



Current Report

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Management of Insect and Mite Pests in Soybean

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Soybean pests, if not controlled 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. There are many non-pest and beneficial insects 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 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. This method is often referred to as the drop cloth method and is particularly useful if beans planted in 30- to 40-inch rows. This method should be conducted weekly after the plants reach 12 inches tall. The equipment needed for this method consists of a piece of white or off-white cloth measuring 24 inches x 42 inches. Each end of the cloth is stapled to a thin strip of wood, approximately 1/2 inch to 1 inch wide and 24 inches 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. Swing the net 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 five 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 Extension 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 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>
Threecornered Alfalfa Hopper Adult is bright green, triangular and ¼ inch. Nymph buff colored or green with 12 pair of spines on top of body.	Acephate [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.
<u>Damage:</u> Adults and nymphs feed on stems. May girdle stems at, or above soil level, causing lodging when the plants get larger.	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.
<u>Threshold:</u> Scout fields at seedling emergence. Threshold is 10 to 15% of stems are girdled, and nymphs are still present.	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.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	30-day waiting period for harvest, do not graze.
	Concero [5,3] (spinosad + gamma cyhalothrin)	A 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, 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/A)	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.	

<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>
Threecornered 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.
	Concero [5,3] (spinosad + gamma-cyhalothrin)	A 1-gallon container will treat from 32 to 42 acres	45-day wait for harvest, do not graze.
<u>Damage:</u> Caterpillars girdle stems and roots.	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>Threshold:</u> This pest is difficult to control. Treat if more than four plants per row-foot have been killed	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 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)	A second application in five 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 one week before bloom. During bloom and pod fill, the threshold falls to 15-20% defoliation, and then increases to 35 to 40% defoliation once pods have filled.

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/A)	21-day waiting period for harvest, 15 days for grazing.
<u>Damage:</u> Suck plant juices, cause yellowing of leaves, produces honeydew and associated sooty mold.	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.
<u>Threshold:</u> None established. Most aphids not a problem.	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 8.0 fl oz	30-day waiting period for harvest, do not graze.
*So far, soybean aphid does not occur in damaging numbers in Oklahoma.	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.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 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/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.

<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)	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.
	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)	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/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.
	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.
Bean Leaf Beetle Beetles measure ¼ inches, yellow-crimson wing covers with four black spots and a black triangle just behind thorax. Some may not have spots, but all have triangle marking Damage: Feed on leaves and pods. 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.	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.
	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.
	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.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	30-day waiting period for harvest, do not graze.
	Concerto [5,3] (spinosad + gamma cyhalothrin)	A 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.

<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) (lambda-cyhalothrin + thiamethoxam)	Endigo ZC [4A,3]	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/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/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.
	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. <u>Threshold:</u> Threshold based on growth stage of plant, level of defoliation, and presence of beetles.	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.
	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.

<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)	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/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.
	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/A)	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.	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)	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 1.07 to 0.022 lb ai/A)	21-day waiting period for harvest, 15 days for grazing. <u>Check label, rates vary with caterpillar.</u>
Fall Armyworm Large, striped, non-bristled caterpillar up to 1.5 inches. Has a light-colored inverted "Y" on head	Besiege [3,28] (lambda-cyhalothrin + chlorantraniliprole)	5.0 to 10.0 fl oz	30-day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar in question.</u>
	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. <u>Check label, rates vary with caterpillar in question.</u>
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.	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.
	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>
Green Cloverworm Green with white stripe along each side, three pair of abdominal prolegs + one pair of anal prolegs. 1 inch when full grown.	Concero [5,3] (spinosad + gamma cyhalothrin)	A 1-gallon container will treat from 42 to 64 acres	45-day wait for harvest, do not graze.
	Coragen [28] (chlorantraniliprole)	3.5 to 7.5 fl oz (0.045 to 0.098 lb ai/A)	1-day wait for harvest.
Loopers Green, with two pair of abdominal prolegs, one pair of anal prolegs and light, longitudinal stripe.	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. <u>Check label, rates vary with caterpillar.</u>
	Velvetbean Caterpillar Green or brown, with light narrow lines, four pair of abdominal prolegs. Wiggle violently when disturbed.	Diamond 0.8 EC [15] (novaluron)	6 to 12 fl oz
Dimilin 2L [15] (diflubenzuron)		2 to 4 fl oz (0.031 to 0.063 lb ai/A)	21-day waiting period for harvest. <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)			Suppression only for soybean looper, not registered for garden webworm.
<u>Damage:</u> Caterpillars feed on foliage.			
<u>Threshold:</u> Threshold based on growth stage of plant, level of defoliation, and presence of caterpillars.	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.
	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>
	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.
	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/A)	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/A)	21-day waiting period for harvest, do not graze. <u>Check label, rates vary with caterpillar.</u>
	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. <u>Check label, rates vary with caterpillar</u>
	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.
	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 [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 <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/A)	45-day waiting period for harvest, 15 days for forage. <u>Check label, rates vary with caterpillar.</u>
Grasshoppers 1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.	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.
<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.

<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 (cont'd) Threshold: 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.
	Coragen [28] (chlorantraniliprole)	2.0 to 5.0 fl oz (0.026 to 0.065 lb ai/A)	1-day waiting period for harvest.
	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 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/A)	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/A)	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/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.
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/A)	45-day waiting period for harvest, Check label, rates vary based on growth stage of soybean.	
Japanese Beetle Adults are 1/2 inch-long, metallic green and bronze beetles with a row of five white tufts on the side of the body below the bronze wing covers and two white patches at the tip of the abdomen.	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)	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.
	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.

<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 (cont'd) <u>Damage</u> Adult beetles feed on foliage, causing skeletonization of leaves. They typically feed on upper canopy.	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 to 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 to 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 <u>it is easy to overestimate</u> 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/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.
	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/A)	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. <u>Damage:</u> 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.	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.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	30-day waiting period for harvest, do not graze.
	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.

<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) <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.	Lorsban 4E [1B] (chlorpyrifos)	0.5 to 1.0 pt (0.375 to 0.5 lb ai/A)	28-day waiting period for harvest, do not graze.

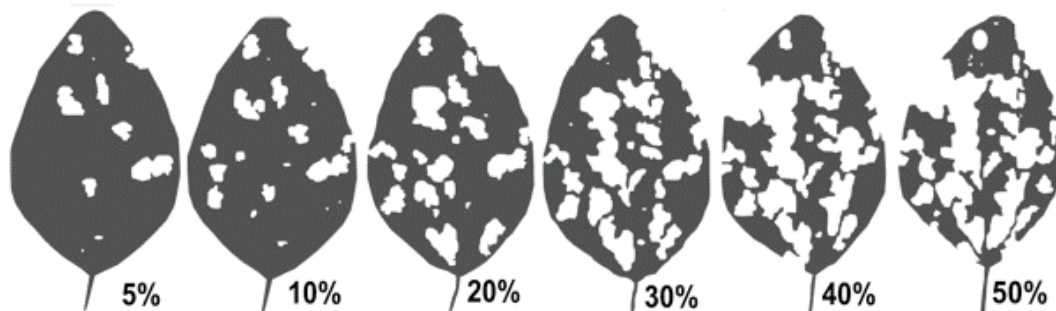
Management of Insect and Mite Pests in Soybeans III: Pod Feeders

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. <u>Damage:</u> Larva consumes foliage, flowers and pods. <u>Threshold:</u> Treat when two or more caterpillars are found per row-foot.	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.
	Cobalt [1B,3] (chlorpyrifos + gamma cyhalothrin)	19 to 38 fl oz	30-day waiting period for harvest, do not graze.
	Coragen [28] (chlorantraniliprole)	3.75 to 7.5 fl oz/A (0.045 to 0.098 lb ai/A)	1-day waiting period for harvest.
	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.
	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.
	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.
	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/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.

<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)	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/A)	45-day waiting period for harvest, 15 days for forage.
Stink Bugs Shield shaped bugs ranging from ½ to ¾ inch long. May be green or brown. Nymphs are colorful.	Acentrin [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.
<u>Damage:</u> Nymphs and adults suck sap from bean pods and cause discoloration of seed from digestive juices.	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.
	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.
<u>Threshold:</u> Treat when one or more stinkbugs per row-foot are found.	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.
	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/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.
	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.
	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.
	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/A)	45-day waiting period for harvest, 15 days for forage.

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
Cobalt [®]	30-day PHI, do not graze.
Coragen	1-day PHI
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 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
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.

* 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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