



Current Report

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Management of Insect and Mite Pests in Soybean

Tom A. Royer
Extension Entomologist

Soybean pests, if not controlled when thresholds are exceeded, will reduce yield and quality of seed and oil. Yet soybeans have few serious insect pests compared to other cultivated crops. There are, however, many non-pest and beneficial insects that are found in soybean fields. Pesticides should not be used as a substitute for good agronomic practices or 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 developing 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. This method is often referred to as the drop cloth method and is particularly useful if beans planted in 30-40 inch rows. This method should be conducted weekly after the plants reach 12 inches. The equipment needed for this method consists of a piece of white or off-white cloth measuring 24" x 42". Each end of the cloth is stapled to a thin strip of wood, approximately 1/2" 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 1.5 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. A standard 15-inch diameter sweep net is used to make 10 consecutive sweeps (180 degrees) while walking through the field. The net is swung from side to side with each step. After 10 successive sweeps, the insects should be identified and counted as

they are removed from the net. Repeat this procedure 5 times for a total of 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 is tricky and requires 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 Extension publications for additional information:

- EPP 7156 Field Key to Larvae in Soybeans
- EPP-7660 Common Soybean Diseases in Oklahoma Part I. Seedling, Root and Nematode Diseases
- EPP-7662 Common Soybean Diseases in Oklahoma Part II. Foliar, Pod and Stem Diseases
- EPP-7084 Pest Management Needs Assessment for Oklahoma Soybean Producers
- EPP-7196 Grasshopper Management in Rangeland, Pastures, and Crops

Management of Insect and Mite Pests in Soybeans I: Stem and Seedling Feeders

For the most part, these insects are not a problem if the grower gets a good stand of beans. Stem and seedling feeders will 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 usually compensate if there are at least four plants per row-foot.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
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.	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)	21 day waiting period for harvest, 15 days for grazing.
<u>Damage:</u> Adults and nymphs feed on stems. May girdle stems at, or above soil level, causing lodging when the plants get larger.	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45 days for feeding of dry vines, 18 days for green vines.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	30 day waiting period for harvest, do not graze.
<u>Threshold:</u> Scout fields at seedling emergence. Threshold is 10% to 15% of stems are girdled, and nymphs are still present.	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai)	21 day waiting period for harvest, do not graze.
	Dimate 4E (dimethoate)	1 pt (0.5 lb ai)	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, 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)	3.0 to 5.0 fl oz	30 day waiting period for harvest, do not graze.
	Karate w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai)	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)	21 day waiting period for harvest, do not graze.
	Orthene 97 [1B] (acephate)	0.75 to 1.0 lb (0.75 to 1.0 lb ai)	14 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)	45 day waiting period for harvest, do not graze.	
	Sevin XLR (carbaryl)	1 qt (1.0 lb ai)	14 day waiting period for grazing, 21 days for harvest.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Three-cornered Alfalfa Hopper (cont'd)			
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	9.25 to 11.75 fl oz	28 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.
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.	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	26 to 38 oz	30 day waiting period for harvest, do not graze. Check label. Can be applied as a pre-plant or post plant foliar spray, rates vary with application.
	Endigo ZC [4A, 3] (lambda-cyhalothrin + thiamethoxam)	4.5 fl oz	30 day waiting period for harvest, do not graze or feed for forage.
<u>Damage:</u> Caterpillars girdle stems and roots.	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.
<u>Threshold:</u> This pest is difficult to control. Treat if more than 4 plants per row-foot have been killed.	Hero [3,3] (bifenthrin+ zeta-cypermethrin)	4.0 to 10.3 fl oz	21 day waiting period for harvest, do not graze.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pts (0.5 to 1.0 lb ai)	A second application in 5 days may be necessary for satisfactory control.

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

The economic thresholds for foliage-feeding pests are considered as a group. Base thresholds on percent leaf loss estimates along with 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.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Aphids*			
Small, soft bodied insects, green or yellow.	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)	21 day waiting period for harvest, 15 days for grazing.
<u>Damage:</u> Suck plant juices, cause yellowing of leaves, produce honeydew and associated sooty mold.	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30 day waiting period for harvest, do not graze.
<u>Threshold:</u> None established. Most aphids not a problem.	Bifenture [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai)	18 day waiting for harvest. (other names: Fanfare, Sniper, Tailgunner, Tundra).
*So far, soybean aphid does not occur in damaging numbers in Oklahoma.	Brigadier [3,4A] (bifenthrin + imidacloprid)	3.8 to 6.1 fl oz	45 days for feeding of dry vines, 18 days for green vines.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	30 day waiting period for harvest, do not graze.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Aphids* (cont'd)			
	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai)	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.
	Justice [4A, 3] (acetamiprid+ bifenthrin)	2.5 to 3.0 fl oz	30 day waiting period for harvest, do not graze.
	Karate w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai)	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.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pts (1.0 lb a)	28 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)	21 day waiting period for harvest, do not graze.
	Orthene 97 [1B] (acephate)	0.75 to 1.0 lbs (0.75 to 1.0 lb ai)	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)	45 day waiting period for harvest, do not graze.
	Sherpa [4A] (imidicloprid)	3.75 fl oz (0.046 lb ai/A)	7 day waiting period for harvest, do not graze.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	28 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.
	Transform WG [4C] (sulfoxaflor)	0.75 to 1.0 oz (0.023 to 0.031 lb ai)	7 day waiting period.
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.	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 days for grazing.
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30 day waiting period for harvest, do not graze.
<u>Damage:</u> Feed on leaves and pods.	Bifenture [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.10 lb ai)	18 day waiting for harvest. (other names: Fanfare, Sniper, Tailgunner, Tundra).
<u>Threshold:</u> Threshold based on growth	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45 days for feeding of dry vines, 18 days for green vines.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Bean Leaf Beetle (cont'd)			
stage of plant, level of defoliation, and presence of beetles. For pod-feeding, treat when 10% pods damaged and beetles present.	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	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)	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.
	Karate 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.
	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.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pts (0.5 to 1.0 lb ai)	28 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)	21 day waiting period for harvest, do not graze.
	Orthene 97 [1B] (acephate)	0.75-1.0 lbs (0.75 to 1.0 lb ai)	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)	45 day waiting period for harvest, do not graze.
	Sevin XLR (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.
Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	28 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)	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.	
Blister Beetle			
Various colors, black, grey striped with broad head, narrow neck. <u>Damage:</u> Leaf feeders, often localized, attracted to flowering plants.	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai)	21 day waiting period for harvest, 15 days for grazing.
	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30 day waiting period for harvest, do not graze.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Blister Beetle (cont'd)			
Threshold: Threshold based on growth stage of plant, level of defoliation, and presence of beetles.	Brigade[3] (bifenthrin)	2.1 to 6.4 fl oz (0.08-0.10 lb ai)	14 day waiting period for harvest, do not graze.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	30 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.
	Karate 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.
	Mustang Maxx EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai)	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)	45 day waiting period for harvest, do not graze.
	Sevin XLR (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.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	28 day waiting period for harvest, do not graze.
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 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.
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.	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. <u>Check label, rates vary with caterpillar.</u>
	Baythroid XL [3] (beta-cyfluthrin)	0.8 to 2.8 fl oz (0.007 to 0.022 lb ai)	21 day waiting period for harvest, 15 days for grazing. <u>Check label, rates vary with caterpillar.</u>
	Belt SC [28] (flubendiamide)	2.0 to 3.0 fl oz (0.063 to 0.094 lb ai)	3 day waiting period for forage, 14 days for harvest.
<u>Fall Armyworm</u> Large, striped, non-bristled caterpillar up to 1.5 inches. Has a light-colored inverted "Y" on head.	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30 day waiting period for harvest, do not graze.
<u>Garden Webworm</u> Larvae are green with black spots on each body segment, up to 1 inch. Produce webbing that they use to attach leaves together.	Brigade[3] (bifenthrin)	2.8-6.4 fl oz (0.04 to 0.10 lb ai)	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.
<u>Green Cloverworm</u> Green with white stripe	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	7 to 38 fl oz	30 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
Foliage Feeding Caterpillars: (cont'd) along each side, 3 pair of abdominal prolegs + 1 pair of anal prolegs. 1 inch when full grown.	Delta Gold [3] (deltamethrin)	1.0 to 2.4 fl oz (0.012 to 0.028 lb ai)	21 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
	Diamond 0.8 EC [15] (novaluron)	6 to 12 fl oz	30 day waiting period for harvest, do not graze <u>Check label, rates vary with caterpillar.</u>

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Foliage Feeding Caterpillars: (cont'd)			
<u>Loopers</u>			
Green, with two pair of abdominal prolegs, one pair of anal prolegs and light, longitudinal stripe.	Dimilin 2L [15] (diflubenzuron)	2 to 4 fl oz (0.031 to 0.063 lb ai)	21 day waiting period for harvest. <u>Check label, rates vary with caterpillar.</u> Suppression only for soybean looper, not registered for garden webworm.
<u>Velvetbean Caterpillar</u> Green or brown, with light narrow lines, 4 pair of abdominal prolegs. Wiggle violently when disturbed.	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. <u>Check label, rates vary with caterpillar.</u>
	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.
<u>Damage:</u> Caterpillars feed on foliage.	Hero[3,3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	21 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
<u>Threshold:</u> Threshold based on growth stage of plant, level of defoliation, and presence of caterpillars.	Intrepid 2F [18] (methoxyfenozide)	4.0 to 8.0 fl oz (0.06 to 0.12 lb ai)	7 day waiting period for forage, 14 days for harvest. Not registered for garden webworm.
	Justice [3,4A] (acetamiprid+ bifenthrin)	3.0 to 5.0 fl oz	30 day PHI, suppression only for resistant soybean loopers.
	Karate 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. <u>Check label, rates vary with caterpillar.</u>
	Larvin EC [1A] (thiodicarb)	10 to 30 fl oz (0.25 to 0.75 lb ai)	28 day waiting period for harvest, do not graze or feed for forage <u>Check label, rates vary with caterpillar.</u>
	Leverage 360 [4A, 3] (imidacloprid + cyfluthrin)	2.8 fl oz	21 day waiting period for harvest, 15 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	0.5 to 2 pts (0.375 to 1.0 lb a)	28 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u> Not registered for garden webworm.
	Mustang Maxx EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai)	21 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
	Prevathon [28] (chlorantraniliprole)	14 to 20 fl oz (0.047 to 0.067 lbi ai)	One day PHI; Registered for corn earworm, beet armyworm and fall armyworm.
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)	45 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
	Radiant (spintoram)	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.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	3.75 to 11.75 fl oz	28 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
	Steward (indoxacarb)	4.6 to 11.3 fl oz (0.045 to 0.11 lb ai/A)	21 day wating period for harvest, do not graze <u>Check label, rates vary with caterpillar.</u>
	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)	45 day waiting period for harvest, 15 days for forage. <u>Check label, rates vary with caterpillar.</u>
	Tracer [5] (spinosad)	1 to 2 fl oz (0.031 to 0.062 lb ai)	28 day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Grasshoppers 1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.	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)	21 day waiting period for harvest, 15 days for grazing.
<u>Damage:</u> Chew leaves, leaving ragged edges or completely chew leaves.	Besiege [3, 28] (lambda-cyhalothrin + chlorantraniliprole)	8.0 to 10.0 fl oz	30 day waiting period for harvest, do not graze.
<u>Threshold:</u> Threshold based on growth stage of plant, level of defoliation, and presence of grasshoppers.	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45 days for feeding of dry vines, 18 days for green vines.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	7 to 13 fl oz	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)	21 day waiting period for harvest, do not graze.
	Dimate 4E (dimethoate)	1 pt (0.5 lb ai)	21 day waiting period for harvest.
	Dimilin 2L (diflubenzuron)	2 fl oz (0.03125 lb ai)	21 day waiting period for harvest. Apply when grasshoppers are 2 nd and 3 rd 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.
	Karate w Zeon [3] (lambda-cyhalothrin)	1.60 to 1.96 fl oz (0.025 to 0.03 lb ai)	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.
	Lorsban 4E [1B] (chlorpyrifos)	0.5 to 1.0 pt (0.375 to 0.5 lb ai)	28 day waiting period for harvest, do not graze.
	Mustang Maxx EC [3] (zeta-cypermethrin)	3.2 to 4 fl oz (0.02 to 0.025 lb ai)	21 day waiting period for harvest, do not graze.
	Orthene 97 [1B] (acephate)	0.25 to 0.5 lbs (0.25 to 0.5 lb ai)	14 day waiting period for harvest, do not graze.
	Prevathon [28] (chlorantraniliprole)	8 to 20 fl oz (0.027 to 0.067 lbi ai)	1 day waiting period for harvest.
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	3.2 to 3.84 fl oz (0.0125 to 0.015 lb ai)	45 day waiting period for harvest, do not graze.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	28 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)	45 day waiting period for harvest, Check label, rates vary based on growth stage of soybean.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Japanese Beetle			
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.	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai)	21 day waiting period for harvest, 15 days for grazing.
	Brigade[3] bifenthrin	2.1 to 6.4 fl oz (0.08-0.10 lb ai)	14 day waiting period for harvest, do not graze.
<u>Damage</u>	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.
<u>Threshold:</u> Seedlings: 10-15% stand loss	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	30 day waiting period for harvest, do not graze.
<u>Growth stage and % Defoliation</u> Before bloom: 35% Bloom to pod fill: 15-20% Full pod fill to maturity: 35-40%	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.
Estimate defoliation by examining upper, middle and lower 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.	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.
	Justice [3,4A] (acetamiprid+ bifenthrin)	3.0 to 5.0 fl oz	30 day waiting period for harvest, do not graze.
	Karate 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.
	Mustang Maxx EC [3] (zeta-cypermethrin)	2.8 to 4 fl oz (0.018 to 0.025 lb ai)	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)	30 day waiting period for harvest, do not graze.
	Sevin XLR (0.5 to 1.0 lb ai)	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.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	28 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)	45 day waiting period for harvest, 15 days for forage. Check label, rates vary based on growth stage of soybean.
Spidermites			
1/100 inches, greenish to dull orange, two large "spots" on each side of body. Produce eggs and webbing.	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	30 day waiting period for harvest, do not graze.
	Dimate 4E (dimethoate)	1 pt (0.5 lb ai)	21 day waiting period for harvest.
<u>Damage:</u> Mites feed on underside of leaves. Feeding causes small white spots to occur on	Hero[3,3] (zeta-cypermethrin + bifenthrin)	10.3 fl oz	21 day waiting period for harvest, do not graze.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Spidermites (cont'd) leaves called "stippling." Leaves eventually turn yellow, bronzed and brown before dropping from plant.	Lorsban 4E [1B] (chlorpyrifos)	0.5 to 1.0 pt (0.375 to 0.5 lb ai)	28 day waiting period for harvest, do not graze.
<u>Threshold:</u> 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.			

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

Pod feeders cause the greatest loss to soybean because plants cannot compensate readily, and the damage is direct to 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.

Corn Earworm Up to 1 inch. Color varies from green, to brown to yellow and pink.	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai)	21 day waiting period for harvest, do not graze.
<u>Damage:</u> Larva consumes foliage, flowers and pods.	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai)	21 day waiting period for harvest, 15 days for grazing.
<u>Threshold:</u> Treat when 2 or more caterpillars are found per row-foot.	Belt SC [28] (flubendiamide)	2.0 to 3.0 fl oz (0.063 to 0.094 lb ai)	3 day waiting period for forage, 14 days for harvest.
	Brigadier [3,4A] (bifenthrin + imidacloprid)	5.1 to 6.1 fl oz	45 days for feeding of dry vines, 18 days for green vines.
	Cobalt [1B,3] (chlorpyrifos + gamma cyhalothrin)	19 to 38 fl oz	30 day waiting period for harvest, do not graze.
	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai)	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.
	Karate w Zeon [3] (lambda cyhalothrin)	0.96 to 1.60 (0.015 to 0.025 lb ai)	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)	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.
	Lorsban 4E [1B] (chlorpyrifos)	1.0 to 2 pts (0.50 to 1.0 lb a)	28 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)	21 day waiting period for harvest, do not graze.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Corn Earworm (cont'd)			
	Prevathon [28] (chlorantraniliprole)	14 to 20 fl oz (0.047 to 0.067 lb ai)	One day PHI; Registered for corn earworm, beet armyworm and fall armyworm.
	Proaxis 0.5 CS [3] (gamma-cyhalothrin)	1.92 to 3.20 fl oz (0.0075 to 0.0125 lb ai)	30 day waiting period for harvest, do not graze.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	9.25 to 11.75 fl oz	28 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)	45 day waiting period for harvest, 15 days for forage.
	Tracer [5] (spinosad)	1.5 to 2.0 fl oz (0.047 to 0.062 lb ai)	28 day waiting period for harvest, do not graze.
Stink Bugs			
Shield shaped bugs ranging from ½ inch to ¾ inch long. May be green or brown. Nymphs are colorful.	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)	21 day waiting period for harvest, 15 days for grazing.
<u>Damage:</u> Nymphs and adults suck sap from bean pods and cause discoloration of seed from digestive juices.	Brigade (bifenthrin)	2.6 to 6.4 fl oz (0.04 to 0.10 lb ai)	30 day waiting period for harvest, do not graze.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	30 day waiting period for harvest, do not graze.
<u>Threshold:</u> Treat when one or more stinkbugs per row-foot are found.	Delta Gold [3] (deltamethrin)	1.5 to 2.4 fl oz (0.018 to 0.028 lb ai)	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.
	Karate w Zeon [3] (lambda-cyhalothrin)	1.60 to 1.92 fl oz (0.025 to 0.030 lb ai)	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)	21 day waiting period for harvest, do not graze.
	Orthene 97 [1B] (acephate)	0.5 to 1.0 lb (0.5 to 1.0 lb ai)	14 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 1.5 lb ai)	30 day waiting period for harvest, do not graze.

<i>Pest, Damage, and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] & (Active Ingredient)</i>	<i>Rate of Product per Acre (rate lb ai/Acre)</i>	<i>Comments</i>
Stink Bugs (cont'd)	Sevin XLR	1 to 1.5 qt (1.0 to 1.5 lb ai)	14 day waiting period for grazing, 21 days for harvest.
	Stallion [1B, 3] (chlorpyrifos + zeta-cypermethrin)	9.25 to 11.75 fl oz	28 day waiting period for harvest, do not graze.
	Tombstone [3] (cyfluthrin)	1.6 to 2.8 fl oz (0.025 to 0.044 lb ai)	45 day waiting period for harvest, 15 days for forage.
	Transform WG [4C] (sulfoxaflor)	2.0 to 2.5 oz/acre (0.063 to 0.071 lb ai)	Suppression only; 7 day PHI.

Pre-harvest Intervals

Asanar XL	21 day PHI, do not feed or graze.
Baythroid 2, XL	21 day PHI, 15 days for grazing.
Belt	3 day PHI, 14 days for harvest.
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.
Cobalt	30 day PHI, do not graze.
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.
Karate	30 day PHI, do not graze.
Larvin	28 day PHI, do not graze.
Leverage	21 day PHI, 15 days for forage.
Lorsban 4E	28 day PHI, do not feed or graze.
Mustang MAX EC	21 day PHI, do not feed or graze.
Orthene	14 day PHI, do not graze.
Prevathon	1 day PHI.
Proaxis	45 day PHI, do not graze.
Radiant	28 day PHI.
Sevin XLR	14 day PHI for grazing, 21 days for harvest.
Sherpa	7 day PHI for harvest.
Stallion	28 day PHI, do not graze.
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.
Transform	7 day PHI.

* 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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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of \$1.00 per copy. Revised 0715 GH.