestations.

Scouting is usually done in three locations in the field (away from the field edge) by sweeping 40 times in each location while walking in a half circle pattern. After each sampling, the number of grasshoppers should be divided by 10 to derive the number of grasshoppers per square yard. The general thresholds are 30–45 nymphs or 8–14 adult grasshoppers per square yard within fields.

Figure 4. Grasshopper nymph on soybean leaf. Note the lack of developed wings.
Photo: Ada Szczepaniec, South Dakota State University.

Because grasshoppers may be feeding on plants in bordering areas as well as in soybeans, thresholds based on the percentage of the leaf area consumed provide additional guidelines for treatments. Treatments for grasshoppers should be considered when defoliation exceeds 30% pre-bloom, and exceeds 20% between bloom and pod fill. Combining the average number of grasshoppers with the percent of defoliation may provide the most accurate method to establish if chemical treatments are warranted.

Sources: University of Nebraska (Extension Publication G1627) and Northern Plains IPM Guide.

Soybean Aphids

Soybean aphids (Hemiptera: Aphididae) are the major pests of soybeans in South Dakota. They have a complex life cycle that includes asexual and sexual reproduction, wingless and winged aphid morphs, and requires presence of an overwintering host plant, buckthorn.

Soybean aphids are small (1/16"), light-yellow to lime green, with dark, short cornicles sticking out of their abdomen. The winged forms are darker than wingless morphs. During the early spring, soybean aphids develop on buckthorn for several generations, and winged aphids fly to young soybean plants by late spring or early summer to establish new colonies. Their development is highly temperature-dependent, and soybean aphids will increase in numbers rapidly if temperature ranges between 77°-86°F.

Weekly scouting for soybean aphids should start in mid June and continue until late August. Approximately 20–30 plants throughout the field should be examined for aphids. Treatment should be considered when 80% of the plants are infested with aphids, and the number of aphids exceed 250 per plant. A speed-scouting method that simplifies this protocol has been developed by entomologists at the University of Minnesota. http://www.soybeans.umn.edu/crop/insects/aphid/aphid_sampling.htm

There is no indication that pesticide applications for aphids provide yield gains for soybeans that reach R6 growth stage.

There are numerous natural predators of soybean aphids (e.g., ladybeetles, parasitoid wasps, lacewings) that can be very abundant and often keep aphid populations below the threshold. If aphid numbers are close to threshold but are not rapidly increasing and natural predators are present, insecticide applications may not be necessary. An aphid-resistant soybean variety (Rag1 line) is available as well, and while Rag1 soybeans are not free of aphids, numbers of aphids are significantly reduced on the resistant variety compared to susceptible soybean varieties.

Source: South Dakota State University (Extension Publication FS914A).

Figure 5. Wingless form of soybean aphid.
Photo: University of Nebraska, Lincoln.

Figure 6. Small colony of soybean aphids.
Photo: Ada Szczepaniec,
South Dakota State University.

Spider Mites

Spider mites belong to a large family of mites (Tetranychidae) that earned their common name because many of them produce webbing when their populations are high. Twospotted spider mites, the species that attacks soybeans, are small (1/16"), round mites with two dark dots on each side of their bodies.

Spider mites feed on plants by piercing plant tissue and sucking up the contents of plant cells, causing characteristic stippling damage (small spots). If their numbers are high, spider mites cause leaves to turn yellow and drop from the plants. Spider mites can go through many generations each season, and in hot and dry conditions, they can take as little as 10 days to complete development. There are several key predators of spider mites that keep their populations in check, such as predatory mites, spider mite destroyers (small beetles from the same beetle family as ladybird beetles), and predatory thrips. A naturally occurring fungus controls spider mites, and in wet and humid years they are unlikely to be a major pest.

Twospotted spider mites can be a problem in soybeans in dry summers, but there are no clearly defined thresholds for them in soybeans. Spider mite treatment guidelines for soybeans are based on observable plant damage. Spider mite damage usually starts in the lower canopy and progresses to the middle and upper canopy as populations build. It is recommended to treat when the lower canopy is heavily damaged by spider mites and stippling reaches the middle canopy.

Spider mite damage may resemble symptoms of drought stress or certain diseases, so ensure that spider mites are present on the leaves before making decisions about pesticide treatments. Using a 10x hand lens is usually necessary to see the mites. To inspect if plants are infested with spider mites, vigorously tap or shake the canopy of potentially infested plants over a white sheet of paper and confirm their presence with a hand lens. Infestations begin in field margins. Often treating field borders and spot-treating within fields is sufficient to manage spider mite populations.

Source: University of Nebraska (Extension Publication G1167).

Figure 7. Twospotted spider mite female and an egg.
Photo: Ada Szczepaniec, South Dakota State University.

Figure 8. Heavy spider mite damage to a soybean plant.
Photo: Ada Szczepaniec, South Dakota State University.

Thrips

Thrips (Thysanoptera) are small, spindle-shaped insects that are about 1/32" to 1/5" when they reach adult stages. At least a 10x hand lens is required to confirm their presence on leaves.

Thrips range in color from off-white to yellow to black, and adults have two pairs of fringed wings. There are many generations of these insects every year, and their life cycle can be as short as two weeks. Thrips feed by sucking cell content from plant tissues and their damage results in linear stippling damage to leaves, which tends to run along leaf veins.

There are numerous species of thrips, and many cause significant damage to field crops. While thrips are likely to be present on soybeans from May until late August, they pose particular danger to young soybeans (VE to V6) in dry and hot weather conditions.

To scout for thrips, five areas throughout the field should be sampled by randomly selecting 10 consecutive plants. The fifth trifoliate, counting down from the uppermost node or the lowest trifoliate available, should be removed. Thrips on the underside of leaves should be counted, and the average number of thrips per trifoliate should be calculated for the entire field. Percent of leaf damage caused thrips feeding should be noted as well.

Because thrips rarely cause economic damage to soybeans, there are no clearly defined thresholds. It is recommended to consider insecticide treatments, however, if 75% of trifoliates that were sampled have evidence of thrips damage, and there are on average eight thrips per leaf.

Source: Purdue University, Extension.

Figure 9. Adult and immature thrips.
Photo: John Obermeyer, Purdue University.

Figure 10. Thrips damage to soybeans.
Photo: Purdue University.