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Management of Insect and Mite Pests in Soybean

Tom A. Royer
 Extension Entomologist

Uncontrolled soybean pest, when thresholds are exceeded, will reduce yield and quality of seed and oil. Yet soybeans have fewer serious insect pests compared to other cultivated crops, and there are many non-pest and beneficial insects that occur in soybean fields. Pesticides are not a substitute for good agronomic practices. They should not be used as "preventative insurance" because it is rarely economically or environmentally justifiable, and may disrupt the beneficial insect activity that is present. Many soybean pest problems can be avoided by implementing an Integrated Pest Management (IPM) plan that includes preventive pest management practices, such as planting high-quality, vigorous, varieties adapted for Oklahoma, planting at the proper time for optimal health and yield, providing proper fertilization and weed control, and using crop rotations.

The decision to use an insecticide in soybean should be made after carefully surveying for pests and associated damage. From mid-season to pod-fill, scouting for insects that feed on foliage or pods can be conducted by shaking plants over a drop cloth or shake sheet and is particularly useful if beans planted in 30"-40" rows. Drop cloth sampling should be conducted weekly after the plants reach 12 inches. A drop cloth can be purchased or made using a piece of white or off-white cloth measuring 24" x 42". Staple each end of the cloth to a thin strip of wood approximately ½" to 1" wide and 24" long.

To begin the survey, select a site at random in the field, kneel between the two rows, and unroll the cloth from one row over to the opposite row. Extend each arm forward parallel with the row on either side. Vigorously shake the vines over the cloth. Your arms, from your elbows to your fingertips, will allow you to sample approximately 1½ row-feet of plants on each side of the row. Thus, a total of three row-feet may be sampled at each site. Count the insects that fall to the cloth. Repeat this process until approximately 10 sites have been sampled per field (up to 50 acres in size). Infestations are then evaluated as to the number of various species per 30 row-feet.

Another scouting routine is the sweep net method, which can be used for beans planted in rows or drilled. Using a standard 15" diameter sweep net, make 10 consecutive sweeps (180 degrees) while walking through the field. Swing the net from side to side with each step. After 10 successive sweeps, the insects should be identified and counted as they are re-

moved from the net. Repeat this procedure 5 times, totaling 50 sweeps and compare counts with economic thresholds established for individual pests. This method is particularly useful on seedling and drilled or broadcast beans.

For foliage feeding pests, an alternative sampling strategy is to estimate percent defoliation. Determine the percent defoliation of the plants in the entire field (not on individual plants) by taking several leaves at random from several selected plants. Then estimate the amount of leaf that has been eaten by foliage feeders. This approach requires practice and a well-trained eye.

The information herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

Pesticide recommendations in this publication were correct as of the "Modified Date" but always check the label that came with the purchased insecticide for the most current rates and restrictions

The first name listed is the trade name of a product registered for use in corn for the listed pest. The name in parentheses listed below the trade name is the name of the active ingredient. The active ingredient name is provided because in many cases, there are other registered products containing the same active ingredient that may cost less, so producers should compare prices.

The number [in brackets] following a product is its Mode of Action number [MOA]. The more frequently insecticides with the same MOA are used, the more likely resistance will occur. This number provides an easy way to select different modes of action to avoid selecting for pests that are resistant to a certain mode of action.

Refer to the following OSU publications for additional information.

- EPP 7156 Field Key to Larvae in Soybeans
- EPP 7660 Seedling, Root Diseases of Soybean
- EPP 7662 Stem and Pod Diseases of Soybean
- EPP 7672 Diseases of Soybean
- EPP 7084 Pest Management Needs Assessment for Oklahoma Soybean Producers
- EPP 7196 Grasshopper Management in Rangeland, Pastures and Crops

Management of Insect and Mite Posts in Soybeans I: Stem and Seedling Fee

For the most part, stem and seedling feeders are not a problem if the grower gets a good stand of beans. They generally do most of their damage before the soybeans reach 12 inches tall. Thus growers must be ready to make a well-timed

insecticide application if warranted. Isolated infestations can often be tolerated because soybeans will compensate if there are at least four plants per row-foot.

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [Moa Group] & (Active Ingredient)	Rate of Prodcut per Acre (rate 1b ai/acre)	Comments
<p>Three Cornered Alfalfa Hopper Adult is bright green, triangular and ¼ inches. Nymph buff colored or green with 12 pair of spines on top of body.</p> <p>Damage: Adults and nymphs feed on stems. May girdle stems at, or above soil level, causing lodging when the plants get larger.</p> <p>Threshold: Scout fields at seedling emergence. Threshold is 10-15% of stems are girdled, and nymphs are still present.</p>	Acenthrin [1B,3] (acephate + bifenthrin)	8 to 21 oz	14-day waiting period for harvest; do not graze or cut for hay or forage.
	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb)	21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing
	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30-day waiting period for harvest, do not graze
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-day waiting period for feeding of dry vines, 18 days for green vines
	Concero [5,3] (spinosad + gamma cyhalothrin)	1 gallon container will treat from 42 to 64 acres	45 day wait for harvest, do not graze
	Acenthrin [1B,3] (acephate + bifenthrin)	8 to 21 oz	14-day waiting period for harvest; do not graze or cut for hay or forage.
	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb)	21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing
	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30-day waiting period for harvest, do not graze
Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-day waiting period for feeding of dry vines, 18 days for green vines	

	Concero [5,3] (spinosad + gamma cyhalothrin)	1 gallon container will treat from 42 to 64 acres	45 day wait for harvest, do not graze
	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai/A)	21-day waiting period for harvest, do not graze
	Dimate 4E (dimethoate)	1 pt (0.5 lb ai/A)	21-day waiting period for harvest
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	3.5 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	2.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Hero [3,3] (bifenthrin+zeta-cypermethrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze
	Justice [3,4A] (acetamiprid+ bifenthrin)	3.0 to 5.0 fl oz	30-day waiting period for harvest, do not graze
	Leverage 360 [4A,3] (imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Orthene 97 [1B] (acephate)	12 to 16 oz (0.75 to 1.0 lb ai/A)	14-day waiting period for harvest, do not graze or cut for hay
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.20 fl oz (0.0075 to 0.0125 lb ai/A)	45-day waiting period for harvest, do not graze
	Sevin XLR [1A] (carbaryl)	1 qt (1.0 lb ai)	14-day waiting period for grazing, 21-days for harvest
	Tempest [3, 4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	28-day waiting period for harvest, do not graze
	Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai/A)	30-day waiting period for harvest do not graze
<p>Lesser Cornstalk Borer Bluish green caterpillar found at or below soil surface in tubes or sacs made of soil particles woven together with silken material.</p> <p>Damage: Caterpillars girdle stems and roots.</p> <p>Threshold: This pest is difficult to control. Treat if more than 4 plants per row-foot have been killed.</p>	Concero [5,3] (spinosad + gamma- cyhalothrin)	1 gallon container will treat from 32 to 42 acres	.45 day wait for harvest, do not graze
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.02 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Hero [3,3] (bifenthrin+zeta-cypermethrin)	4.0 to10.3 fl oz	21-day waiting period for harvest, do not graze

Management of Insect and Mite Posts in Soybeans II: Foliage Feeders

The economic thresholds for foliage-feeding pests are considered as a group. Base treatment thresholds by estimating percent leaf loss as well as the presence of defoliators. Research from various states has shown that soybeans can

withstand 35% foliage loss up to 1 week before bloom. During bloom and pod fill, the threshold falls to 15-20% defoliation, and then increases to 35-40% defoliation once pods have filled.

Pest, Damage and Treatment Threshold	Insecticide, Formulation, (Moa* Group)	Rate of Product per Acre (rate 1b ai/acre)	Comments
<p>Aphids* Small, soft bodied insects, green or yellow.</p> <p>Damage: Suck plant juices, cause yellowing of leaves, produce honeydew and associated sooty mold.</p> <p>Threshold: None established. Most aphids not a problem.</p> <p>*So far, soybean aphid does not occur in damaging numbers in Oklahoma.</p>	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	2.0 to 2.8 fl oz (0.016 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing
	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30-day waiting period for harvest, do not graze
	Brigade [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	18 day waiting for harvest. (other names: Fanfare, Sniper, Tailgunner, Tundra)
	Brigadier [3,4A] (bifenthrin + imidacloprid)	3.8 to 6.1 fl oz	45-days for feeding of dry vines, 18 days for green vines
	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai/A)	21-day waiting period for harvest, do not graze
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	3.5 to 4.0 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	2.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Justice [4A,3] (acetamiprid + bifenthrin)	2.5 to 3.0 fl oz	30-day waiting period for harvest, do not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze
	Leverage 360 [4A,3] (imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Orthene 97 [1B] (acephate)	12 to 16 oz (0.75 to 1.0 lb ai/A)	14-day waiting period for harvest, do not graze
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.2 fl oz (0.0075 to 0.0125 lb ai/A)	45-day waiting period for harvest, do not graze
	Sephina [9D] afidopyropen	3.0 fl oz (0.01 lb ai/A)	7-day waiting period
	Sherpa [4A] (imidacloprid)	3.75 fl oz (0.047 lb ai/A)	7-day waiting period for harvest, do not graze
Sivanto [4D] (flupyradifurone)	7.0 to 10.5 fl oz (0.09 to 0.137 lb ai/A)	7-day waiting period	
Tempest [3,4A] (bifenthrin + imidacloprid)	3.8 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.	

	Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai/A)	30-day waiting period for harvest, do not graze
<p>Bean Leaf Beetle Beetles measure ¼ inches, yellow-crimson wing covers with 4 black spots and a black triangle just behind thorax. Some may not have spots, but all have triangle marking.</p> <p>Damage: Feed on leaves and pods.</p> <p>Threshold: Threshold based on growth stage of plant, level of defoliation, and presence of beetles. For pod-feeding, treat when 10% pods damaged and beetles present.</p>	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb)	21-day waiting period for harvest, 15 ys for grazing
	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30-day waiting period for harvest, do not graze
	Brigade [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.10 lb ai/A)	18-day waiting for harvest. (other names: Fanfare, Sniper, Tailgunner, Tundra)
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-day waiting period for feeding of dry vines, 18 days for green vines
	Concero [5,3] (spinosad + gamma cyhalothrin)	1 gallon container will treat from 42 to 64 acres	45 day wait for harvest, do not graze
	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai/A)	21-day waiting period for harvest, do not graze
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	4.0 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	2.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Justice [3,4A] (acetamiprid+ bifenthrin)	2.5 to 3.0 fl oz	30-day waiting period for harvest, do not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	2.6 to 6.1 fl oz	21-day waiting period for harvest, do not graze
	Leverage 360 [4A, 3] (imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Orthene 97 [1B] (acephate)	12 to 16 oz (0.75 to 1.0 lb ai/A)	14-day waiting period for harvest, do not graze or cut for hay
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.2 fl oz (0.0075 to 0.0125 lb ai/A)	45-day waiting period for harvest, do not graze
	Sevin XLR [1A] (carbaryl)	0.5 to 1 quarts (0.5 to 1 lb ai/A)	14-day waiting period for grazing, 21-days for harvest. Do not apply with 2,4DB in tank mix
	Sherpa [4A] (imidacloprid)	3.75 fl oz (0.047 lb ai/A)	7-day waiting period for harvest.
	Tempest [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.
	Tombstone [3] (cyfluthrin)	0.8 to 2.8 fl oz (0.013 to 0.044 lb ai)	45-day waiting period for harvest, 15 days for forage. Check label, rates vary based on growth stage of soybean.
Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai/A)	30-day waiting period for harvest do not graze	

<p>Blister Beetle Various colors, black, grey striped with broad head, narrow neck.</p> <p>Damage: Leaf feeders, often localized, attracted to flowering plants.</p> <p>Threshold: Threshold based on growth stage of plant, level of defoliation, and presence of beetles.</p>	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing
	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30-day waiting period for harvest, do not graze
	Brigade [3] bifenthrin	2.1 to 6.4 fl oz (0.08 to 0.10 lb ai/A)	14-day waiting period for harvest, do not graze
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	4.0 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	2.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	3.2 to 3.84 fl oz (0.0125 to 0.015 lb ai/A)	45-day waiting period for harvest, do not graze
	Sevin XLR [1A] (carbaryl)	0.5 to 1.0 qt (0.5 to 1.0 lb ai)	14-day waiting period for grazing, 21-days for harvest. Do not apply with 2,4DB in tank mix.
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 to 0.044 lb ai/A)	45-day waiting period for harvest, 15 days for forage. Check label, rates vary based on growth stage of soybean
Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai/A)	30-day waiting period for harvest do not graze	
<p>Foliage Feeding Caterpillars: While these caterpillars cause similar injury and damage, the insecticide labeled rates differ, depending on the species. CONSULT LABELS FOR RATES FOR SPECIFIC CATERPILLARS.</p> <p>Fall Armyworm Large, striped, non-bristled caterpillar up to 1.5 inches. Has a light-colored inverted "Y" on head</p>	Acentrin [1B,3] (acephate + bifenthrin)	8 to 21 oz	14-day waiting period for harvest; do not graze or cut for hay or forage
	Asana XL [3] (esfenvalerate)	2.9 to 9.6 fl oz (0.015 to 0.05 lb ai/A)	21-day waiting period for harvest, do not graze. Check label, rates vary with caterpillar
	Baythroid XL [3] (beta-cyfluthrin)	0.8 to 2.8 fl oz (0.07 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing. Check label, rates vary with caterpillar
	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 10.0 fl oz	30-day waiting period for harvest, do not graze. Check label, rates vary with caterpillar in question
<p>Garden Webworm Larvae are green with black spots on each body segment, up to 1 inch. Produce webbing that they use to attach leaves together.</p> <p>Green Cloverworm Green with white stripe along each side, 3 pair of abdominal prolegs + 1 pair of anal prolegs. 1 inch when full grown.</p> <p>Loopers Green, with two pair of abdominal</p>	Blackhawk [5] (spinosad)	1.1 to 2.2 fl oz (0.031 to 0.062 lb ai/A)	28-day waiting period for harvest; do not graze. Check label, rates vary with caterpillar in question
	Brigade [3] (bifenthrin)	2.8 to 6.4 fl oz (0.04 to 0.10 lb ai/A)	14-day waiting period for harvest, do not graze
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-days for feeding of dry vines, 18 days for green vines
	Concero [5,3] (spinosad + gamma cyhalothrin)	1 gallon container will treat from 42 to 64 acres	45 day wait for harvest, do not graze
	Delta Gold [3] (deltamethrin)	1.0 to 2.4 fl oz (0.012 to 0.028 lb ai/A)	21-day waiting period for harvest; do not graze. Check label, rates vary with caterpillar

<p>prolegs, one pair of anal prolegs and light, longitudinal stripe.</p> <p>Velvetbean Caterpillar Green or brown, with light narrow lines, 4 pair of abdominal violently when disturbed.</p> <p>Damage: Caterpillars feed on foliage.</p> <p>Threshold: Threshold based on growth stage of plant, level of defoliation, and presence of caterpillars.</p>	Diamond 0.8 EC [15] (novaluron)	6 to 12 fl oz	30-day waiting period for harvest, do not graze Check label, rates vary with caterpillar
	Dimilin 2L [15] (diflubenzuron)	2 to 4 fl oz (0.031 to 0.063 lb ai/A)	21-day waiting period for harvest. Check label, rates vary with caterpillar. Suppression only for soybean looper, not registered for garden webworm.
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	3.5 to 4.5 fl oz	30-day waiting period for harvest; do not graze or feed for forage. Check label, rates vary with caterpillar
	Fastac EC [3] (alpha-cypermethrin)	1.8 to 3.8 fl oz (0.008 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest; do not graze. Check label, rates vary with caterpillar
	Intrepid 2F [18] (methoxyfenozide)	4.0 to 8.0 fl oz (0.06 to 0.12 lb ai/A)	7-day waiting period for forage, 14-days for harvest. Not registered for garden webworm
	Intrepid Edge [5, 18] (methoxyfenozide + spinetoram)	4.0 to 6.4 fl oz	28-day waiting period for harvest.
	Justice [3,4A] (acetamiprid+ bifenthrin)	3.0 to 5.0 fl oz	30-day PHI, suppression only for resistant soybean loopers
	Larvin EC [1A] (thiodicarb)	10 to 30 fl oz (0.25 to 0.75 lb ai/A)	28-day waiting period for harvest, do not graze or feed for forage Check label, rates vary with caterpillar
	Leverage 360 [4A,3] (imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage.
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze. Check label, rates vary with caterpillar
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai/A)	45-day waiting period for harvest, do not graze. Check label, rates vary with caterpillar
	Radiant [5] (spinetoram)	2 to 4 fl oz (0.015 to 0.31 lb ai/A)	28-day waiting period for harvest, not registered for yellow-striped or western yellow striped armyworm.
	Steward [22] (indoxacarb)	4.6 to 11.3 fl oz (0.045 to 0.11 lb ai/A)	21-day waiting period for harvest, do not graze Check label, rates vary with caterpillar
	Tempest [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.
	Tombstone [3] (cyfluthrin)	0.8 to 2.8 fl oz (0.0125 to 0.044 lb ai/A)	45-day waiting period for harvest, 15 days for forage. Check label, rates vary with caterpillar
Vantacor [28] (chlorantraniliprole)	1.2 to 2.5 fl oz (0.045 to 0.098 lb ai/A)	1 day wait for harvest	
Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.92 (0.015 to 0.030 lb a)	30-day waiting period for harvest, do not graze. Check label, rates vary with caterpillar	
<p>Grasshoppers 1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.</p>	Asana XL [3] (esfenvalerate)	3.9 to 9.6 fl oz (0.02 to 0.05 lb ai/A)	Rate depends on grasshopper growth stage. 21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	2.0 to 2.8 fl oz (0.016 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing

<p>Damage: Chew leaves, leaving ragged edges or completely chew leaves.</p> <p>Threshold: Threshold based growth stage of plant, level of defoliation, and presence of grasshoppers.</p>	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30-day waiting period for harvest, do not graze
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-days for feeding of dry vines, 18 days for green vines
	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai/A)	21-day waiting period for harvest, do not graze
	Dimate 4E (dimethoate)	1 pt (0.5 lb ai/A)	21-day waiting period for harvest
	Dimilin 2L (diflubenzuron)	2 fl oz (0.03125 lb ai/A)	21-day waiting period for harvest Apply when grasshoppers are 2nd and 3rd instars, see label for additional information
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	4.0 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.022 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	2.6 to 6.1 fl oz	21-day waiting period for harvest, do not graze
	Leverage 360 [4A,3] (Imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage
	Mustang MAXX EC [3] (zeta-cypermethrin)	3.2 to 4 fl oz (0.02 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Orthene 97 [1B] (acephate)	4 to 8 oz (0.25 to 0.5 lb ai/A)	14-day waiting period for harvest, do not graze or cut for hay
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	3.2 to 3.84 fl oz (0.0125 to 0.015 lb ai/A)	45-day waiting period for harvest, do not graze
	Tempest [3,4A] (bifenthrin + imidacloprid)	3.8 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.
	Tombstone [3] (cyfluthrin)	2.0 to 2.8 fl oz (0.031 to 0.044 lb ai/A)	45-day waiting period for harvest, Check label, rates vary based on growth stage of soybean.
	Vantacor [28] (chlorantraniliprole)	0.7 to 1.7 fl oz (0.026 to 0.065 lb ai/A)	1 day waiting period for harvest
Warrior II w Zeon [3] (lambda-cyhalothrin)	1.60 to 1.96 fl oz (0.025 to 0.03 lb ai/A)	30-day waiting period for harvest do not graze	
Japanese Beetle			
<p>Adults are 1/2 inch-long, metallic green and bronze beetles with a row of 5 white tufts on the side of the body below the bronze wing covers and 2 white patches at the tip of the abdomen.</p> <p>Damage Adult beetles feed on foliage, causing skeletonization of leaves. They typically feed on upper canopy.</p> <p>Threshold: Seedlings: 10-15% stand loss</p> <p>Growth stage and % Defoliation Before bloom: 35% Bloom to pod fill: 15-20% Full pod fill to maturity: 35-40%</p> <p>Estimate defoliation by examining upper, middle and lower</p>	Acenthrin [1B,3] (acephate + bifenthrin)	8 to 21 oz	14-day waiting period for harvest; do not graze or cut for hay or forage
	Baythroid XL [3] (beta-cyfluthrin)	.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing
	Brigade [3] bifenthrin	2.1 to 6.4 fl oz (0.08 to 0.10 lb ai/A)	14-day waiting period for harvest, do not graze
	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30-day waiting period for harvest, do not graze
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-days for feeding of dry vines, 18 days for green vines
	Endigo ZC [4A, 3] (lambda-cyhalothrin + thiamethoxam)	4.0 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage
	Fastac EC [3] (alpha-cypermethrin)	.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze
	Justice [3,4A] (acetamiprid+ bifenthrin)	3.0 to 5.0 fl oz	30-day waiting period for harvest, do not graze

leaves. Japanese beetles tend to feed only on the upper leaf canopy, and it is easy to overestimate the amount of defoliation that they are causing.	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	3.20 to 3.84 fl oz (0.0125 to 0.015 lb ai/A)	30-day waiting period for harvest, do not graze
	Sevin XLR [1A] (carbaryl)	0.5 to 1.0 qt (0.5 to 1.0 lb ai)	14-day waiting period for grazing, 21-days for harvest. Do not apply with 2,4DB in tank mix.
	Sherpa [4A] (imidacloprid)	3.75 fl oz (0.047 lb ai/A)	7-day waiting period for harvest.
	Tempest [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 to 0.044 lb ai/A)	45-day waiting period for harvest, 15 days for forage. Check label, rates vary based on growth stage of soybean
	Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.92 (0.015 to 0.030 lb a)	30-day waiting period for harvest do not graze
Spidermites			
1/100 inches, greenish to dull orange, two large "spots" on each side of body. Produce eggs and webbing. Damage: Mites feed on underside of leaves. Feeding causes small white spots to occur on leaves called "stippling." Leaves eventually turn yellow, bronzed and brown before dropping from plant. Threshold: Treat if significant pod or seed filling has not occurred, and leaves are not yellow, but mites are present. Control is difficult; consider using drop nozzles, high water gallonage.	Agri-Mek SC [6] (abamectin)	1.75 to 3.5 fl oz (0.096 to 0.19 lb ai/A)	7-day wait for forage or hay, 28 days for harvest.
	Dimate 4E [1B] (dimethoate)	1 pt (0.5 lb ai/A)	21-day waiting period for harvest
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	10.3 fl oz	21-day waiting period for harvest, do not graze

Management of Insect and Mite Posts in Soybeans III: Pod Feeders

Pod feeders cause the greatest loss to soybean because plants cannot compensate readily, and they directly damage the seeds. Control of corn earworms is suggested if you find

two or more per row-foot. Control of stink bugs is suggested when one or more per row-foot is found.

Pest, Damage and Treatment Threshold	Insecticide, Formulation, (Moa* Group)	Rate of Product per Acre (rate 1b ai/acre)	Comments
<p>Corn Earworm Up to 1 inch. Color varies from green, to brown to yellow and pink.</p> <p>Damage: Larva consumes foliage, flowers and pods.</p> <p>Threshold: Treat when 2 or more caterpillars are found per row-foot.</p>	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period for harvest, do not graze.
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing.
	Blackhawk [5] (spinosad)	1.7 to 2.2 fl oz (0.047 to 0.062 lb ai/A)	28-day waiting period for harvest, do not graze or feed for forage
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45-days for feeding of dry vines, 18 days for green vines
	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai/A)	21-day waiting period for harvest, do not graze.
	Endigo ZC [4A, 3] (lambda-cyhalothrin + thiamethoxam)	3.5 to 4.0 fl oz	30-day waiting period for harvest, do not graze or feed for forage.
	Fastac EC [3] (alpha cypermethrin)	2.8 to 3.8 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Hero [3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze.
	Justice [3,4A] (acetamiprid+ bifenthrin)	2.5 to 3.0 fl oz	30-day waiting period for harvest, do not graze
	Larvin EC [1A] (thiodicarb)	10 to 30 fl oz (0.25 to 0.75 lb ai/A)	28-day waiting period for harvest, do not graze or feed for forage
	Leverage 360 [4A, 3] (imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage.
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze.
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.20 fl oz (0.0075 to 0.0125 lb ai/A)	30-day waiting period for harvest, do not graze
	Tempest [3, 4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	21-day waiting period for harvest, 18 days for green vines, 45-days for dry vines.
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 to 0.044 lb ai/A)	45-day waiting period for harvest, 15 days for forage.
Vantacor [28] (chlorantraniliprole)	1.2 to 2.5 fl oz/A (0.045 to 0.098 lb ai/A)	1-day waiting period for harvest.	
Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai/A)	30-day waiting period for harvest do not graze	
<p>Stink Bugs Shield shaped bugs ranging from ½ to ¾ inch long. May be green or brown. Nymphs are colorful.</p>	Acenithrin [1B,3] (acephate + bifenthrin)	12 to 21 oz	14-day waiting period for harvest; do not graze or cut for hay or forage
	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb)	21-day waiting period for harvest, do not graze
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing forage

<p>Damage: Nymphs and adults suck sap from bean pods and cause discoloration of seed from digestive juices.</p> <p>Threshold: Treat when one or more stinkbugs per row-foot are found.</p>	Belay [4A] (clothianidin)	3 to 6 fl oz (0.05 to 0.1 lb ai/A)	21-day waiting period for harvest, do not graze
	Brigade (bifenthrin)	2.6 to 6.4 fl oz (0.04 to 0.10 lb ai/A)	30-day waiting period for harvest, do not graze
	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai/A)	21-day waiting period for harvest, do not graze
	Endigo ZC [4A,3] (lambda-cyhalothrin + thiamethoxam)	4.0 to 4.5 fl oz	30-day waiting period for harvest, do not graze or feed for forage.
	Fastac EC [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.022 to 0.025 lb ai/A)	21-day waiting period for harvest, to not graze
	Hero [3,3] (bifenthrin+zeta-cypermethrin)	4.0 to 10.3 fl oz	21-day waiting period for harvest, do not graze
	Justice [3,4A] (acetamiprid+ bifenthrin)	5.0 fl oz	30-day waiting period for harvest, do not graze
	Leverage 360 [4A, 3] (Imidacloprid + cyfluthrin)	2.8 fl oz	21-day waiting period for harvest, 15 days for forage
	Mustang MAXX EC [3] (zeta-cypermethrin)	3.2 to 4 fl oz (0.02 to 0.025 lb ai/A)	21-day waiting period for harvest, do not graze
	Orthene 97 [1B] (acephate)	8 to 16 oz (0.5 to 1.0 lb ai/A)	14-day waiting period for harvest, do not graze or cut for hay
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	3.20 to 3.84 fl oz (0.0125 to 1.5 lb ai/A)	30-day waiting period for harvest, do not graze
	Sevin XLR [1A] (carbaryl)	1 to 1.5 qt (1.0 to 1.5 lb ai/A)	14-day waiting period for grazing, 21-days for harvest
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 to 0.044 lb ai/A)	45-day waiting period for harvest, 15 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.60 to 1.92 fl oz (0.025 to 0.030 lb ai/A)	30-day waiting period for harvest do not graze

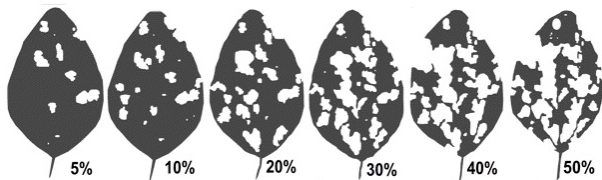


Figure 1: Levels of soybean defoliation. Check growth state to determine defoliation impact on yield.

Pre-Harvest Intervals

Agri-Mek	7-day PHI forage or hay, 28 days for harvest
Asana XL	21-day PHI, do not feed or graze
Baythroid 2,XL	21-day PHI, 15 days for grazing
Besiege	30-day waiting period for harvest, do not graze
Brigade	14-day PHI, do not graze
Brigadier	45-day PHI, 14-days for green vines
Delta Gold	21-day PHI, do not graze
Diamond	30-day PHI, do not graze
Dimate	21-day PHI
Dimilin	21-day PHI
Endigo	30-day PHI, do not graze
Fastac EC	21-day PHI, do not graze
Hero	21-day PHI, do not graze
Justice	30-day waiting period for harvest, do not graze
Larvin	28-day PHI, do not graze
Leverage	28-day PHI, do not graze
Mustangr MAX EC	21-day PHI, do not feed or graze
Orthene	14-day PHI, do not graze or cut for hay
Proaxis	45-day PHI, do not graze
Radiant	28-day PHI
Sevin XLR	14-day PHI for grazing, 21-day PHI for harvest
Sherpa	7-day PHI for harvest.
Sivanto	7-day PHI for grazing, 21-day PHI for harvest
Steward	21-day PHI, do not graze
Tempest	21-day PHI, 18 days for green vines, 45-days for dry vines
Tombstone	45-day PHI, 15 days for forage
Tracer	28-day PHI, do not graze
Vantacor	1-day PHI
Warrior II	30-day PHI, do not graze

* MOA group numbers in brackets [#] following the insecticide name are used to designate the mode of action of the insecticide according to the classification system developed by the Insecticide Resistance Action Committee (IRAC) in 2011. It is intended to help in the selection of insecticides for preventative resistance management. If you make multiple applications for a specific pest during a growing season, simply select a registered insecticide with a different number for each application. To further delay resistance from developing, integrate other control methods into your pest management programs.

**The pesticide information presented in this publication was current with federal and state regulations at the time of revision. READ and FOLLOW all LABEL directions.*

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