

## INSECTICIDE RECOMMENDATIONS FOR SOYBEANS- 2007

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Kentucky now ranks among the major soybean producing states. More insect problems have been associated with Kentucky soybeans since it has become a major crop. The following information and control aids should enable the grower to minimize losses due to insect pests on soybeans.

### Evaluation of Soybean Insect Infestations

To establish need and estimate proper timing for soybean insect control, fields need to be inspected at least once a week from first planting until maturity. Shaking soybeans over the row middle will generally be adequate in determining the soybean insects present. A cloth or a newspaper 42" x 24" may be used in the row middle to facilitate counting the soybean insects in almost any row width. Place the cloth between two rows, vigorously shake approximately two row feet of plants in each row over the cloth. Count the insects and repeat this process at 10 different locations in the field. If you have no available cloth, use the soil surface as the area for counting insects. Use the average number of insects found for determining when to spray. (**Note "Time of Treatment" in Control Tables at the end of this publication.**)

Determining the percent of defoliation by observing the bean field may be difficult because the dense foliage hides damaged leaves. Pull up plants from several locations in the field and place the leaves against a light background. This method should give a fairly accurate measure of the percent defoliation. Refer to the tables for the percent defoliation to determine if control measures are justified.

Some years may not require the use of insecticides. However, as many as two to three treatments may be needed with a severe insect outbreak. In any event, the **"Non-Chemical Control Aids"** indicates the management practices that will help to decrease the number of soybean insect problems encountered.

### Biological Insecticides

Several "biological insecticides" are labeled for use on soybean pests. The action of these insecticides differs from the traditional concepts in that they do not poison the pest. Rather these compounds kill by causing a disease, in the case of *Bacillus thuringiensis*, or a physiological dysfunction as with Dimilin. These products are particularly suited to use with pest management operations because they have no effect on the natural enemies of the pest. However, because of their mode of action, use of these compounds does not result in a quick kill. It may take from one to three days after application before the insect is killed. However, little or no feeding by the pest will occur during this period.

### Additional Information

These recommendations are meant to serve only as a guide. Many unpredictable environmental and biological factors will influence the final choice of insecticides to be used. In addition to these recommendations the producer is advised to review **IPM-3 Kentucky IPM Manual for Soybean**. This publication will provide information about identification, life cycle, scouting techniques, and threshold values for the common pests of soybean. This manual may be found on the IPM web pages at: <http://www.uky.edu/Agriculture/IPM/ipm.htm>.

Additionally, you may find useful information about a specific pest in our ENTFACT series. These fact sheets may be found on the Entomology web pages at: <http://www.uky.edu/Agriculture/Entomology/entfacts.htm>. These and other publications and educational materials are also available to the producer through your County Extension Office.

### Use Insecticides Properly

Products listed in this publication are not the only products labeled for use. These products are commonly used and generally available in Kentucky. You may find many other products with different trade names containing the same active ingredient. Be sure the product you choose is labeled for the intended use and registered in Kentucky.

This publication is an abbreviated guide; it is **not a substitute for a product label**. Before using an insecticide, read the entire label. Note sections containing directions for use, and the warning and precautionary statements. Be thoroughly familiar with the proper safety equipment (i.e., goggles, protective suits, respirators, etc.) required to afford maximum protection. Those involved in control operations should always know the name of the chemical being used and the particular concentration being applied.

Chemicals listed in **bold italics** are **Restricted Use** pesticides. Persons buying, using, or supervising the use of these pesticides must be certified as competent to do so. Certification training is available from your county extension agent for agriculture. Check <http://www.uky.edu/Agriculture/PAT/welcome.htm> for information on certification.

### Seed Maggots

Seed maggots, the larvae of a small fly, can destroy seeds planted into cool, wet soils. Infestations can greatly reduce germination and severely weaken seedlings. An insecticide seed treatment, such as Agrox D-L Plus at 2 oz per bushel of seed, can protect against this pest. This product contains diazinon and lindane. Read the label carefully before use.

### Foliar Treatments for Cutworms

(See: Cutworms in Kentucky Soybeans. Entfact-132.  
<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa132.pdf>)

Insecticide	Rate per Acre	Days to Harvest/Forage
<b><i>Asana XL</i></b> (esfenvalerate)	5.8 to 9.6 fl. oz.	21 (Grain) Do not feed or graze livestock
<b><i>Baythroid 2</i></b> (cyfluthrin)	0.8 -1.6 fl. oz.	45 (Grain & feeding dry vines) 15 (Green forage)
<u><i>Bacillus thuringiensis</i></u> "B.t."	Aid in control of caterpillars can be obtained using many products containing "B.t." Some examples are Agree, Biobit, Dipel, Javelin, and Lepinox. Check labels for details. Days to Harvest = 0.	
<b><i>Larvin 3.2 AF</i></b> (thiodicarb)	20 to 30 fl. oz.	28 (Grain) Do not feed forage, hay or straw
<b><i>Lorsban 4 E</i></b> (chlorpyrifos)	1 to 2 pts.	28 (Grain) Do not graze or feed livestock
<b><i>MustangMax</i></b> (zeta-cypermethrin)	1.4 to 4.0 fl. oz	21 (Grain) Do not graze or feed livestock
<b><i>Pounce 3.2 EC</i></b> (permethrin)	2 to 4 fl. oz.	60(Grain) Do not graze or feed livestock

- Treat when 30% of young plants are cut and live larvae are present.

### Foliar Treatments for Soybean Podworm and Fall Armyworms

Corn earworm is also known as the soybean podworm. Early planting will greatly reduce problems with this pest.

Insecticide	Rate per Acre	Days to Harvest/Forage
<b><i>Lannate SP</i></b> (methomyl)	1/4 to 3/8 lb.	14 Grain, 3 Forage, 12 Hay
<b><i>Larvin 3.2 AF</i></b>	10 to 30 fl. oz.	28 (Grain) Do not feed forage, hay or straw
Tracer (spinosad)	1 ½ to 2.0 fl. oz.	28 Do not feed forage or hay
Steward (idoxacarb)	5.6 to 11.3 fl. oz.	21 Do not feed or graze livestock

- Corn earworms or fall armyworm infestations should be treated when defoliation levels exceed those listed in Table 2. If pod feeding is occurring, treat when populations reach 2 per row foot.

**Foliar Treatments for Soybean Podworm only**

(See: Soybean podworm in Kentucky Soybeans. Entfact-144.

<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa144.pdf>)

<b>Insecticide</b>	<b>Rate per Acre</b>	<b>Days to Harvest/Forage</b>
<i>Asana XL</i>	5.8 to 9.6 fl. oz.	21 (Grain) Do not feed or graze livestock
<i>Baythroid 2</i>	1.6 - 2.8 fl. oz.	45 (Grain & feeding dry vines) 15 (Green forage)
<i>Lorsban 4 E</i>	1 to 2 pts.	28 (Grain) Do not graze or feed livestock
<i>MustangMax</i>	2.8 to 4.0 fl. oz	21(Grain) Do not graze or feed livestock
<i>Pounce 3.2 EC</i>	4 to 8 fl. oz.	60 (Grain) Do not graze or feed livestock
Sevin 80S Sevin XLR Plus (carbaryl)	5/8 to 1-7/8 lbs. 1/2 to 1-1/2 qts	21 (Dry beans or hay) 14 (Grazing or forage)
<i>Warrior</i> (lambda cyhalothrin)	1.92 to 3.2 fl. oz.	45 (Grain) Do not graze or feed.

**Foliar Treatments for Green Cloverworm, Bean Leaf Beetle, and Mexican Bean Beetle**

(See: Bean Leaf Beetle in Kentucky Soybeans. Entfact-131.

<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa131.pdf>)

(See: Greenclover worm in Kentucky Soybeans. Entfact-142.

<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa142.pdf>)

<b>Insecticide</b>	<b>Rate per Acre</b>	<b>Days to Harvest/Forage</b>
<i>Asana XL</i>	2.9 to 5.8 fl. oz. (GCW & MBB)	21(Grain) Do not feed or graze livestock
	5.8 to 9.6 fl. oz. (BLB)	21(Grain) Do not feed or graze livestock
<i>Baythroid 2</i>	1.6 - 2.8 fl. oz.	45 (Grain & feeding dry vines) 15 (Green forage)
<i>Dimilin 25 W</i> (diflubenzuron)	2 to 4 oz. (MBM & GCW)	21
<i>Lannate WSP</i>	1/4 to 1/2 lb.	14 Grain, 3 Forage, 12 Hay
<i>Larvin 3.2 AF</i>	18 to 30 fl. oz. (MBB & BLB)	28(Grain) Do not feed forage, hay or straw
<i>Lorsban 4 E</i>	1/2 to 1 pt( GCW) 1 to 2 pts. (BLB & MBB)	28 (Grain) Do not graze or feed livestock
<i>MustangMax</i>	2.8 to 4.0 fl. oz.	21(Grain) Do not graze or feed livestock

Orthene 90 (acephate)	0.83 to 1.1 lbs.	14 (Grain)
<b><i>Penncap M</i></b> (methyl parathion)	2 to 3 pts.	20 (Harvest or grazing)
<b><i>Pounce 3.2 EC</i></b>	2 to 4 fl. oz.	60 (Grain) Do not graze or feed livestock
Sevin 80	5/8 to 1-1/4 lb.	21(Dry beans or hay 14 ( Graze or forage)
<b><i>Warrior</i></b>	1.92 to 3.2 fl. oz.	45 (Grain) Do not graze or feed

- Fields infested with green cloverworm should be treated when populations exceed those computed from Table 1.
- Treat for Mexican bean beetles according to defoliation guidelines in Table 2 or the population thresholds listed below.

#### Economic Threshold Table for Mexican Bean Beetles

Growth Stage	Number of Mexican Bean Beetles per 4 row ft to justify control
Seedling	3 adults
Prebloom	20 adults and larvae
Bloom	16 adults and larvae
Pod Set	16 adults and larvae

- Bean leaf beetle damage is estimated by percent defoliation. Use Table 2 to make application decisions.

#### Foliar Treatments for Green Cloverworm Only

Insecticide	Rate per Acre	Days to Harvest/Forage
<i>Bacillus thuringiensis</i> "B.t."	Aid in control of caterpillars can be obtained using many products containing "B.t." Some examples are Agree, Biobit, Dipel, Javelin, and Lepinox. Check labels for details. Days to Harvest = 0	
<b><i>Larvin 3.2 AF</i></b>	10 to 30 fl. oz.	28(Grain) Do not feed forage, hay or straw
Steward	5.6 to 11.3 fl. oz.	21 Do not feed or graze livestock
Tracer	1.5 to 2.0 fl. oz.	28(Grain) Do not feed forage or hay

The *Bacillus thuringiensis* products and Dimilin are "biological insecticides". Although larval feeding will cease, death may take several days.

#### Foliar Treatments for Three-cornered Alfalfa Hopper

Insecticide	Rate per Acre	Days to Harvest/Forage
<b><i>Asana XL</i></b>	5.8 to 9.6 fl. oz.	21 (Grain) Do not feed or graze livestock
<b><i>Baythroid 2</i></b>	1.6 - 2.8 fl. oz.	45 (Grain & feeding dry vines) 15 (Green forage)
Dimethoate 4E (dimethoate)	1 pt	21(Grain) 5 (Feed or graze)
Orthene 90	0.83 to 1.1 lbs.	14 (grain)

<i>Penncap M</i>	2 to 3 pts.	20 (Harvest or grazing)
Sevin 80 S	1-1/4 lb.	21 (Dry beans or hay) 14 (Graze or forage)
<i>Mustang Max</i>	2.8 to 4.0 fl. oz.	21 (Grain) Do not graze or feed livestock
<i>Warrior</i>	1.92 to 3.2 fl. oz.	45 (Grain) Do not graze or feed.

- If 50% of the plants are girdled or if fewer than 4-6 un-girdled plants per row foot remain in conventional rows (30-40" rows) **and three-cornered alfalfa hopper nymphs are still present**, controls are recommended.

#### Foliar Treatments for Grasshoppers

(See: Three Common Kentucky Grasshoppers and their Natural Enemies. Entfact-116.  
<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa116.pdf>)

Insecticide	Rate per Acre	Days to Harvest/Forage
<i>Asana XL</i>	5.8 to 9.6 fl. oz.	21 (Grain) Do not feed or graze livestock
<b>Baythroid 2</b>	2.0 - 2.8 fl. oz.	45 (Grain & dry vines) 15 Green forage
Dimethoate 4E	1 pt.	21 (Grain) 5 (Graze or feed)
<i>Furadan 4 F</i> (carbofuran)	1/4 to 1/2 pt.	21
<i>Lorsban 4 E</i>	1/2 to 1 pt.	28 (Grain) Do not graze or feed livestock
<i>Mustang Max</i>	3.2 to 4.0 fl. oz.	21 (Grain) Do not graze or feed livestock
Orthene 90	0.28 to 0.56 lbs.	14 (grain)
Sevin 80	5/8 to 1-7/8 lb.	21 (Dry beans or hay) 14 (Graze or forage)
<i>Warrior T</i>	3.2 to 3.84 fl. oz.	45 (Grain) Do not graze or feed.

Application of herbicides well in advance of plantings may aid control.

- Treat according to defoliation guidelines in Table 2. • A field border application is often adequate in conventional beans.

#### Foliar Treatments for Spider Mites

Insecticide	Rate per Acre	Days to Harvest/Forage
Dimethoate 4	1 pt	21
<i>Lorsban 4E</i>	1/2 to 2 pt.	28

- This pest is likely only in drought conditions. Treat "bronzed" tissue as defoliation for making control decisions.

### Foliar Treatments for Japanese Beetles

(See: Japanese Beetles in Kentucky Soybeans. Entfact-143.  
<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa143.pdf>)

Insecticide	Rate per Acre	Days to Harvest/Forage
<i>Asana XL</i>	5.8 to 9.6 fl. oz.	21 (Grain) Do not feed or graze livestock
<i>Baythroid 2</i>	1.6 - 2.8 fl. oz.	45 (Grain & dry vines) 15 Green forage
<i>Mustang Max</i>	2.8 to 4.0 fl. oz.	21(Grain) Do not graze or feed livestock
<i>Pounce 3.2 EC</i>	2 to 4 fl oz	21 (dry beans or hay) 14 (Graze or forage)
Sevin 80	5/8 to 1-1/4 lb.	21(Dry beans or hay) 14 (Graze or forage)
<i>Warrior T</i>	3.2 to 3.84 fl. oz.	45 (Grain) Do not graze or feed.

- A field borer application is often adequate in conventional beans. Use Table 2 to decide treatment thresholds.

### Foliar Treatments for Soybean Aphid (aka Chinese aphid)

Insecticide	Rate per Acre	Days to Harvest/Forage
<i>Baythroid 2</i> (cyfluthrin)	2.0 to 2.8 fl. oz	45 Grain or feeding of dry vines Green Forage may be fed 15 days post application.
<b>Govern 4E</b> (chlorpyrifos)	1.0 to 2.0 pts.	28 Do not graze or otherwise feed forage, hay or straw.
<i>Lambda</i> (lambda – cyhalothrin)	0.96 to 1.6 fl. oz	45 Do not graze or harvest treated forage, straw, or hay for livestock feed.
<i>Lorsban 4E</i> (chlorpyrifos)	1 to 2 pt.	28 Do not graze or otherwise feed treated forage, hay or straw.
<i>Mustang</i> (zeta – cypermethrin)	3 to 4.3 fl. oz	21 Do not graze or harvest treated forage, straw, or hay for livestock feed.
<i>Mustang Max</i> (zeta – cypermethrin)	2.8 to 4 fl. oz	21 Do not graze or harvest treated forage, straw, or hay for livestock feed.
<i>Mystic Z</i> (lambda – cyhalothrin)	0.96 to 1.6 fl. oz	45 Do not graze or harvest treated forage, straw or hay.
<i>Penncap-M</i> (methyl parathion)	to 3 pts.	20

<b><i>Proaxis</i></b> (gamma - cyhalothrin)	1.92 to 3.20 fl. oz	45 Do not graze or harvest treated forage, straw or hay.
<b><i>Taiga Z</i></b> (lambda – cyhalothrin)	1.92 to 3.20 fl. oz	45 Do not graze or otherwise feed forage, hay or straw.
<b><i>Warhawk</i></b> (chlorpyrifos)	1 to 2 pt.	28 Do not graze or otherwise feed forage, hay or straw.
<b><i>Warrior</i></b> (lambda – cyhalothrin)	1.92 to 3.20 fl. oz.	30 Do not graze for harvest for forage, straw or hay.
<b><i>Whirlwind</i></b> (chlorpyrifos)	1 to 2 pt.	28 Do not graze for other wise feed forage, hay or straw.
<b><i>Yuma 4E</i></b> (chlorpyrifos)	1 to 2 pt.	28 Do not graze for otherwise feed treated forage, hay or straw.

**Insecticides for control of Soybean Aphid on Soybean by issuance of “2(ee)” labels.  
Applicator must have a copy of the supplemental label in their possession to be in compliance.**

<b>Insecticide</b>	<b>Rate per Acre</b>	<b>Days to Harvest/Forage</b>
<b><i>Artic 3.2 EC</i></b> (permethrin)	4 to 8 fl. oz.	60 Do not graze or feed soybean forage or hay.
<b><i>Furadan 4F</i></b> (carbofuran)	¼ to 1/2 pt.	21 Do not graze, forage or cut for silage or hay.
Acephate 90 (acephate)	0.83 to 1.1 lbs.	14 Do not graze or cut vines for hay or forage.
Chlorpyrifos 4E AG (chlorpyrifos)	1 to 2 pt.	28 Do not graze or otherwise feed forage, hay, and straw.
Orthene 75 S (acephate)	1.0 to 1.33 lbs.	14 Do not graze or cut vines for hay or forage.
Orthene 75 WSP (acephate)	1.0 to 1.33 lbs.	14 Do not graze or cut vines for hay or forage
Orthene 90 S (acephate)	0.83 to 1.1 lbs.	14 Do not graze or cut vines for hay or forage
Orthene 97 (acephate)	0.75 to 1 lbs.	14 Do not graze or cut vines for hay or forage

- Threshold 250 aphids per plant AND 80% of plants infested AND plant growth stage is R1 (first bloom) through R5 (beginning seed). Threshold for R6 is currently unknown but must be significantly greater than the

threshold for R1-R5. Beyond the R6 stage of soybeans, there is no economic return on insecticidal applications for soybean aphid control.

### Foliar Treatments for Green Stink Bugs

Insecticide	Rate per Acre	Days to Harvest/Forage
<i>Asana XL</i>	5.8 to 9.6 fl. oz.	21 Do not feed to livestock
<i>Mustang Max</i>	3.2 to 4.0 fl. oz	21(Grain) Do not graze or feed livestock
Orthene 90	0.83 to 1.1 lbs.	14 (grain)
<i>Penncap-M</i>	1 to 3 pts.	20 (Harvest or grazing)
Sevin 80	1-1/4 to 1-7/8 lbs	21 (Dry beans or hay) 14 (Graze or forage)
<i>Warrior</i>	3.2 to 3.84 fl. oz	45 (Grain) Do not graze or feed.

- Nonchemical control: Destroy or utilize crop remnants. Clean weeds from fences, roadsides, ditches, etc. Treat when stink bugs average one per two feet of row, when pods are filling. A field border application may often be adequate.

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### Products for Control of Insect Pests in Stored Soybean

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(See: Controlling Insect in Stored Grain. Entfact-145.  
<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs/entfa145.pdf>)

Information in these Tables is subject to change at any time. Always check the label of the product to insure that you use it correctly. There are other brand names and formulations of the products listed below. These are only the most common forms. If you wish to use a similar product check the label to insure it is registered for the intended use.

#### “Clean-out” Fumigant

Applied to boots of elevators, beneath false floors etc. This is an “empty” space fumigation targeted at the space beneath the perforated floor in a metal grain bin. Fumigant is applied on a volume not bushel basiss. See the **WARNING** below.

*Chlor-O-Pic* (chloropicrin) 2-4 lbs. / 1000 cubic feet

Chloropicrin is significantly heavier than air and is therefore preferred for “clean-out” fumigations. However, though it is still labeled for “clean-out” of empty bins, it may not be available due to shipping constraints. Chloropicrin is highly corrosive to most metals. **DO NOT USE CHLOROPICRIN TO TREAT SOYBEANS!**

*Phostoxin* (aluminum phosphide) tablets 30-140 / 1000 cubic feet.  
 pellets 150-700 / 1000 cubic feet

Aluminum phosphide is not significantly heavier than air and is therefore not the preferred product. However, it is labeled for this use and is easily available. Because of its light and penetrating nature very close attention must be paid to sealing the area to be treated.

#### Bin Surface Applications

Dilute in sufficient water make enough spray to treat 1,000 sq ft of bin surface. Use only in empty bins.

Tempo SC Ultra 0.27 fl. oz.



**Grain Protectants**

Applied directly to stored soybean.

NONE REGISTERED

**Grain Surface “Cap Out” Treatments**

Applied directly to the top surface of stored soybean for control of Indian Meal Moth.

B.t. products will not control beetles and weevils.

Biobit HP (B.t.) 1 lb. / 1000 ft sq (mixed to 4 inches deep)

Dipel DF (B.t.) 1 lb. / 1,000 ft sq (mixed to 4 inches deep)

Javelin WG (B.t.) 14 oz. / 1,000 ft sq (mixed to 4 inches deep)

Indian meal moth adults may be controlled by hanging DDVP Resin strips (Vapona) in the head space over the grain mass. Use 1 strip for each 1,000 cubic feet of air space over the grain. One treatment will last about 3 months.

**Bulk Grain Fumigation**

To be applied/1,000 bu. stored soybean.

<i>Phostoxin</i> (aluminum phosphide)	tablets	40 - 180 / 1,000 bu.
	pellets	200 - 900 / 1,000 bu.

WARNING: Fumigation is a complicated and dangerous technique. If at all possible hire a commercial fumigator. If a commercial fumigation is not possible consult the label of the product you have chosen to use and follow it to the letter. Note that aluminum phosphide labels have undergone major revision in recent years and now contains significant requirements for pre-planning and documentation of the fumigation, and access to considerable safety equipment.

**Table 1.** The number of GREEN CLOVERWORMS per foot of row that will cause economic injury to soybeans. Pre-bloom (5 to 6 trifoliates)- treatment recommended when defoliation exceeds 35%.

	PRIOR TO BLOOM					BLOOM STAGE					POD FILL					APPROACHING MATURITY				
Anticipated Yield of <u>25</u> bu/A																				
Cost of Treatment																				
	\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12				
Market Value	\$5	14	15	16	17	\$5	25	28	32	35	\$5	24	27	30	33	\$5	37	43	50	53
	\$6	14	15	16	17	\$6	24	27	31	34	\$6	22	25	28	31	\$6	34	40	47	52
	\$7	13	14	15	16	\$7	22	26	29	32	\$7	20	23	26	29	\$7	31	37	43	48
	\$8	13	14	15	16	\$8	21	24	27	29	\$8	18	22	24	27	\$8	28	34	39	44
Anticipated Yield of <u>35</u> bu/A																				
Cost of Treatment																				
	\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12				
Market Value	\$5	13	14	15	16	\$5	21	24	27	30	\$5	20	23	26	28	\$5	29	35	40	45
	\$6	13	14	15	15	\$6	20	23	26	29	\$6	18	21	24	26	\$6	27	33	38	43
	\$7	12	13	14	15	\$7	19	22	25	27	\$7	16	19	22	24	\$7	25	30	34	38
	\$8	12	13	13	14	\$8	17	20	22	25	\$8	15	18	20	22	\$8	22	27	32	36
Anticipated Yield of <u>35</u> bu/A																				
Cost of Treatment																				
	\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12					\$6    \$8    \$10    \$12				
Market Value	\$5	12	13	14	14	\$5	18	21	24	26	\$5	15	19	21	23	\$5	24	30	34	38
	\$6	12	13	13	14	\$6	18	20	23	25	\$6	15	18	20	22	\$6	23	28	32	36
	\$7	11	12	13	13	\$7	17	19	22	23	\$7	14	17	19	21	\$7	21	25	29	33
	\$8	11	12	13	13	\$8	15	18	20	22	\$8	13	15	18	20	\$8	19	23	27	30

**How to Use These Tables:**

Because of the difficulty in determining percentage defoliation, you may prefer to use the tables above for determining approximate economic injury levels of the GREEN CLOVERWORM. First select the table most nearly representing the growth stage of your beans and anticipated yield from the field. Then locate the estimated cost per acre of control (top line) and the estimated value per bushel of your beans (left-hand column). The number found at the point where these lines and columns intersect is the approximate number of GREEN CLOVERWORMS per foot of row that will cause economic injury to soybeans. Do not allow infestations of this insect to exceed this level.

For example, suppose your soybeans are at the stage of early pod-fill, anticipated yield is 35 bushels per acre. Your cost of control is \$6 per acre, and the estimated market value of your beans is \$8 per bushel. The correct answer is 15 green cloverworms per foot of row.

**Table 2.** Percent Defoliation Charts for Determining Defoliation Required for Economic Injury to Soybeans Pre-bloom (5 to 6 trifoliates)-treatment recommended when defoliation exceeds 35 percent.

	FULL BLOOM				POD FILL STAGE				APPROACHING MATURITY						
	Anticipated Yields <u>25</u> bu/A				Anticipated Yield <u>35</u> bu/A				Anticipated Yield <u>45</u> bu/A						
	Cost of Treatment				Cost of Treatment				Cost of Treatment						
	¢6	¢8	¢10	¢12	¢6	¢8	¢10	¢12	¢6	¢8	¢10	¢12			
Market Value	¢5	34	39	43	47	¢5	21	26	29	32	¢5	37	43	50	56
	¢6	32	37	41	45	¢6	20	24	27	30	¢6	34	40	46	52
	¢7	30	34	34	42	¢7	19	22	25	27	¢7	31	37	42	47
	¢8	28	32	32	39	¢8	18	20	23	26	¢8	28	34	39	44
Market Value	¢5	29	33	37	40	¢5	18	22	25	27	¢5	29	36	40	45
	¢6	27	31	35	38	¢6	17	20	23	25	¢6	27	33	38	42
	¢7	23	27	30	33	¢7	16	18	21	23	¢7	25	30	34	38
	¢8	23	27	30	33	¢8	15	17	19	21	¢8	22	27	31	35
Market Value	¢5	25	30	33	37	¢5	16	18	22	24	¢5	25	31	35	34
	¢6	24	28	31	34	¢6	15	17	20	22	¢6	21	28	32	36
	¢7	22	25	28	31	¢7	14	16	18	20	¢7	21	25	29	33
	¢8	21	24	27	29	¢8	13	15	17	19	¢8	19	23	27	30

The ability of soybean plants to sustain defoliation without yield reduction varies with the growth of the plant. Under favorable growing conditions the average percent defoliation figures given in this appendix can be used to determine economic injury levels. When the percentage of foliage removed approximates that given in the table for your particular set of variables (cost of treatment, projected yield and projected selling price of beans) treatment should be considered.

**For example,** if your beans are in bloom stage, you anticipate the yield will be 35 bushels per acre with a selling price of \$8.00 per bushel and the cost of treating will be \$6.00 per acre, defoliation must be 23 percent or greater to justify treatment.

### Information Summary Table for Soybean Insecticides

This table is provided for a quick comparison of insecticides labeled on soybean. Insecticides are listed alphabetically by pesticide common name (usually present in the active ingredients section of the product label). One or more brand names are included along with the Restricted Entry Interval (REI) and Mode of Action Group number. Brand names of Restricted Use pesticides appear in *bold italics*.

Use pesticide products only in accordance with their labels and with the Worker Protection Standard. Do not enter or allow worker entry into treated areas during the restricted entry interval. Check the label for Personal Protective Equipment required for early entry to treated areas that is permitted under the Worker Protection Standard and involves contact with anything that has been treated, such as plants, soil, or water.

**Mode of Action Group** A numerical classification system has been developed to make it easy to recognize the modes of action of insecticide products. Insecticides with the same mode of action belong to groups with unique numbers. Selection of a labeled product from a different number category (different mode of action) will help to slow down the development of resistance to either group. For example, alternate use of pyrethroid insecticides and pyrethrins sprays (Category 3) with labeled organophosphate insecticides (Category 1B). Always avoid tank mixing products with the same mode of action. These Mode of Action Group codes are on many pesticide labels and have been developed by the Insecticide Resistance Action Committee (IRAC).

Common Name	Brand Name	Restricted Entry Interval (hours)	Mode of Action Group
acephate	Orthene	24	1B
aluminum phosphide	<i>Phostoxin, Fumtoxin</i>	NA <sup>‡</sup>	8D
Bt aizawai	Agree WG	4	11B1
Bt kurstaki	Biobit, Dipel DF, Javelin WG, etc.	4	11B2
carbaryl	Sevin	12	1A
carbofuran	<i>Furadan 4F</i>	48	1A
chloropicrin	<i>Chlor-O-Pic</i>	NA <sup>‡</sup>	NA
chlorpyrifos	<i>Lorsban 4E, Warhawk, Whirlwind, Yuma</i>	24	1B
cyfluthrin	<i>Baythroid 2, Govern Tempo</i>	12 NA <sup>‡</sup>	3 3
<i>lambda</i> -Cyhalothrin	<i>Warrior, Mystic Z, Taiga Z</i>	24	3
<i>zeta</i> -Cypermethrin	<i>Mustang Max</i>	12	3
diflubenzuron	<i>Dimilin 25 W</i>	12	15
dimethoate	Dimethoate, Cygon 400	48	1B
esfenvalerate	<i>Asana XL</i>	12	3
indoxacarb	Steward 1.25 SC	12	22
methyl bromide	<i>Bromo Gas</i>	NA <sup>‡</sup>	8A
methomyl	<i>Lannate</i>	48	1A
methyl parathion	<i>PennCap-M</i>	48	1A
permethrin	<i>Ambush, Pounce, Arctic</i>	12	3
spinosad	Tracer	4	5
thiocarb	<i>Larvin 3.2 AF</i>	48	1A

NA Not applicable in the usual sense.

\* If the product is soil-injected or soil incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

‡ For use in storage bins no reentry is allowed. See label for details.