Soybean INSECT MANAGEMENT 2017

K-STATE Research and Extension
Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

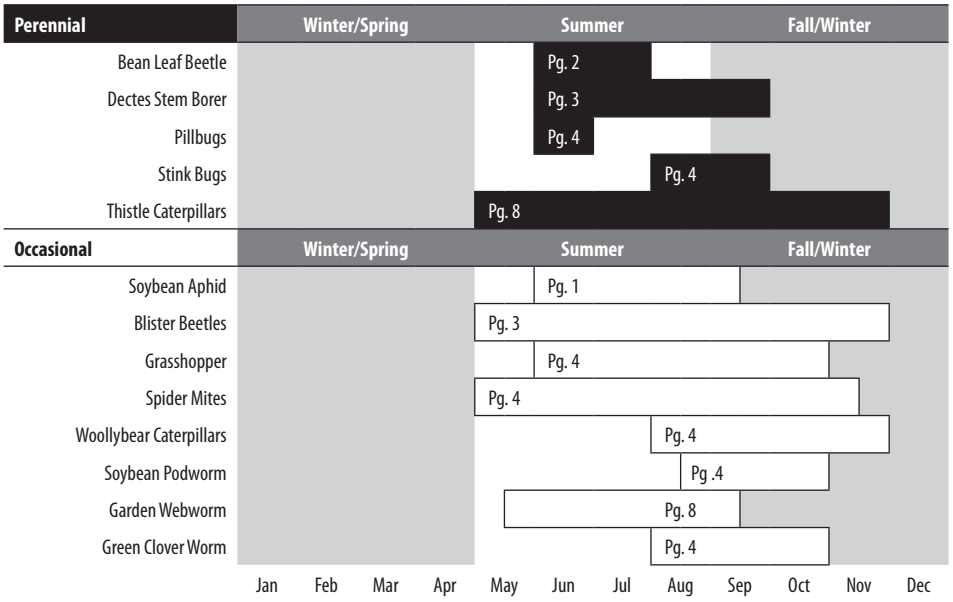
How to Use This Guide

This publication was prepared to help producers manage insect populations with the best available methods proven practical under Kansas conditions. It is revised annually and intended for use during the current calendar year. The user should know that pesticide label directions and restrictions are subject to change, and some may have changed since the date of publication.

The economics of control should be considered in any pest management decision. Because costs vary greatly over time and are influenced by factors beyond the scope of this publication, specific insecticide products were not included or omitting based on that criteria. Always compare product price, safety, and availability when making treatment decisions. The user is responsible for proper usage. Read label directions carefully before making a pesticide application. Remember, it is illegal to use a pesticide in a manner inconsistent with the label.

Crop-specific directories with information for identification and management of pests described in this publication can be found at *entomology.k-state.edu/extension/insect-information/crop-pests.*

A new tool that uses this information enables you to build customized management guides for selected pests. To learn how to use this feature, see *myfields.info/pests*. Kansas State University entomologists assume no responsibility for product performance, personal injury, property damage, or other types of loss resulting from the handling or use of the pesticides listed.



Sampling Techniques

Surveying for soybean insects attacking aboveground plant parts is not difficult if beans are planted in rows. On plants less than a foot high, insect densities can be established by kneeling along the row, turning over leaves and looking for insects. On larger plants a shake cloth technique is generally recommended. Place a 3-foot square cloth between the soybean rows. Bend about 1.5 row feet of plants from adjacent rows over the cloth, and shake vigorously for a few seconds. Count the insects that fall on the cloth. Repeat this operation in at least 10 locations per field, and average the results. Use of a slick-sided material will help keep the insects from crawling away before they are counted.

To survey narrow-row or drilled soybeans for insects use the "Texas Vertical Beat Sheet." This device is made of a piece of galvanized metal flashing or similarly stiff material, 36 inches wide, 32 inches tall and crimped on the bottom to form a collecting trough 4 inches wide. Place it next to the row and shake plants against the vertical surface. Dislodged arthropods slide into the trough where they can be counted or poured into a container to be counted elsewhere.

Seed-Attacking Insects

Seedcorn Beetle, Seedcorn Maggot

These are soil-infesting insects that attack seeds. Damage is heaviest in cool, wet springs when emergence is delayed. Recent problems in Kansas seem to be most serious where heavy rates of liquid or solid livestock manure have been spread on the field just before planting or where soybeans are planted in no-till situations.

Some planter box seed treatments containing permethrin (Kernel Guard Supreme or KickStart VP) are labeled for controlling these pests in soybeans. In addition, the seed treatments thiamethoxam (Cruiser 5FS or CruiserMAXX) and imidacloprid (numerous products) are labeled for protecting soybeans against the seed corn maggot. Follow label directions and DO NOT use leftover seed for food, oil, or livestock feed.

Aphids

Soybean Aphid

The soybean aphid, *Aphis glycines,* has been present in eastern Kansas since 2002. Relatively cool summer weather and large migrations from northern states may have contributed to the abundance of soybean aphids present in 2004 and 2008. Temperatures around 80° F are optimal for soybean aphids, while significantly higher temperatures impede population growth.

The soybean aphid is a small, yellowish or lime-green aphid with black cornicles. During vegetative growth look for aphids

under young upper leaves, petioles, and stems. Larger colonies are tended by ants, which are easier to spot against green soybean leaves. When soybeans are in reproductive stages, look for aphids in mid-canopy leaves and on stems. Other aphid species occasionally land in soybean, but do not develop large colonies.

Growers in north central and eastern Kansas should watch for this pest but resist the temptation to treat until populations exceed the established threshold of 250 aphids per plant from the vegetative stage through early pod fill. This threshold incorporates an approximate 7-day lead-time between scouting and treatment to allow time for spray arrangements or weather delays.

A sampling plan is available at *myfields.info/method/soybean-aphid* for registered users. This tool provides a treatment decision based on the number of infested plants sampled above a tally threshold. Soybeans in early reproductive stages appear most susceptible to yield loss that takes the form of reduced pod numbers. Aphid populations on maturing plants are typically in decline and producing winged forms that will leave the field. Treating these fields generally is not justified.

Several seed treatments are labeled for early season protection against soybean aphid. In Kansas, the presence of soybean aphids alone does not warrant the use of seed treatments, but their use may be justified in late-planted or double-cropped soybeans in northeast Kansas in years with high soybean aphid populations.

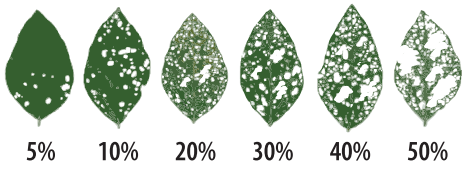
If significant aphid populations are observed on soybeans in Kansas, contact your local K-State Research and Extension office or email *mccornac@ksu.edu* so the infestation can be tracked and studied. To learn more about management of soybean aphids visit *myfields.info/pests/soybean-aphid.*

Beetles

Bean Leaf Beetle

The bean leaf beetle is red to light tan, ¼-inch long, and found in all parts of the state. The upper back is marked by six black spots near the midline bordered by a narrow black band. Insects react to nearby disturbances by dropping to the ground.

Typically, bean leaf beetles chew oval holes in the foliage, causing damage of little economic consequence. Border rows of emerging soybeans may support populations capable of causing localized



Bean leaf beetle feeding damage

economic loss. Treatment in limited areas may be justified in the case of severe cotyledon feeding, threatened destruction of the growing point, or populations of seven beetles per row-foot on soybeans with four or fewer nodes and 25 percent defoliation.

Most years, 50 or more beetles per row-foot are required to reduce yields in late season. Treatments may be justified if significant pod-feeding occurs while pods are still developing. This insect is known to transmit bean pod mottle virus disease. Research is ongoing to determine if reducing the treatment threshold would reduce the chance of plants being affected by this disease. Several seed treatments are labeled for early season protection against bean leaf beetle. A seed treatment is not justified solely for control of bean leaf beetle unless there have been recurring problems.

For more about this pest, see the *Bean Leaf Beetle* publication available at *ksre.ksu.edu/bookstore/pubs/MF2824.pdf* or *myfields.info/pests/bean-leaf-beetle*.

Soybean Aphid Management Options

Insecticide	Rate
Acephate (selected formulations of Acephate, Bracket, and Orthene)	(See supplemental labels for formulations and rates.)
Acetamiprid plus bifenthrin (Justice)	0.0351 to 0.0422 lb. a.i./acre (2.5 to 3.0 fl. oz./acre)
Alpha-cypermethrin (Fastac EC)	2.8 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.0155 to 0.022 lbs. a.i./acre (2.0 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.06 to 0.095 lb. a.i./acre (3.8 to 6.1 fl. oz./acre)
Chlorpyrifos (Lorsban-4E)	1 to 2 pints/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	11 to 26 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Deltamethrin (Decis 1.5)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Esfenvalerate (Adjourn)	2ee label, apply 0.03 to 0.05 lb. a.i./acre (5.8 to 9.6 fl. oz.)
Gamma-cyhalothrin* (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz/acre) (See label for Declare)
Imidacloprid (Alias 4F, Sherpa)	Check labels
Imidacloprid plus cyfluthrin (Leverage 2.7)	2.8 fl. oz./acre
Lambda-cyhalothrin (Warrior with Zeon Technology)	0.015 to 0.025 lb. a.i./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	3.5 to 4.0 fl. oz./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 8.0 fl. oz./acre
Methomyl (Lannate)	0.45 to 0.9 lb ai/acre (8 to 16 fl oz/acrea)
Permethrin (Pounce 3.2 E)	2ee label (Agrisolutions), 0.1 to 0.2 lb. a.i./acre (4 to 8 fl. oz.)
Zeta-cypermethrin (Mustang Max)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz. of product/acre

Blister Beetles

Foliage feeding is generally localized, with only large aggregations causing economic problems. Rarely is more than spot treatment required. Soybean plants can withstand up to 35 percent foliage loss during the blooming period. Foliage loss of 20 percent or more may decrease yields when pods are forming and beginning to fill. After beans are nearly filled, defoliation rarely causes a yield reduction.

Soybean Stem Borer

The dectes stem borer is a small, grayish longhorned beetle that lays eggs in soybean petioles. Larvae tunnel down the petiole and into the stem, causing the entire leaf to wilt and die. Dead, wilted and drying leaves above the normal senescence zone at the bottom of the plant may indicate stem borer infestation. Bored stalks reveal reddish interior discoloration when split.

When plants reach physiological maturity, the larvae tunnel to the base of the main stalk and girdle the stalk internally. Stems weaken as plants dry, which induces lodging.

Larvae overwinter in stem bases, plugging the hollowed section near the girdling point so the base appears solid. The larvae are cannibalistic. By late in the year, only one remains within each infested plant.

Bean Leaf Beetle Management Options

Insecticide	Rate
Acephate (Acephate, Bracket, or Orthene)	(See supplemental labels for formulations and rates.)
Acetamiprid plus bifenthrin (Justice)	0.0351 to 0.0422 lb. a.i./acre (2.5 to 3.0 fl. oz./acre)
Alpha-cypermethrin (Fastac EC)	2.8 to 3.8 fl.oz (0.018 to 0.025 lb. a.i.)/acre
Beta-cyfluthrin (Baythroid XL)	0.0125 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Brigadier)	5.1 to 6.1 fl.oz/acre
Carbaryl (Sevin 80S)	⅝ to 1 ¼ lb./acre
Chlorpyrifos (numerous products)	Check label, but generally 1 to 2 pints/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	16 to 38 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	Growth stage VC–V2: 0.8 to 1.6 fl oz. or 0.013 to 0.025 lbs./acre After V2: 1.6 to 2.8 fl. oz./acre, see label
Deltamethrin (Decis 1.5EC)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Dimethoate (Check labels. Bean leaf beetles are not listed on all labels).	0.5 lb. a.i./acre
Esfenvalerate (Asana XL 0.66)	0.03 to 0.05 lb. a.i./acre (5.8 to 9.6 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz.) (See label for Declare)
Imidacloprid (Alias 4F, Sherpa)	Check labels
Imidacloprid plus cyfluthrin (Leverage 2.7)	3.8 fl. oz./acre
Lambda-cyhalothrin (numerous products)	0.015 to 0.025 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 8.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	4.0 to 4.5 fl. oz./acre
Permethrin (Pounce 25 WP)	0.05 to 0.10 lb. a.i./acre
Thiodicarb (Larvin EC)	0.45 to 0.75 lb. a.i./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	0.025 to 0.06 lb. a.i./acre or 2.6 to 6.1 fl.oz./acre

Blister Beetle Management Options

Insecticide	Rate
Beta-cyfluthrin (Baythroid XL)	0.0125 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Carbaryl (Sevin)	0.5 to 1 lb. a.i./acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	11 to 26 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.025 to 0.044 lb. a.i./acre (1.6 to 2.8 fl. oz./a)
Gamma-cyhalothrin (Proaxis , Declare)	0.0125 to 0.015 lb. a.i./acre (3.20 to 3.84 fl. oz.) (See label for Declare)
Lambda-cyhalothrin (numerous products)	0.025 to 0.030 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	8.0 to 10.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	4.0 to 4.5 fl. oz./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz. of product/acre

Windy conditions cause girdled plants to lodge, leading to significant harvesting problems and yield losses. Serious damage has been common in south central and north central Kansas, and is increasing in western Kansas. No resistant varieties are currently available for this pest. Adult beetles emerge over several weeks and remain active for up to two months. Control with foliar insecticides is not feasible. Timely harvest is the best way to avert losses.

Fields can be sampled before maturity for the presence of stem borer tunneling and live larvae by carefully splitting stems from several locations throughout the field. Fields with high percentages of infested stems should be harvested as soon as possible to avoid girdling and lodging. Recent research has revealed that the onset of girdling is associated with stalk desiccation, so timely harvest is especially important under conditions of low soil moisture.

For more information see *Dectes Stem Borer (*MF2581) available at *ksre.ksu.edu/bookstore/pubs/mf2581.pdf* and *myfields.info/pests/dectes-stem-borer.*

Miscellaneous Pests

Grasshoppers

Grasshopper damage may occur from June through September. Initially, hoppers accumulate on vegetation bordering the field. If a significant population exists, nearby noncrop areas should be treated with an insecticide labeled for this purpose before migration starts. Nymphs are easier to control than adults. Observe precautions if soybean foliage is treated directly.

Spider Mites

Significant infestations of spider mites, particularly in dry years, can cause leaves to turn yellow, then gray-green, and finally bronze. Leaves prematurely drop from plants. Treatment decisions are not easy because drought stress can exacerbate mite damage and impede plant recovery. Plants losing more than 50 percent of their foliage during bloom and pod set may warrant treatment if significant pod or seed filling remains and leaves have not yellowed. The use of drop nozzles may enhance control by improving coverage of the undersides of leaves. Complete control is difficult to achieve. Mite problems typically develop near gravel roads (where road dust coats leaf surfaces), or downwind of newly swathed alfalfa fields or mowed roadside right-of-ways, which can serve as emigrating sources of mites.

Pillbugs

Pillbugs are crustaceans and have become serious early-season problems in no-till fields, especially in south central KS. They must have a moist environment, which no-till often creates, and thus has allowed pillbug populations to greatly increase in some areas. Pillbugs usually feed on dead and decaying organic matter, but seem to relish feeding on young succulent soybean seedlings. Pillbugs are relatively easy to control except in no-till situations since they are under the residue and thus protected from any contact insecticide which may be applied as a foliar rescue treatment. They also have to bite the plant to get the toxin from a seed treatment, and this often kills the plant even though it also kills the pillbug. Early or late planting seems to be the best (only) option for no-tillers in pillbug infested areas. For more information see MF2855, *Pillbugs*: *ksre.ksu.edu/bookstore/pubs/MF2855.pdf* .

Stink Bugs

Stink bugs are usually only damaging in south-central, central and southeast Kansas. Shrunken and deformed seeds can result from pod feeding. Controls should be applied when 10 bugs per 30 feet of row are found. More information on this pest is available in the publication MF-2891, *Stink Bugs*: *ksre.ksu.edu/bookstore/pubs/mf2891.pdf*. Localized infestations can be spot treated.

Worms

Corn Earworm

Corn earworm damage to soybeans occurs from August through September. Significant damage may occur when large larvae feed on pods consuming the developing seeds. Fields should be scouted for small larvae beginning at bloom. Control measures should be implemented when an average of one small worm per foot of row is detected.

Green Cloverworm

Green cloverworm larvae are light green with three pairs of stripes running the length of the body. There are three pairs of 'true' legs behind the head separated by three legless segments from three fleshy 'prolegs' near the middle of the body, with another pair of prolegs on the terminal segment. Larvae wiggle vigorously when disturbed. Smaller stages may drop from the leaf when disturbed and hang from a silken thread. Larvae chew irregularly shaped holes in the leaves from July through September.

To determine if treatment is justified, sample a minimum of 10 locations in the field. Use a cloth and bend over one row-foot of soybeans on either side, shaking insects onto the cloth. Then calculate the average number of larvae per row-foot. Refer to Table 1 on page 7 to find what response, if any, is necessary. Note that treatment thresholds vary with stage of soybean development, density of larval population, control costs, and expected soybean market value. This is an easy insect to kill, with most insecticides listing green cloverworm on the label.

Saltmarsh Caterpillar and other Woollybear Caterpillars

Woollybears are hairy (woolly), yellowish or brown caterpillars up to 2 inches in length. Populations are often overestimated because the larvae and damage are striking. The smaller larvae often are observed feeding in groups on the underside of the leaves, which quickly become skeletonized and die. The larger, showy larvae tend to feed exposed on the upper leaf surfaces. In 2013, scattered populations developed to levels justifying control.

Spider Mite Management Options

Insecticide	Rate
Abamectin (Agri-Mek SC)	1.75 to 2.5 fl oz/acre (low to moderate infestations) 3.5 fl oz/acre (high infestations)
Chlorpyrifos (numerous products)	Check label, but generally 1 pint/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	11.0 to 26.0 fl. oz./acre
Dimethoate (Dimethoate 2.67EC)	1⅓ to 1½ pints (0.4 to 0.5 lb. a.i.)/acre
Etoxazole (Zeal SC)	2 to 6 oz./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	10.0 fl. oz./acre
Zeta-cypermethrin plus bifenthrin (Hero)	10.3 fl. oz./acre

Grasshopper Management Options

Field Sprays

Insecticide	Rate
Acephate (Acephate, Bracket, or Orthene)	(See supplemental labels for formulations and rates.)
Alpha-cypermethrin (Fastac EC)	0.020 to 0.025 lb. a.i./acre (3.2 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.0155 to 0.022 lb. a.i./acre (2.0 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.06 to 0.095 lb. a.i./acre (3.8 to 6.1 fl. oz./acre)
Carbaryl (Sevin)	0.5 to 1.5 lb. a.i./acre
Chlorantraniliprole (Prevathon)	8.0 to 20.0 fl oz/acre
Chlorpyrifos (numerous products)	Check label, but generally 1/2 to 1 pint/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	6.0 to 13.0 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.031 to 0.044 lb. a.i./acre (2.0 to 2.8 fl. oz. /acre)
Deltamethrin (Delta Gold)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Diflubenzuron (Dimilin 2L)	0.03125 lb. a.i./acre (2 fl. oz. per acre). Treat when the majority of the infesting grasshoppers have reached the 2nd to 3rd nymphal stage. Treatment is not effective controlling grasshoppers once they have reached the adult stage.
Dimethoate (Dimethoate or Dimate)	0.5 lb. a.i./acre.
Esfenvalerate (Asana XL 0.66)	0.03 to 0.05 lb. a.i./acre (5.8 to 9.6 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0125 to 0.015 lb. a.i./acre (3.20 to 3.84 fl. oz.) (See label for Declare)
Imidacloprid plus cyfluthrin (Leverage)	2.8 fl. oz./acre
Lambda-cyhalothrin (numerous products)	0.025 to 0.03 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	8.0 to 10.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	4.0 to 4.5 fl. oz./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	2.6 to 6.1 fl. oz. product/acre

Grasshopper Management Options

Noncrop Area Treatments

Insecticide	Rate	Special Instructions
Acephate (Bracket 90 Orthene 75S)	Bracket 90, 0.28 lb./acre (4 oz); Orthene 75S, ⅓ lb/acre	Apply in 10 to 20 gallons by ground, or in 1 to 5 gallons by air. Use as a treatment on ditch banks, roadsides, and field borders. Do not feed or graze treated forage.
Beta-cyfluthrin (Baythroid XL)	2.6 to 2.8 fl. oz./acre	Labeled for use in pastures, rangeland, grass for hay, and grass grown for seed. PHI is 0 days.
Chlorantraniliprole (Prevathon)	8 to 20 fl.oz./acre	
Diflubenzuron (Dimilin 2L)	2 fl.oz/acre	Apply to manage grasshoppers in breeding areas before they move into crop land. Treat early instars (majority in the second to third nymphal stages). For use on field border, fence rows, roadsides, farmsteads, ditchbanks, wasteland, and CRP land. REI is 12 hours.
Esfenvalerate (Asana XL)	0.015 to 0.03 lb. a.i./acre (2.9 to 5.8 fl.oz./acre of Asana XL)	This label is for noncrop use on land adjacent to tilled area to control migrating insects. Repeat as needed, but do not exceed 0.5 lb. a.i./acre per year. Do not feed the treated vegetation. Do not spray ditch banks or areas adjacent to water.
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.015 lb. a.i./acre (1.92 to 3.84 fl.oz/acre) (See label for Declare)	Spray non-cropland adjacent to agricultural areas to control migratory insects that may threaten crops. Use highest labeled rates for dense/tall foliage, high insect populations and/or larger insects. Do not graze livestock in treated area. REI is 24 hours
Lambda-cyhalothrin (Grizzly Z)	0.02 to 0.03 lb. a.i./acre or 2.56 to 3.84 fl.oz/acre	Spray non-cropland adjacent to agricultural areas to control migratory insects that may threaten crops. Use highest labeled rates for dense/tall foliage, high insect populations and/or larger insects. Do not graze livestock in treated area. REI is 24 hours.
Zeta-cypermethrin (Mustang Maxx)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz./acre)	Labeled for use on grass forage, fodder, pasture, and rangeland with a 12 hour REI and a 0-day harvest restriction on forage. Thus, this material may be used to treat these areas when grasshoppers are threatening to move from these areas into neighboring crop fields.

Stink Bug Management Options

Insecticide	Rate
Acephate (Acephate, Bracket, or Orthene)	(See supplemental labels for formulations and rates.)
Acetamiprid plus bifenthrin (Justice)	0.07 lb. a.i./acre (5.0 fl. oz./acre)
Alpha-cypermethrin (Fastac EC)	3.2 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.0125 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Swagger)	7.6 to 12.2 fl.oz/acre
Carbaryl (Sevin 80S)	1¼ to 1⅞ lb./acre
Chlorpyrifos (numerous products)	Check label, but generally 2 pints/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	16.0 to 38.0 fl. oz./acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	9.25 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.025 to 0.044 lb. a.i./acre (1.6 to 2.8 fl. oz.)
Deltamethrin (Decis 1.5EC)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Esfenvalerate (Asana XL 0.66)	0.03 to 0.05 lb. a.i./acre (5.8 to 9.6 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0125 to 0.015 lb. a.i./acre (3.20 to 3.84 fl. oz.) (See label for Declare)
Imidacloprid plus cyfluthrin (Leverage 2.7)	3.8 fl. oz./acre
Lambda-cyhalothrin (numerous products)	0.025 to 0.030 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	8.0 to 10.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	4.0 to 4.5 fl. oz./acre
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz./acre

Corn Earworm Management Options

Insecticide	Rate
Acetamiprid plus bifenthrin (Justice)	0.0351 to 0.0422 lb. a.i./acre (2.5 to 3.0 fl. oz./acre)
Alpha-cypermethrin (Fastac EC)	2.8 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.013 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.08 to 0.095 lb. a.i./acre (5.1 to 6.1 fl. oz./acre)
Carbaryl 4L (Sevin)	½ to 1½ quarts/acre
Chlorantraniliprole (Prevathon)	14.0 to 20.0 fl. oz/acre
Chlorpyrifos (Lorsban 4E)	Check label, but generally 1 to 2 pints/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	16.0 to 38.0 fl. oz./acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	9.25 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.025 to 0.044 lb. a.i./acre (1.6 to 2.8 fl. oz./a)
Deltamethrin (Delta Gold)	0.012 to 0.018 lb. a.i./acre (1 to 1.5 fl. oz.)
Esfenvalerate (Asana XL 0.66)	0.03 to 0.05 lb. a.i./acre (5.8 to 9.5 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz.) (See label for Declare)
Imidacloprid plus cyfluthrin (Leverage 2.7)	3.8 fl. oz./acre
Indoxacarb (Steward 1.25 SC)	0.045 to 0.11 lb ai/acre (4.6 to 11.3 fl oz/acre)
Lambda-cyhalothrin (Warrior with Zeon Technology)	0.015 to 0.025 lb. of a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 8.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	3.5 to 4.0 fl. oz./acre
Methomyl (Lannate LV)	0.12 to 0.45 lb ai/acre when worms are up to ½ inch long.
Permethrin (Pounce 25 WP)	6.4 to 12.8 ounces (0.1 to 0.2 pound a.i./acre
Spinosad (Blackhawk)	0.038-0.050 lb a.i./acre (1.7 to 2.2 oz/acre)
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz. product/acre

Green Cloverworm Management Options

Insecticide	Rate
Acephate (Acephate, Bracket, or Orthene)	(See supplemental labels for formulations and rates.)
Alpha-cypermethrin (Fastac EC)	2.8 to 3.8 fl. oz./acre
Bacillus thuringiensis (Biobit, Deliver, Dipel, Lepinox and Xentari)	Check labels: Rates vary by product and formulation.
Beta-cyfluthrin (Baythroid XL)	0.0065 to 0.0125 lbs. a.i./acre (0.8 to 1.6 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.08 to 0.095 lb. a.i./acre (5.1 to 6.1 fl. oz./acre)
Carbaryl (Sevin)	0.5 to 1 lb. a.i./acre
Chlorantraniliprole (Prevathon)	14.0 to 20.0 fl oz/acre
Chlorpyrifos (numerous products)	Check label, but generally 1/2 to 1 pint/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	7.0 to 13 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.013 to 0.025 lb. a.i./acre (0.8 to 1.6 fl. oz./acre)
Deltamethrin (Delta Gold)	0.012 to 0.018 lb. a.i./acre (1 to 1.5 fl. oz.)
Diflubenzuron (Dimilin 2L)	0.03125 to 0.0625 lb. a.i./acre (2 to 4 fl. oz. per acre). Apply when larvae are small (less than 0.5 inches)
Esfenvalerate (Asana XL 0.66)	0.015 to 0.03 lb. a.i./acre (2.9 to 5.8 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz.) (See label for Declare)
Imidacloprid plus cyfluthrin (Leverage)	2.8 fl. oz./acre
Indoxacarb (Steward 1.25 SC)	0.045 to 0.11 lb ai/acre (4.6 to 11.3 fl oz/acre)
Lambda-cyhalothrin (numerous products)	0.015 to 0.025 lb. of a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 8.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	3.5 to 4.0 fl. oz./acre
Methomyl (Lannate)	0.25 to 0.45 lb. a.i./acre. Light to moderate infestations of worms up to ¼ inch long may be controlled with 0.125 to 0.25 lb. a.i./acre. This rate has been shown to favor the survival of beneficials.
Methoxyfenozide (Intrepid 2F)	0.06 to 0.12 lb. a.i./acre (4 to 8 fl. oz)
Permethrin (multiple products)	0.05 to 0.10 lb. a.i./acre
Spinosad (Blackhawk)	0.025-0.050 lb ai/acre (1.1 to 2.2 oz/acre)
Thiodicarb (Larvin EC)	0.25 to 0.4 lb. a.i./acre.
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	2.6 to 6.1 fl. oz. of product/acre

Table 1. Guidelines for Determining the Need for Insecticides to Suppress Green Cloverworm Larvae on Soybeans

Soybean developmental stage	Resample in 7 to 10 days if: (do not treat)			Insecticides are probably justified (treat) if:		
	(Expected Market Value in $/bu)			(Expected Market Value in $/bu)		
	($5.00)	($6.50)	($8.00)	($5.00)	($6.50)	($8.00)
	The Average Number of Larvae per Foot of Row is[a,b,c]					
	Less than or equal to:			Greater than or equal to:		
Beginning bloom	5	4	4	10	9	9
Full bloom through early pod set	9	8	7	19	16	15
Full pod through beginning seed	7	6	5	15	13	11

a Resample in 3 to 4 days if the average larval density is between these values.

b Based on control costs of $6.50/acre. Other factors including the prevalence of natural control agents, previous defoliation, moisture availability, larval age distribution, and yield potential may influence the "no treat, resample, treat" decision.

c Severe, extended weed competition may lower these treatment thresholds by pre-stressing the soybean plants before the insect defoliation develops. However, research in Iowa has shown that yield losses from velvetleaf competition and simulated green cloverworm defoliation are additive for practical purposes (velvetleaf densities below one weed per 5 feet of soybean row and defoliation during full bloom).

Thistle Caterpillar

Soybean leaves may be webbed together by this hairy caterpillar (also known as the painted lady caterpillar). Larvae are covered by branched black spines or hairs over much of the body. Treat if 10 or more caterpillars are found per foot of row, or where defoliation becomes severe (greater than 25 to 35 percent) during pod set.

Webworms

The garden webworm, a common webworm, is slender and green with three dark spots arranged in a triangle on the sides of each body segment. Each spot supports at least one hair. Larvae skeletonize the foliage in the protected, webbed area. If disturbed, larvae move backward rapidly.

Peak damage occurs July through August with multiple generations possible. The edges of some soybean fields in northeast Kansas became infested during 2001 with high numbers of webworms moving out of harvested alfalfa fields. Many fields in SE and central Kansas required treatment in 2009, and again in 2010.

Saltmarsh Caterpillar and other Woollybear Caterpillar Management Options

Insecticide	Rate
Alpha-cypermethrin (Fastac EC)	1.3 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.0125 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.08 to 0.095 lb. a.i./acre (5.1 to 6.1 fl. oz./acre)
Carbaryl (Sevin)	1.5 to 2 lb. a.i./acre
Chlorantraniliprole (Prevathon)	14.0 to 20.0 fl oz/acre
Chlorpyrifos (numerous products)	Check label, but generally 1 to 2 pints/acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	11.0 to 26.0 fl. oz./acre
Cyfluthrin (Tombstone)	0.025 to 0.044 lb. a.i./acre (1.6 to 2.8 fl. oz./acre)
Deltamethrin (Delta Gold)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Esfenvalerate (Asana XL 0.66)	0.015 to 0.03 lb. a.i./acre (2.9 to 5.8 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz.) (See label for Declare)
Imidacloprid plus cyfluthrin (Leverage)	2.8 fl. oz./acre
Lambda-cyhalothrin (numerous products)	0.015 to 0.025 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 8.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	3.5 to 4.0 fl. oz./acre
Methoxyfenozide (Intrepid 2F)	0.06 to 0.12 lb. a.i./acre (4 to 8 fl. oz)
Permethrin (multiple products)	0.05 to 0.10 lb. a.i./acre
Spinosad (Blackhawk)	0.038-0.050 lb. a.i./acre (1.7 to 2.2 oz/acre)
Thiodicarb (Larvin EC)	0.25 to 0.4 lb. a.i./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz. of product/acre

Thistle Caterpillar (Painted Lady) Management

Insecticide	Rate
Alpha-cypermethrin (Fastac EC)	1.3 to 3.8 fl. oz./acre
Carbaryl (Sevin)	1.5 to 2 lb. a.i./acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	13 to 26 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	3.75 to 11.75 fl. oz./acre
Gamma-cyhalothrin (Proaxis, Declare)	0.0075 to 0.0125 lb. a.i./acre (1.92 to 3.20 fl. oz.) (See label for Declare)
Lambda-cyhalothrin (numerous products)	0.015 to 0.025 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	5.0 to 10.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	3.5 to 4.0 fl. oz./acre
Permethrin (multiple products)	0.05 to 0.10 lb. a.i./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	2.6 to 6.1 fl. oz. of product/acre

Garden Webworm Management Options

Insecticide	Rate
Alpha-cypermethrin (Fastac EC)	2.8 to 3.8 fl. oz./acre
Beta-cyfluthrin (Baythroid XL)	0.0125 to 0.022 lbs. a.i./acre (1.6 to 2.8 fl. oz.)
Bifenthrin plus imidacloprid (Tempest)	0.08 to 0.095 lb. a.i./acre (5.1 to 6.1 fl. oz./acre)
Carbaryl (Sevin)	1.0 to 1.5 lb. a.i./acre
Chlorpyrifos plus gamma-cyhalothrin (Cobalt)	11.0 to 26.0 fl. oz. of product/acre
Chlorpyrifos plus zeta-cypermethrin (Stallion)	5.0 to 11.75 fl. oz./acre
Cyfluthrin (Tombstone)	0.025 to 0.044 lb. a.i./acre (1.6 to 2.8 fl. oz.)
Deltamethrin (Delta Gold)	0.018 to 0.022 lb. a.i./acre (1.5 to 1.9 fl. oz.)
Gamma-cyhalothrin (Proaxis, Declare)	0.0125 to 0.015 lb. a.i./acre (3.2 to 3.84 fl. oz.) (See label for Declare)
Lambda-cyhalothrin (numerous products)	0.025 to 0.030 lb. a.i./acre
Lambda-cyhalothrin chlorantraniliprole (Besiege)	8.0 to 10.0 fl. oz./acre
Lambda-cyhalothrin plus thiamethoxam (Endigo ZC)	4.0 to 4.5 fl. oz./acre
Permethrin (multiple products)	0.1 to 0.2 lb. a.i./acre
Zeta-cypermethrin (Mustang MAXX, etc.)	0.0175 to 0.025 lb. a.i./acre (2.8 to 4.0 fl. oz.)
Zeta-cypermethrin plus bifenthrin (Hero)	4.0 to 10.3 fl. oz. of product/acre

Label Terminology

The preharvest interval (PHI) refers to the time that must elapse between application and harvest. The interval usually is different for forage use than it is for grain harvest, but when not specified, the preharvest interval usually is the same regardless of use of the treated product. The waiting interval does not signify how long an insecticide provides control following application.

The restricted entry interval (REI) specifies the time that must elapse before people can safely return to work in treated fields without the use of protective clothing and/or equipment.

A number of insecticides are classified as restricted use pesticides. All individuals must be certified by the Kansas Department of Agriculture before they can purchase or use restricted products. Some pesticide uses may be permitted by means of State of Kansas Special Local Needs (SLN) label. The law requires applicators to possess this label before making an SLN application.

Endangered Species

EPA's Endangered Species Protection Program (ESPP) helps promote the recovery of endangered species. If limitations on pesticide use are necessary to protect listed species in a certain geographic area, the information is relayed through Endangered Species Protection Bulletins. Pesticide labels may direct you to contact your local K-State Research and Extension office or you can obtain EPA bulletins directly at *www.epa.gov/espp/bulletins.htm.*

Poison Control

In case of emergency contact Mid-America Poison Control Center: Emergency Phone Number (800)-222-1222.

More Information

This information is intended to help producers select management options for common soybean pests, but not every pest can be covered due to space limitations. Additional information can be found on our website at *entomology.k-state.edu/extension/insect-information/crop-pests/soybeans/*. This website contains color images of many of the pests mentioned in this document, which can be useful in helping to correctly identify pest problems.

Soybean Insecticide Use Instructions

Insecticide	Special Instructions
Abamectin (Agri-MeK SC)	To avoid illegal residues, Agri-Mek SC must be mixed with a non-ionic activator type wetting, spreading and/or penetrating spray adjuvant. Do not use binder or sticker type adjuvants.
Acephate (Selected formulations of Acephate, Bracket and Orthene)	Acephate is labeled for treating non-crop areas for grasshoppers. Signal word on label: CAUTION. Do not graze or feed vegetation cut from treated areas. REI is 24 hours. In addition, Acephate 90SP, WSB & WSP, Bracket 90 WSP, Orthene 75S, 90S and 97 have supplemental federal labels that must be in possession of the user at the time of application for controlling grasshoppers, thrips, potato leafhoppers, stinkbugs, bean leaf beetles, green cloverworms and soybean aphids in soybeans. Refer to the supplemental label for specific instructions.
Acetamiprid plus bifenthrin (Justice)	Do not make more than 2 applications per year. Do not graze or use cut forage or hay as an animal feed. PHI is 30 days.
Alpha-cypermethrin (Fastac EC)	Do not make applications less than 7 days apart. Do not graze or harvest treated soybeans for forage, straw, or hay for livestock feed. Do not apply more than 11.4 oz. of product per acre per season. REI is 12 hours. PHI is 21 days.
Bacillus thuringiensis (Biobit, Deliver, Dipel, Lepinox and Xentari)	These are biologically based products that act as stomach poisons and are very effective against some caterpillars, causing death in two to four days. Signal word on label: CAUTION. Chemigation is usually allowed by label. Rates and application instructions of Bacillus thuringiensis products vary widely, so refer to labels for specific instructions. REI is 4 to 12 hours depending on formulation. No PHI.
Beta-cyfluthrin* (Baythroid XL)	Warning. Extremely hazardous to fish and aquatic invertebrates – do not apply directly over water. Drift and runoff from treated areas may be hazardous to aquatic organisms. Beta-cyfluthrin is highly toxic to bees. Do not apply this product or allow it to drift to blooming crops or weeds on which bees are actively foraging. Minimum application is 2 gallons of water for aerial application and 10 gallons by ground. Chemigation and ultralow volume (ULV) applications are allowed by label. Signal word on label: WARNING. REI is 12 hours. PHI is 21 days, however green forage can be fed 15 days after last application.
Bifenthrin plus imidacloprid (Tempest)	Do not make applications less than 30 days apart. Apply no more than 0.30 lb. a.i./acre of bifenthrin or 0.14 lb. a.i. of imidacloprid total per season. PHI is 18 days for beans and feeding green vines and 45 days for feeding dry vines.
Carbaryl (Sevin)	Do not apply or allow to drift to blooming crops or weeds if bees are visiting the treatment area. Extremely hazardous to aquatic invertebrates – do not apply directly over water. Most labels recommend the use of 25 to 40 gallons of water with ground equipment to ensure adequate coverage. Refer to specific product labels for information on chemigation. Signal word on label: CAUTION or WARNING, depending on formulation. REI is 12 hours. Do not apply within 14 days of grazing or harvest for forage, or within 21 days of harvest for seed.
Chlorantraniliprole (Prevathon)	Make no more than 4 applications per acre per crop; 3 days minimum between treatments. Do not apply more than 60 fl. oz. 0.21 lb. a.i. of chlorantraniliprole-containing products per acre per year. REI is 4 hours. PHI is 1 day.
Chlorpyrifos* (Numerous products)	Highly toxic to bees exposed to direct treatment. Do not apply more than 3 lb. a.i./acre per season. Signal word on label: WARNING. REI is 24 hours. PHI is 28 days. Do not allow livestock to graze in treated areas or feed treated soybean forage, hay or straw to meat or dairy animals.
Chlorpyrifos plus gamma-cyhalothrin* (Cobalt)	Minimum of 2 gallons of spray volume by air and 10 gallons by ground. Do not apply more than 59 fl. oz. of Cobalt per season. Do not make a second application of Cobalt or another product containing chlorpyrifos within 14 days of first application. Do not make more than 3 applications per year of Cobalt or other products containing chlorpyrifos. Do not make more than one application after pod set. Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay and straw to meat or dairy animals. Signal words on label: DANGER–POISON. REI is 24 hours. PHI 30 Days.
Chlorpyrifos plus zeta-cypermethrin* (Stallion)	A new product registration that is a combination of chlorpyrifos (2.72 lb./gal.) plus zeta-cypermethrin (0.272 lb./gal.). REI is 24 hrs. PHI is 28 days.
Cyfluthrin (Tombstone)	Maximum Tombstone allowed per 7-day interval: 2.8 fl. oz./acre. Maximum Tombstone allowed per crop season 11.2 fl. oz./acre. Has WARNING on the label due to environmental toxicity to fish and bees.

Soybean Insecticide Use Instructions

Deltamethrin* (Delta Gold)	Extremely hazardous to fish and aquatic invertebrates. Do not apply directly over water or to areas where surface water is present. Drift and runoff may be hazardous to aquatic organisms in areas near application site. This pesticide is highly toxic to bees exposed to direct treatment. Do not apply this product or allow it to drift to blooming crops or weeds on which bees are actively foraging. Minimum gallonage is 2 gallons of water for aerial application and 5 gallons by ground, and should be increased under hot, dry environmental conditions. See label for chemigation directions. Signal words on label: DANGER–POISON. REI is 12 hours. Do not apply within 21 days of harvest. Do not allow livestock to graze treated forage, or feed treated hay to livestock.
Diflubenzuron (Dimilin 2L)	This insect growth regulator is labeled for treating non-crop areas for grasshopper nymphs before they move into cropland and is labeled on soybeans for controlling green cloverworm and grasshoppers. It is toxic to aquatic invertebrates. Signal word on label: CAUTION. REI is 12 hours. PHI is 21 days.
Dimethoate (Dimethoate or Dimate)	Highly toxic to bees. Do not apply directly to water. Runoff may be hazardous to aquatic organisms. Can be applied by ground or air. Refer to label for recommended gallonage. Chemigation allowed on some labels. Signal word(s) on label: WARNING or DANGER–POISON, depending on formulation. REI is 48 hours. Do not feed or graze within 5 days of last application. PHI is 21 days.
Esfenvalerate* (Asana XL 0.66)	See label for chemigation instructions. Do not exceed 0.2 lb a.i./acre per season. Signal word on label: WARNING. REI is 12 hours. PHI is 21 days. Do not feed or graze treated plant parts.
Gamma-cyhalothrin* (Proaxis, Declare)	Apply in a minimum of 2 gallons of water per acre by air. Do not apply more than 0.03 pound active ingredient (0.48 pint) per acre per season. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Signal word on label: CAUTION. REI is 24 hours and PHI is 30 days.
Imidacloprid (Numerous products)	Imidacloprid systemic seed treatment that has efficacy against seed corn maggots, early season soybean aphids and early season bean leaf beetles. Signal word on label: CAUTION.
Imidacloprid (Alias 4F, Sherpa)	A formulation of imidacloprid that allows foliar application to soybeans. Signal word on label: CAUTION. Check labels.
Imidacloprid plus cyfluthrin* (Leverage)	May be applied through properly calibrated ground, aerial or chemigation application equipment. Maximum amount allowed per crop season is 9.0 fl. oz./acre. Minimal interval between applications is 7 days. Signal word on label: WARNING. REI 12 hours. PHI is 21 days.
Indoxacarb (Seward 1.25 SC)	Toxic to mammals, birds, fish and aquatic invertebrates. Highly toxic to bees exposed to direct treatment. Labeled for ground and aerial application, but not chemigation. Seward applications should target eggs and small instar larvae. Signal word on label: CAUTION. REI is 12 hours. PHI is 21 days.
Lambda-cyhalothrin* (Numerous products)	Use a minimum of 2 gallons of water per acre by air. See label for chemigation instructions. Do not graze livestock in treated areas or harvest for fodder, silage or hay. Do not apply more than (0.48 pt.) 0.06 lb. a.i./acre per season. Signal word on label: WARNING. REI is 24 hours. PHI is 45 days.
Lambda-cyhalothrin chlorantraniliprole (Besiege)	Maximum interval between applications is 5 days. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. PHI is 30 days.
Lambda-cyhalothrin plus thiamethoxam* (Endigo ZC)	Combination of a pyrethroid and a neonicotinoid insecticide. Extremely toxic to fish and aquatic organisms. Do not use less than 10 GPA for ground applications or 2 GPA for aerial applications. Can be chemigated; refer to label for more information. Signal word on label: WARNING. REI is 24 hours. PHI is 30 days. Do not exceed 9 fl. oz./acre per season. Allow 7 days between applications. Do not graze or harvest treated forage for forage straw or hay for livestock feed. Do not apply this product within 45 days of planting if soybean seeds were treated with a neonicotinoid product.
Methomyl* (Lannate)	Toxic to fish and wildlife. Drift and runoff from treated areas may be hazardous to aquatic organisms. Highly toxic to bees. Do not apply or allow to drift to blooming crops or weeds if bees are visiting the treatment area. Do not apply through any type of irrigation system. Do not apply more than 1.35 lb. a.i./acre per crop. Signal words on label: DANGER–POISON. REI is 48 hours. PHI is 14 days. If under 0.225 lb. a.i./acre, forage can be used in 3 days and hay in 7 days. If more than 0.225 lb. a.i./acre, forage can be used in 10 days and hay in 12 days.
Methoxyfenozide (Intrepid 2F)	Use on soybeans is based on supplemental labeling that must be in possession of the user at time of use. Product must be ingested by larvae to be effective. Do not apply by ground within 25 feet, or by air within 150 feet of lakes, reservoirs, rivers, permanent streams, marshes, natural ponds or commercial fish farm ponds. Do not apply this product through any type of irrigation system. Signal word on label: CAUTION. REI is 4 hours. Do not apply within 7 days of harvest of hay and forage or within 14 days of harvest of seed.

Soybean Insecticide Use Instructions

Permethrin* (Arctic, Ambush and Pounce)	Use a minimum of 10 gallons of finished spray per acre by ground application or a minimum of 2 gallons if applied by air. Can be chemigated. Refer to label for more information. Do not exceed 0.4 lb. a.i./acre per season. Signal word on label: CAUTION or WARNING, depending on formulation. REI is 12 hours. Do not graze treated areas or harvest for forage or hay. PHI is 60 days.
Spinosad (Blackhawk)	This product is highly toxic to bees exposed to direct treatment on blooming crops or other vegetation. Signal word on label: CAUTION. REI of 4 hours. Chemigation instructions on label. Do not feed treated forage or hay to meat or dairy animals. PHI is 28 days. Do not apply more than 6 fl. oz. of Blackhawk (0.188 lb spinosad) per acre per year. Do not make more than two consecutive applications of spinosad-based products.
Thiamethoxam (Cruiser, CruiserMAXX)	A systemic neonicotinoid insecticide used as a seed treatment. Labeled for soybean insect pests, such as the bean leaf beetle, seedcorn maggot, and wireworm. Signal word on label: CAUTION.
Thiodicarb* (Larvin EC)	See label for chemigation instructions. Apply in a minimum of 2 gallons of finished spray by air or 5 gallons by ground. Do not feed forage, hay, or straw to livestock. Signal word on label: WARNING. REI is 12 hours. PHI is 28 days.
Zeta-cypermethrin* (Mustang MAXX)	Extremely toxic to fish and aquatic invertebrates. Apply a minimum of 2 gallons of finished spray per acre by aerial equipment or 10 gallons per acre by ground equipment. Can be chemigated. Refer to label for more information. Signal word on label: CAUTION. REI is 12 hours. PHI is 21 days. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.15 lb. a.i./acre per season. Do not make applications less than 7 days apart.
Zeta-cypermethrin plus Bifenthrin* (Hero)	Combination of two pyrethroid insecticides. Signal word on label CAUTION. Can be chemigated; refer to label for more information. Twelve hour REI. PHI is 21 days for grain. Do not graze or harvest soybean forage, straw or hay for livestock feed.

* Restricted Use Pesticide

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