SOYBEAN INSECT CONTROL

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The keys to managing insect pests in soybean are to:

1. Scout fields during high-risk periods for your area.
2. Correctly identify insect pests.
3. Use treatment thresholds to make spray decisions.
4. Use the safest, most economical, and environmentally sound insecticide and rate.
5. Accurately calibrate spray equipment, and properly apply insecticides.

SCOUTING

Check soybeans regularly from early vegetative stages to beginning maturity (R7). If velvetbean caterpillars (mainly the southern Coastal Plain) or stink bugs are a problem in your area, continue scouting until leaves start to shed (into R7). Place a high priority on checking fields in bloom from the last week of July through August. Corn earworm moths are attracted to blooming fields and will lay more eggs in open-canopied beans on high spots and lighter soil areas. Stink bugs can be difficult to scout for because they may not be found in all areas of a field. Stink bug damage can occur from pod set to when pods begin to yellow, but greatest injury occurs during early pod-fill. Because kudzu bugs are stem feeders, they can infest soybeans during any growth stage and should be scouted for regularly. The most important consideration for any field scouting program is to get a representative sample. If it is impossible to scout all fields, at least sample representative varieties and planting dates each week. Do not treat all fields based on what is found in one variety or maturity group.

Check in at least two different accessible areas of a field, such as opposite ends, or on a lighter and heavier soil type. In both areas move in 20 steps and take at least two samples. Take more samples if insect populations are not clearly above or below the treatment threshold level. To take each sample in conventional wide-row spacing, bend one row out of the way and place a 3 ft by 3 ft beat cloth (also called a ground or drop cloth) with dowel handles between the rows. Bend 3 feet of <u>one</u> <u>row</u> over the cloth and beat down vigorously on the soybeans at least 10 times. Move the beans back, and then count and identify insects. Divide by three to get the number of pests per row foot. Shake the cloth off thoroughly before taking another sample.

Soybeans that are drilled require insect scouting and treatment thresholds tailored for use in narrow rows. There are several sampling alternatives, but the most practical involves using a sweep net. Use a 15-inch diameter heavy-duty sweep net such that the upper edge of the net stays even with or slightly below the top of the canopy as you sweep it through the crop. Sweep forcefully with a back-and-forth motion as you walk through the field. Make one sweep with each stride. You actually make an elongated "figure 8" motion with the net; each pass covering two 38-inch rows or the equivalent width of narrow rows. Make 10 sweeps (each pass in either direction counts as a sweep); then count the number of insects in the net, being careful to sort through the leaves in the bottom of the net. Take a minimum of two 10-sweep samples in each of two different areas of the field, or more until you are confident of your estimates. Note: Sources of sweep nets are Gempler's (800-382-8473 or www.gemplers.com), Forestry Suppliers (800-647-5368 or www.forestry-suppliers.com), and SweepNets.com (408-887-7995 or www.sweepnets.com). Ask for the heavy duty 15-inch insect sweep net. Also be sure to order a replacement net.

DEFOLIATION THRESHOLDS

The general defoliation threshold for foliage-feeding pests or pest combinations is 30 percent leaf-area loss before bloom and 15 percent thereafter. There is a tendency to overestimate foliage loss, in part because insects often feed in the upper, more visible part of the canopy. In addition, there is a tendency for the eye to focus more on damaged leaves. A technique to "calibrate" or check defoliation estimates is to remove a trifoliate leaf (three leaflets) from the top, middle, and lower part of the canopy without looking. Then take an extra leaflet from the middle canopy, for a total of ten leaflets. Look at each leaflet individually, and assign a score of 0 to 10 to each based on an estimate of the portion of leaf area that is missing. For example, a score of 1 requires that at least 10% is missing; a 3 means that 30% is eaten; a 10 indicates that all or nearly the entire leaflet is gone. Add up the score total for all ten leaflets to arrive at a defoliation estimate. Calculate several such defoliation scores and compare the average to estimates made by simply scanning the canopy.

BEAT-CLOTH THRESHOLDS

The thresholds in **Table 1 (per row ft)** and **Table 2 (per 3-ft sample)** can be used with the beat cloth method.

Table 1. Treatment thresholds **(per row ft)** for soybean insects sampled with beat cloth.

Pest	Row width (inches)				
	38	30	21	14	7
stink bug	1	0.8	0.5	0.3	0.2
corn earworm*	2	1.6	1.1	0.7	0.4
velvetbean caterpillar	4-6	4	2.7	1.8	0.9
soybean looper	6-8	5.5	3.8	2.6	1.3

*this is the pod-feeding threshold for corn earworm

Table 2. Treatment thresholds **(per 3 row ft)** for soybean insects sampled with beat cloth.

Pest	Row width (inches)				
	38	30	21	14	7
stink bug	3	2.4	1.6	1.1	0.5
corn earworm*	6	4.7	3.3	2.2	1.1
velvetbean caterpillar	12-18	12	8.3	5.5	2.7
soybean looper	18-24	16	11.6	7.7	3.8

*this is the pod-feeding threshold for corn earworm

SWEEP-NET THRESHOLDS

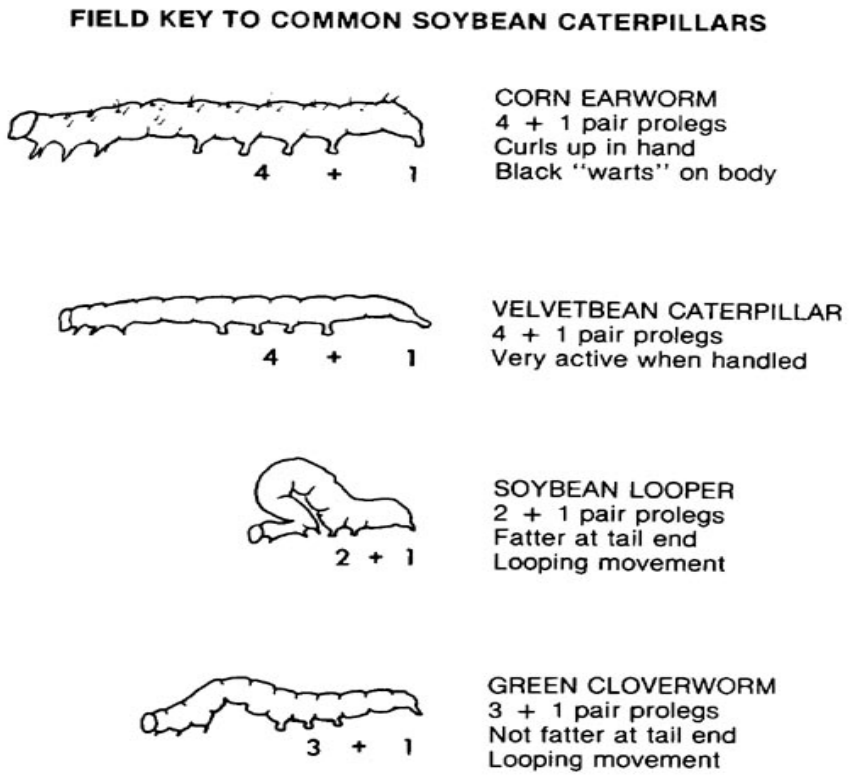
Sweep net thresholds in drilled soybeans are not as well-defined as those for beat/shake samples. The following thresholds should be considered guidelines until more research is available. Use percent defoliation estimates as an additional treatment guideline for foliage feeders. Prior to bloom, up to 30% defoliation is acceptable without economic yield loss, but once blooming begins, the guideline drops to 15% defoliation.

Table 3. Treatment guidelines for soybean insects sampled with a sweep net.

Pest	Number per 10 sweeps	Comments
stink bug	1-2	
corn earworm	3	or 15% foliage loss
velvetbean caterpillar	10	or 15% foliage loss
soybean looper	15	or 15% foliage loss
kudzu bug	10 (nymphs)	1 nymph per sweep
For other foliage feeders use a threshold of 30% defoliation before first bloom, 15% after first bloom.		

INSECT IDENTIFICATION

The four most common caterpillars found in soybean are the corn earworm, green cloverworm, velvetbean caterpillar, and soybean looper. Because color and size are quite variable, the field key below can be helpful in pointing out distinguishing characteristics.



Corn Earworm (Podworm). Corn earworms have many color variations, but the presence of dark "warts" and more body "hairs" helps to distinguish smaller larvae from other common soybean leps. Corn earworm also tends to curl up in a C-shape when handled. They have a 4 + 1 proleg pattern, unlike green cloverworms or loopers. The primary infestation period is from the last week of July to early September. Corn earworm, often called "podworm," is a pest throughout the state feeding on foliage, blooms, pods, and terminal stems. Corn earworms and stink bugs are the most economically important pests of soybean because they feed directly on pods.

Velvetbean Caterpillar. 4 + 1 pair prolegs (3 + 1 when small); very active when touched; light green to black; causes problems around mid-August to late October; mainly found in southern Coastal Plain, especially Beaufort, Charleston, Colleton, Hampton and Jasper counties. This late-season pest is often mistakenly called "armyworm" because it seems to appear overnight in large numbers and can rapidly strip a field. The dark color of some specimens also causes confusion. If you see large numbers of very small green worms on the shake cloth late in the season, be on the alert for velvetbean caterpillar defoliation beginning in the top of the canopy.

Soybean Looper. 2 + 1 pair prolegs; looping movement; fatter at "tail-end" of body; usually causes problems from mid-August to mid-September, mainly in cotton production areas and southern coastal counties. The three pairs of thoracic (front) legs may be green or black. Leg color can change on the same insect as it ages and has no effect on insecticide tolerance. This pest prefers plants which are not drought-stressed. Damage usually starts in the middle of a lush canopy.

Green Cloverworm. 3 + 1 pair prolegs; looping movement; not fatter at tail-end; can be problem during July to September; seldom does significant damage by itself, statewide distribution. This insect is often misidentified as looper due to the looping motion of small larvae. This mistaken identity can be expensive. High rates of pyrethroids and other insecticides are often wasted on cloverworms misidentified as loopers.

Stink Bugs. Green or brown shield-shaped insects as adults, immatures with same general shape, but no wings; mainly an August-September problem; mostly southern Coastal Plain. Stink bug damage is much less obvious than caterpillar damage but usually more costly. Stink bug feeding causes shriveled seed with reduced germination and can cause small pods to abort.

Lesser Cornstalk Borer. Green-blue or purple-banded larvae, up to three-quarters of an inch long; found at soil surface or tunneled into stem; body twitches vigorously when touched; builds a sand tube often found attached to the stem. Can be serious pest during drought stress, particularly on soils with a sandy surface. Burning and disking of wheat stubble prior to planting increases lesser cornstalk borer problems. Reduced tillage reduces lesser cornstalk borer damage. This pest destroys soybean stands by girdling or tunneling into seedlings. The problem is usually misdiagnosed as poor germination or stand loss caused directly by drought stress. The preventative treatment listed under control can protect stands in high-risk situations.

Soybean (*Dectes*) Stem Borer. Pale gray adults with long black and gray banded antennae. Larvae are cream-colored legless grubs that tunnel stems of soybeans and other hosts (ragweed, cocklebur, etc.). Larval stage is injurious to soybean by tunneling mainstems, producing seriously damaged plants and significant yield loss when infestation is early, resulting in lodged or cut plants. Associated with repetitive monoculture soybean, so crop rotation helps tremendously with prevention. Insecticide sprays are ineffective in controlling larvae or adults, and cultural practices involving crop destruction and land preparation (i.e. disking, deep plowing) are primary modes of control.

Kudzu Bugs. Kudzu bug adults grow to about the same size as adult lady beetles. They have a small, almost square-like appearance, measure approximately one-fourth inch long, and have a light brown color with an olive-green hue and dark specks. Kudzu bug eggs have a light tan color and are laid in a slanting position in two-row masses. Each barrel-shaped egg has a row of spines around the operculum (lid or opening for emerging nymphs). When immature insects hatch from the eggs, they have an orange color and remain in close proximity to the egg mass for a short time before dispersing. As nymphs grow, they take on a paler green color and a very "hairy" appearance, particularly in the late immature stages. When large numbers of adults and/or nymphs exist together, the species has a very distinct odor that can be quite strong, often to the point of being useful in detecting their presence before visually confirming it.

Timing of major soybean pest infestations South Carolina

<table>
<tr><td colspan="4">Kudzu Bugs (all season)</td></tr>
<tr><td></td><td colspan="2">Corn Earworms</td><td></td></tr>
<tr><td colspan="2"></td><td>Loopers</td><td></td></tr>
<tr><td colspan="2"></td><td colspan="2">Stink Bugs</td></tr>
<tr><td colspan="2"></td><td colspan="2">Velvetbean Caterpillars</td></tr>
<tr><td>July</td><td>August</td><td>September</td><td>October</td></tr>
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CHEMICAL AND RATE SELECTION

See the following section for insecticide recommendations. A rate range is usually given for pest control. Factors that influence the required rate are pest size, pest density, plant size, temperature, and application method. The higher rates generally are needed for combinations of heavy populations, larger insects, dense plant canopy, extreme temperatures (95 degrees F), and aerial application.

Use of broad-spectrum insecticides such as Lannate can result in retreatment for late-season velvetbean caterpillar outbreaks. In areas with annual velvetbean caterpillar problems, growers should consider adding Dimilin to corn earworm, stink bug, or boron treatments to prevent retreatment.

SOYBEAN INSECT CONTROL

CORN EARWORM & GREEN CLOVERWORM* (Pyrethroids/Non-Pyrethroids)
BEAN LEAF BEETLE, THREECORNERED ALFALFA HOPPER, & JAPANESE BEETLE (Pyrethroids)

Product (pyrethroids)	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
beta-cyfluthrin **(R)** Baythroid XL 1 EC	1.6-2.8 oz	0.013-0.022	45.7-80	12 hr	45 d	Pyrethroids provide residual activity for VBC. Defoliation should not exceed 15-20% after mid-bloom or 30% before mid-bloom. Consider size of population, canopy density, temperature in selecting rate. After pods appear, treat for 2 or more large (>0.5 in) CEW per row ft. *Use low rates for GCW that infrequently require control. Treat for TCAH when stand is threatened, at 3 per row ft, or more than several/sweep.
lambda-cyhalothrin **(R)** Karate Z 2.08 CS or Warrior II 2.08 CS Silencer 1 EC or Lambda-Cy 1 EC	 0.96-1.6 oz 1.92-3.2 oz	0.0156-0.026	 80-133 40-66.6	24 hr	30 d	
esfenvalerate **(R)** Asana XL 0.66 EC	5.8-9.6 oz	0.03-0.05	13-22	12 hr	21 d	
gamma-cyhalothrin **(R)** Declare 1.25 CS	0.77-1.28 oz	0.0075-0.0125	100-166	24 hr	30 d	
zeta-cypermethrin **(R)** Mustang Max 0.8 EC	2.8-4.0 oz	0.0175-0.025	32-45.7	12 hr	21 d	
zeta-cypermethrin **(R)** + bifenthrin **(R)** Hero 1.24 EC	2.6-6.1 oz	0.025-0.06	21-49.2	12 hr	21 d	
bifenthrin **(R)** Discipline 2 EC or Brigade 2 EC or Fanfare 2 EC or Bifenture 2 EC	2.6-6.4 oz	0.04-0.1	20-50	12 hr	18 d	
Product (non-pyrethroids)	**Product/acre**	**Lb ai/acre**	**Acre/gal**	**REI**	**PHI**	
indoxacarb Steward 1.25 EC	5.6-11.3 oz	0.054-0.11	11.3-22.8	12 hr	21 d	
spinosad Blackhawk 36 WG	1.7-2.2 oz	0.038-0.05	-	4 hr	28 d	
methomyl **(R)** Lannate 2.4 LV	0.75-1.5 pt	0.225-0.45	5.3-10.7	48 hr	14 d	
carbaryl Sevin 80 S Sevin XLR Plus Sevin 4 F	 0.94-1.56 lb 0.75-1.25 qt 0.75-1.25 qt	0.75-1.25	 - 3.2-5.33 3.2-5.33	12 hr	21 d	
chlorantraniliprole Prevathon 0.43 SC	14.0-20.0 oz	0.047-0.067	6.25-9.1	4 hr	21 d	5-d interval/ application
methoxyfenozide/spinetoram Intrepid Edge 3	4.0-6.4 oz	0.094-0.15	20-32	4 hr	28 d	Pre-mixed

THRIPS

Product	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
acephate Orthene/Acephate 97 Orthene/Acephate 90	 4.6-8.0 oz 5.0-8.96 oz	0.28-0.5	 - -	24 hr	14 d	Treat only when stand is threatened

GRASSHOPPERS

Product (pyrethroids)	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
beta-cyfluthrin **(R)** Baythroid XL 1 EC	2.0-2.8 oz	0.016-0.022	45.7-64	12 hr	45 d	Grasshoppers can be a problem on soybeans in reduced tillage systems. Eggs are deposited in the soil in pods and are not destroyed in minimum tillage. Re-infestation occurs from field edges and from eggs hatching in fields. High rates of OPs and pyrethroids are needed on larger species. Dimilin, an insect growth regulator (IGR), works only on immatures and should be considered in minimum-tillage fields with a history of problems.
lambda-cyhalothrin **(R)** Karate Z 2.08 CS or Warrior II 2.08 CS Silencer 1 EC or Lambda-Cy 1 EC	 1.6-1.92 oz 3.2-3.84 oz	0.026-0.03	 66.6-80 33.3-40	24 hr	30 d	
esfenvalerate **(R)** Asana XL 0.66 EC	5.8-9.6 oz	0.03-0.05	13-22	12 hr	21 d	
gamma-cyhalothrin **(R)** Declare 1.25 CS	1.28-1.54 oz	0.0125-0.015	83-100	24 hr	30 d	
zeta-cypermethrin **(R)** Mustang Max 0.8 EC	3.2-4.0 oz	0.02-0.025	32-40	12 hr	21 d	
bifenthrin **(R)** Discipline 2 EC or Brigade 2 EC or Fanfare 2 EC or Bifenture 2 EC	2.6-6.4 oz	0.04-0.1	20-50	12 hr	18 d	
zeta-cypermethrin **(R)** + bifenthrin **(R)** Hero 1.24 EC	2.6-6.1 oz	0.025-0.06	21-49.2	12 hr	21 d	
Product (non-pyrethroids)	**Product/acre**	**Lb ai/acre**	**Acre/gal**	**REI**	**PHI**	
acephate Orthene/Acephate 97 Orthene/Acephate 90	 4.6-8.0 oz 5.0-8.96 oz	0.28-0.5	 - -	24 hr	14 d	
carbaryl Sevin 80 S Sevin XLR Plus or Sevin 4 F	 0.94-1.56 lb 0.75-1.25 qt	0.75-1.25	 - 3.2-5.33	12 hr	21 d	
chlorpyrifos **(R)** Lorsban 4 E or Chlorpyrifos 4 E or Nufos 4 E Lorsban Advanced 3.755	 1.0-2.0 pt 0.5-1.0 pt	0.23-1.0 0.5-1.0 0.23-0.47	 4-8 8-16	24 h	28 d	
diflubenzuron Dimilin 2 L **(R)**	2.0 oz	0.03125	64	12 hr	21 d	Effective on nymphs only

SPIDER MITES

Product	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
dimethoate Dimethoate 4 EC	1.0 pt	0.5	8	48 hr	21 d	Can be a problem in drought stress

VELVETBEAN CATERPILLAR

Product (pyrethroids)	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
beta-cyfluthrin **(R)** Baythroid XL 1 EC	1.6 oz	0.0125	80	12 hr	45 d	VBC occurs in high numbers but is easily controlled. Use higher rates for high populations. Significant defoliation can be caused by 4-6 large VBC per row ft, and pod clipping can occur after defoliation. Treat when defoliation exceeds 15% after mid-bloom and at 30% before mid-bloom. Pyrethroids can provide extended residual control of VBC. Dimilin is a preventative treatment for high-risk areas.
lambda-cyhalothrin **(R)** Karate Z 2.08 CS or Warrior II 2.08 CS Silencer 1 EC or Lambda-Cy 1 EC	 0.96 oz 1.92 oz	0.0156	 133 66.6	24 hr	30 d	
esfenvalerate **(R)** Asana XL 0.66 EC	2.9 oz	0.015	44	12 hr	21 d	
gamma-cyhalothrin **(R)** Declare 1.25 CS	0.77 oz	0.0075	166	24 hr	30 d	
zeta-cypermethrin **(R)** Mustang Max 0.8 EC	2.8 oz	0.0175	45.7	12 hr	21 d	
zeta-cypermethrin **(R)** + bifenthrin **(R)** Hero 1.24 EC	2.6-6.1 oz	0.025-0.06	21-49.2	12 hr	21 d	
Product (non-pyrethroids)	**Product/acre**	**Lb ai/acre**	**Acre/gal**	**REI**	**PHI**	
methoxyfenozide Intrepid 2 F	4.0 oz	0.0625	32	4 hr	14 d	
diflubenzuron Dimilin 2 L	2.0-3.0 oz	0.03125-0.047	42.6-64	12 hr	21 d	
spinosad Blackhawk 36 WG	1.1-2.2	0.025-0.05	-	4 hr	28 d	
methomyl **(R)** Lannate 2.4 LV	4.8-9.6 oz	0.09-0.18	13.3-26.6	48 hr	14 d	
carbaryl Sevin 80 S Sevin XLR Plus or Sevin 4 F	 0.5-1.0 lb 1.0-1.5 pt	0.5-0.75	 - 5.33-8.0	12 hr	21 d	
chlorantraniliprole Prevathon 0.43 SC	14.0-20.0 oz	0.047-0.067	6.25-9.1	4 hr	21 d	5-d interval/ application
methoxyfenozide/spinetoram Intrepid Edge 3	4.0-6.4 oz	0.094-0.15	20-32	4 hr	28 d	Pre-mixed

SOYBEAN LOOPER, TOBACCO BUDWORM, BEET & FALL ARMYWORM

Product	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
indoxacarb Steward 1.25 EC	5.6-11.3 oz	0.054-0.11	11.3-22.8	12 hr	21 d	See CEW defoliation thresholds. It takes 6-8 large loopers per row ft to cause major defoliation. *Not for TBW.
spinosad Blackhawk 36 WG	1.1-2.2	0.025-0.05	-	4 hr	28 d	
methoxyfenozide Intrepid 2 F*	4.0-8.0 oz	0.0625-0.125	16-32	4 hr	14 d	
chlorantraniliprole Prevathon 0.43 SC	14.0-20.0 oz	0.047-0.067	6.25-9.1	4 hr	21 d	3-d interval/ application
methoxyfenozide/spinetoram Intrepid Edge 3	4.0-6.4 oz	0.094-0.15	20-32	4 hr	28 d	Pre-mixed

STINK BUGS

Product (pyrethroids)	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
beta-cyfluthrin **(R)** Baythroid XL 1 EC	1.6-2.8 oz	0.013-0.022	45.7-80	12 hr	45 d	After pods appear, treat when stink bugs reach 1 per row ft using a drop cloth or 1-2 per 10 sweeps using a sweep net. Treat for stink bugs exceeding threshold into R7. Redbanded stink bugs (RBSB) are more difficult to control. Use mix of pyrethroid and acephate for redbanded stink bug. Orthene might increase chances for later problems with loopers and velvetbean caterpillars.
lambda-cyhalothrin **(R)** Karate Z 2.08 CS or Warrior II 2.08 CS Silencer 1 EC or Lambda-Cy 1 EC	 1.6-1.92 oz 3.2-3.84 oz	0.026-0.03	 66.6-80 33.3-40	24 hr	30 d	
gamma-cyhalothrin **(R)** Declare 1.25 CS	1.28-1.54 oz	0.0125-0.015	83-100	24 hr	30 d	
zeta-cypermethrin **(R)** Mustang Max 0.8 EC	3.2-4.0 oz	0.02-0.025	32-40	12 hr	21 d	
zeta-cypermethrin **(R)** + bifenthrin **(R)** Hero 1.24 EC	4.0-10.3 oz	0.04-0.1	12.4-32	12 hr	21 d	
bifenthrin **(R)** Discipline 2 EC or Brigade 2 EC or Fanfare 2 EC or Bifenture 2 EC	2.6-6.4 oz	0.04-0.1	20-50	12 hr	18 d	
alpha-cypermethrin **(R)** Fastac 0.83 EC	3.8 oz	0.025	33.7	12 hr	21 d	
Product (non-pyrethroids)	**Product/acre**	**Lb ai/acre**	**Acre/gal**	**REI**	**PHI**	
acephate Orthene/Acephate 90 Orthene/Acephate 97	 9.6-16.0 oz 8.0-16.0 oz	0.5-1.0	 - -	24 hr	14 d	

LESSER CORNSTALK BORER

Product	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
chlorpyrifos **(R)** Lorsban 15 G	6.7-13.3 lb	1.0-2.0	-	24 h	7 d	PREVENTION: Reduced tillage significantly reduces LCB damage, as does early season irrigation. AT PLANTING: Apply 8-15 oz 15G/1000 row ft (38' rows) in 6-8-inch band over row. Incorporate lightly with press wheel and drag chain or tines. RESCUE (erratic): When 10% of seedlings show damage, apply 4E in 25 gal water in 6-inch band directly at the base of plant.
chlorpyrifos **(R)** Lorsban 4 E or Nufos 4 E or Chlorpyrifos 4 E Lorsban Advanced 3.755	 1.0 qt 0.5-1.0 qt	0.47-1.0 1.0 0.47-0.94	 4 4-8	 24 h	28 d	

KUDZU BUGS

Product (pyrethroids)	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
bifenthrin **(R)** Discipline 2 EC Brigade 2 EC Fanfare 2 EC	 4.0-6.4 oz 4.0-6.4 oz 4.0-6.4 oz	0.0625-0.1	 20-32 20-32 20-32	12 hr	18 d	Apply insecticide when sweep-net sampling yields one nymph per sweep. If kudzu bug immatures are easily and repeatedly found on petioles and main stems during visual inspections of the canopy, treatment is likely warranted. Do not bias all sampling to border rows where initial populations build. Border treatment for initial infestations of adults limited to field edges might delay need for whole-field treatment.
lambda-cyhalothrin **(R)** Karate Z 2.08 CS Warrior II 2.08 CS Silencer 1 EC	 1.92 oz 1.92 oz 3.84 oz	0.03	 66.6 66.6 33.3	24 hr	30 d	
gamma-cyhalothrin **(R)** Declare 1.25 CS	 1.54 oz	0.015	 83	24 hr	30 d	
zeta-cypermethrin **(R)** Mustang Max 0.8 EC	 4.0 oz	0.025	 32	12 hr	21 d	
zeta-cypermethrin **(R)** + bifenthrin **(R)** Hero 1.24 EC	 6.4-10.3 oz	0.062-0.1	 12.4-20	12 hr	21 d	
alpha-cypermethrin **(R)** Fastac 0.83 EC	 3.8 oz	0.025	 33.7	12 hr	21 d	
Pre-mixed products containing a pyrethroid listed here and another active ingredient with activity on kudzu bugs (see MULTIPLE PESTS – PRE-MIXED PRODUCTS below)						

MULTIPLE PESTS – PRE-MIXED PRODUCTS

Product	Product/acre	Lb ai/acre	Acre/gal	REI	PHI	Comments
thiamethoxam/*lambda*-cyhalothrin **(R)** Endigo 2.06 ZC*	 2.5-4.5 oz	0.04-0.072	 28.4-51.2	24 hr	30 d	Season limit of 9 oz/acre Pre-mixed
imidacloprid/*beta*-cyfluthrin **(R)** Leverage 360	 2.8 oz	0.0656	 45.7	12 hr	14 d	Pre-mixed
imidacloprid/bifenthrin **(R)** Brigadier 2 SC*	 5.1-6.1 oz	0.08-0.095	 21-25	12 hr	18 or 45 d	Pre-mixed
chlorpyrifos/*lambda*-cyhalothrin **(R)** Cobalt Advanced 2.63*	 11.0-38.0 oz	0.226-0.78	 3.4-11.6	24 hr	30 d	Pre-mixed
chlorantraniliprole/*lambda*-cyhalothrin **(R)** Besiege 1.25 ZC*	 5.0-10.0 oz	0.049-0.098	12.8-25.6	24 hr	30 d	Season limit of 20 oz/acre Pre-mixed
diflubenzuron/*lambda*-cyhalothrin **(R)** DoubleTake 3*	 3.0-4.0 oz	0.07-0.0938	 32-42.7	24 hr	30 d	Pre-mixed
methoxyfenozide/spinetoram Intrepid Edge 3	 4.0-6.4 oz	0.094-0.15	 20-32	4 hr	28 d	Pre-mixed

Pre-mixed products	Pests and Activity of Product (does not imply good control…just activity)										
	LCB	VBC	TCAH	BAW/FAW	CEW	TBW	SBL	GCW	SB	KB	Grasshoppers
Leverage	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Endigo	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Brigadier	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Besiege	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cobalt Adv	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
DoubleTake	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Intrepid Edge	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No

For control of multiple pests exceeding thresholds, including but not limited to various combinations of the following: cutworm, cabbage looper, green cloverworm (GCW), corn earworm (CEW), saltmarsh caterpillar, aphids, threecornered alfalfa hopper (TCAH), velvetbean caterpillar (VBC), bean leaf beetles, grasshoppers, plant bugs, kudzu bug (KB), and stink bugs (SB). Use higher rates for stink bugs, corn earworm, and grasshoppers. Use highest labeled rates for kudzu bug*.

ai = active ingredient; **(R)** = Restricted use; **REI** = re-entry interval; **PHI** = pre-harvest interval