

INSECTICIDE RECOMMENDATIONS FOR SOYBEANS- 2017

Raul T. Villanueva, Extension Entomologist

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

Fields need to be inspected at least once a week from planting until maturity to assess the need for and to estimate proper timing for soybean insect control. 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.

Most years will not require the use of insecticides. However, as many as two treatments may be needed with a severe insect outbreak. **"Non-Chemical Control Aids"** are management practices that will help to decrease insect problems.

Multi- Active Ingredient Insecticides

Several products contain multiple insecticide active ingredients (AIs). Examples are: Cobalt (chlorpyrifos and gamma-cyhalothrin), Besiege (lambda-cyhalothrin and chlorantraniliprole), Brigadier (bifethrin and imidacloprid), Hero (zeta-cypermethrin and bifethrin), Endigo (lambda-cyhalothrin and thiamethoxam), Leverage (imidacloprid and cyfluthrin), Swagger (bifethrin and imidacloprid), Voliam Xpress (lambda-cyhalothrin and chlorantraniliprole), and Voliam Flexi (thiamethoxam and chlorantraniliprole). They are not recommended when products containing a single insecticide AI provide comparable control. In some cases, there is a specific need to use multiple AIs: resistance management **or control** of specific, difficult to manage pests. The use of multiple insecticide AIs exposes sub-economic pest populations to selection pressure and increases the likelihood of non-target effects on pollinators and natural enemies of arthropod pests.

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 Dipel (*Bacillus thuringiensis*), or a physiological dysfunction, as with Dimilin (diflubenzuron). 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. However, they are commonly used and if registered, they should be 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 or using 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. Product names are followed by the common name of the active ingredient in parentheses.

Using Insecticides for Plant Health Response

Insecticides should only be used to reduce, prevent, avoid, or mitigate insect pests or problems related to insect activity (such as the vectoring of certain diseases). I do not encourage nor recommend the use of insecticides for plant health responses in the absence of arthropod pest management. Insecticides should be used to protect the yield and quality of agricultural products. Using insecticides for reasons other than pest management unnecessarily increases the potential for non-target impacts, development of insecticide resistance, and exposure of mixers and applicators.

Selecting Insecticides

Using insecticides with the same mode of action may lead to resistance within the targeted pest population. The tables below allow you to select products with different modes of action. Products with different trade names may have the same active ingredient or a different active ingredient but the same mode of action. Note that the Trade name (above) and active ingredient name (below) are listed in the left most column. The second column shows the active ingredient's **Mode of Action (MOA)** group. The mode of action is an indication of how the insecticide kills the pest.

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 soil treatment, such as Force 3Gat 4-5 oz per 100 ft of row banded, t-banded or in furrow, can protect against this pest. This product contains tefluthrin. 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 | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|---|--|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 (Grain) Do not feed or graze livestock |
| Baythroid XL (cyfluthrin) | 3A | 0.8 to 1.6 fl. oz. | 21 (Grain & feeding dry vines) 15 (Green forage) |
| Belt (♦ read note below) (flubendiamide) | 28 | 2 to 3 fl. oz. | 14 (grain) 3 (forage & hay) |
| <u>Bacillus thuringensis</u> "B.t." | 11A | 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. | |
| Lorsban 4 E (chlorpyrifos) | 1B | 1 to 2 pts. | 28 (Grain) Do not graze or feed livestock |
| MustangMaxx (zeta-cypermethrin) | 3A | 1.28 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |

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

Foliar Treatments for Corn Earworm (=Soybean Podworm) and Fall Armyworms

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

| Insecticide | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|--|---|
| Belt (♦ read note below) (flubendiamide) | 28 | 2 to 3 fl. oz. | 14 Grain, 3 Forage & Hay |
| Lannate SP (methomyl) | 1A | 1/8 to ¼ lb. CEW 1/4 to 3/8 lb. FAW | 14 Grain, 3 Forage, 12 Hay |
| Larvin 3.2 (thiodicarb) | 1A | 10 to 30 fl. oz. | 28 (Grain) Do not feed forage, hay or straw |
| Steward (idoxacarb) | 22 | 4.6 to 11.3 fl. oz. | 21 Do not feed or graze livestock |
| Tracer (spinosad) | 5 | 1 ½ to 2 fl. oz. | 28 Do not feed forage or hay |

- 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 OR if 9 or more larvae are found per 25 sweeps with 15" sweep net

- ♦ The EPA has issued a notice to cancel all flubendiamide registrations in 2016, growers can still use existing flubendiamide stocks following directions specified on its label

Foliar Treatments for Corn Earworm (=Soybean Podworm) only

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

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

| Insecticide | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|---------------------|--|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 Grain Do not feed or graze livestock |
| Baythroid XL (cyfluthrin) | 3A | 1.6 to 2.8 fl. oz. | 21 Grain & feeding dry vines 15 Green forage |
| Brigade 2 EC (bifenthrin) | 3A | 2.1 to 6.4 fl. oz. | 18 |
| Lorsban 4 E (chlorpyrifos) | 1B | 1 to 2 pts. | 28 Grain Do not graze or feed livestock |
| MustangMaxx (zeta-cypermethrin) | 3A | 2.8 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |
| Radiant (spinetoram) | 5 | 2 to 4 fl. oz. | 28 |
| Sevin 4F (carbaryl) | 1A | ½ to 1 ½ qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda cyhalothrin) | 3A | 0.96 to 1.6 fl. oz. | 30 (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>)

Alternative threshold to 30% defoliation thresholds during pod filling (R1-R5) 15" sweep net.

Bean leaf beetle 50 beetles per 25 sweeps Green cloverworm 28 larvae per 25 sweeps

| Insecticide | MOA | Rate per Acre | Days to Harvest/Forage |
|--|-----|--------------------------------|---|
| Asana XL (esfenvalerate) | 3A | 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 |
| Baythroid XL (cyfluthrin) | 3A | 0.8 to 1.6 fl. oz. | 21 (Grain & feeding dry vines) 15 (Green forage) |
| Brigade 2 EC (bifenthrin) | 3A | 2.1 to 6.4 fl. oz. | 18 |
| Dimilin 25 W (diflubenzuron) | 15 | 2 to 4 oz. (MBM & GCW) | 21 |
| Lannate SP (methomyl) | 1A | 1/4 to ½ lb. | 14 Grain, 3 Forage, 12 Hay |
| Larvin 3.2 (thiodicarb) | 1A | 18 to 30 fl. oz. (MBB & BLB) | 28 (Grain) Do not feed forage, hay or straw |
| Lorsban 4 E | 1B | 1/2 to 1 pt (GCW) | 28 (Grain) |

| | | | |
|---|----|-------------------------|---|
| (chlorpyrifos) | | 1 to 2 pts. (BLB & MBB) | Do not graze or feed livestock |
| MustangMaxx (zeta-cypermethrin) | 3A | 2.8 to 4 fl. oz. | 21(Grain) Do not graze or feed livestock |
| Orthene 97 (acephate) | 1B | 0.75 to 1 lbs. | 14 (Grain) Do not graze or cut vines for hay or forage |
| Sevin 4F (carbaryl) | 1A | ½ to 1 qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda – cyhalothrin) | 3A | 0.96 to 1.6 fl. oz. | 30 (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 | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|--|---|
| <i>Bacillus thuringiensis</i> "B.t." | 11A | 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 | |
| Lannate SP (methomyl) | 1A | 1/8 to 1/4 lb. | 14 Grain, 3 Forage, 12 Hay |
| Belt (flubendiamide) | 28 | 2 to 3 fl. oz. | 14(grain), 3 (hay & forage) |
| Intrepid 2F (methoxyfenozide) | 18 | 4 to 8 fl. oz. | 14 (grain), 7 (hay & forage) |
| Larvin 3.2 (thiodicarb) | 1A | 10 to 30 fl. oz. | 28 (Grain) Do not feed forage, hay or straw |
| Radiant SC (spinetoram) | 5 | 2 to 4 fl. oz. | 28 |
| Steward (idoxacarb) | 22 | 4.6 to 11.3 fl. oz. | 21 Do not feed or graze livestock |
| Tracer (spinosad) | 5 | 1 to 2 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 | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|---------------------|---|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 (Grain) Do not feed or graze livestock |
| Baythroid XL (cyfluthrin) | 3A | 0.8 to 1.6 fl. oz. | 21 (Grain & feeding dry vines) 15 (Green forage) |
| Dimethoate 4E (dimethoate) | 1B | 1 pt. | 21(Grain) 5 (Feed or graze) |
| Orthene 97 (acephate) | 1B | 0.75 to 1 lbs. | 14 (grain) Do not graze or cut vines for hay or forage. |
| Mustang Maxx (zeta-cypermethrin) | 3A | 2.8 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |
| <i>Sevin 4F</i> (carbaryl) | 1A | 1 qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda – cyhalothrin) | 3A | 0.96 to 1.6 fl. oz. | 30 (Grain) Do not graze or feed. |

- If 50% of the plants are girdled or if fewer than 4-6 ungirdled 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 | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|---------------------|--|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 (Grain) Do not feed or graze livestock |
| Baythroid XL (cyfluthrin) | 3A | 2 to 2.8 fl. oz. | 21 (Grain & dry vines) 15 Green forage |
| Brigade (bifenthrin) | 3A | 2.1 to 6.4 fl. oz. | 18 |
| Dimethoate 4E (dimethoate) | 1B | 1 pt. | 21 (Grain) 5 (Graze or feed) |
| Dimilin 25W (diflubenzuron) | 15 | 2 oz. | 21 |
| Lorsban 4 E (chlorpyrifos) | 1B | ½ to 1 pt. | 28 (Grain) Do not graze or feed livestock |
| Mustang Maxx (zeta-cypermethrin) | 3A | 3.2 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |
| Orthene 97 (acephate) | 1B | 0.25 to 0.5 lbs. | 14 (Grain) Do not graze for cut vines for hay or forage. |
| <i>Sevin 4F</i> (carbaryl) | 1A | ½ to 1 ½ qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda – cyhalothrin) | 3A | 1.6 to 1.92 fl. oz. | 30 (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 | MOA | Rate per Acre | Days to Harvest/Forage |
|------------------------------------|-----|--------------------|-----------------------------------|
| Bifenthrin 2EC (bifenthrin) | 3A | 5.12 to 6.4 oz. | 3 |
| Brigade (bifenthrin) | 3A | 5.2 to 6.4 fl. oz. | 18 |
| Dimethoate 4 (dimethoate) | 1B | 1 pt. | 21 |
| Lorsban 4E (chlorpyrifos) | 1B | 0.5 to 1 pt. | 28 Do not feed or graze livestock |

- 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 | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|----------------------|--|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 (Grain) Do not feed or graze livestock |
| Baythroid XL (cyfluthrin) | 3A | 0.8 to 2.8 fl. oz. | 21 (Grain & dry vines) 15 Green forage |
| Mustang Maxx (zeta-cypermethrin) | 2A | 2.8 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |
| Sevin 4F (carbaryl) | 1A | ½ to 1 qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda – cyhalothrin) | 3A | 1.60 to 1.92 fl. oz. | 30 (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

| Insecticide | MOA | Rate per Acre | Days to Harvest/Forage |
|--|-----|---------------------|---|
| Asana (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 (Grain) Do Not Feed or graze |
| Baythroid XL (cyfluthrin) | 3A | 2.0 to 2.8 fl. oz. | 21 Grain or feeding of dry vines Green Forage may be fed 15 days post application. |
| Lorsban 4E (chlorpyrifos) | 1B | 1 to 2 pts. | 28 Do not graze or otherwise feed forage, hay or straw. |
| Lannate SP (methomyl) | 1A | 1.7 to 1/3 lb. | 14 (Bean) 3 (forage), 12 (Hay) |
| Mustang Maxx (zeta – cypermethrin) | 3A | 2.8 to 4 fl. oz. | 21 Do not graze or harvest treated forage, straw, or hay for livestock feed. |
| Orthene 97s (acephate) | 1B | 0.75 to 1 lb. | 14 Do not graze or cut vines for hay or forage. |
| Warrior II (lambda – cyhalothrin) | 3A | 0.96 to 1.6 fl. oz. | 30 Do not graze or otherwise feed forage, hay or straw. |

- Threshold 250 aphids per plant AND 80% of plants infested AND an increasing population 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 Stink Bugs

Threshold: From beginning bloom (R1) to near maturity (R7): Using a 15" sweep net treat when an average of 9 or more stink bugs are found in 25 sweeps; or if using a shake cloth on wide rows ,1 stink bug is found per row foot.

| Insecticide | MOA | Rate per Acre | Days to Harvest/Forage |
|---|-----|---------------------|---|
| Asana XL (esfenvalerate) | 3A | 5.8 to 9.6 fl. oz. | 21 Do not feed to livestock |
| Baythroid XL (cyfluthrin) | 3A | 1.6 to 2.8 fl. oz. | 21 Grain or feeding of dry vines Green Forage may be fed 15 days post application. |
| Brigade (bifenthrin) | 3A | 2.1 to 6.4 fl. oz. | 18 |
| Lorsban 4E (chlorpyrifos) | 1B | 0.5 to 1 pt. | 28 (Grain) Do not graze or otherwise feed forage, hay or straw. |
| Mustang Maxx (zeta-cypermethrin) | | 3.2 to 4 fl. oz. | 21 (Grain) Do not graze or feed livestock |
| Orthene 97 (acephate) | 1B | 0.5 to 1 lbs. | 14 (Grain) Do not graze or cut vines for hay or forage. |
| Sevin 4F (carbaryl) | 1A | 1 to 1 ½ qt. | 21 (Dry beans or hay) 14 (Graze or forage) |
| Warrior II (lambda – cyhalothrin) | 3A | 1.6 to 1.92 fl. oz. | 30 (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.

Products for Control of Insect Pests in Stored Soybean

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

This Information 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. 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 targeted at the space beneath the perforated floor in a metal grain bin. Fumigant is applied on a volume not bushel basis. See the **WARNING** below.

Rate per 1000 **cubic feet**

Phostoxin, Fumitoxin, etc. (aluminum phosphide) 30 to 140 tablets OR 150- 700 pellets

Note: applied to a volume not bushels

Aluminum phosphide is not significantly heavier than air. Because of its light and penetrating nature, pay very close attention to sealing the area to be treated.

Empty Bin Surface Applications

Rate per 1,000 ft. sq. of bin surface. Use only in empty bins.

| | |
|---|--------------|
| Diacon-D IGR (S-methoprene) | 1.5 oz. |
| Tempo SC Ultra (b-Cyfluthrin) | 0.27 fl. oz. |
| Insecto, etc_ (silicon dioxide from diatomaceous earth) | 1 lb. |

Grain Protectants

Applied directly to stored soybean.

| | |
|---|----------------------------|
| Diacon-D IGR (S-methoprene) | 8 to 10 lbs. per 1,000 bu. |
| Insecto (Silicon dioxide from diatomaceous earth) | 1 to 2 lbs. per ton |

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.

Rate per 1,000 ft sq. (mixed to 4 inches deep)

| | |
|---|---------------------------------------|
| Biobit HP (<i>Bacillus thuringiensis, kurstaki</i>) | 1 lb. in 5 to 10 gal. |
| Dipel DF (<i>Bacillus thuringiensis kurstaki</i>) | 0.5 lb. in 5 to 10 gal. |
| Diacon-D IGR (S-methoprene) | 8 lb. (Note: mixed to 12 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.

Phostoxin, Fumitoxin, etc. (aluminum phosphide) tablets 40 to 180 tablets OR 200 to 900 pellets

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 contain significant requirements for pre-planning and documentation of the fumigation, and access to considerable safety equipment.

Warning: Insecto and Diacon-D are dust based formulations. Wear a dust mask and protective gloves when handling or applying.

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>45</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 | | | | | | | | | | | | | | | |
| Cost of Treatment | | | | | | | | | | | | | | | |
| | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 |
| Market | \$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 |
| Anticipated Yield <u>35</u> bu/A | | | | | | | | | | | | | | | |
| Cost of Treatment | | | | | | | | | | | | | | | |
| | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 |
| Market | \$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 |
| Anticipated Yield <u>45</u> bu/A | | | | | | | | | | | | | | | |
| Cost of Treatment | | | | | | | | | | | | | | | |
| | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 | | \$6 | \$8 | \$10 | \$12 |
| Market | \$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.

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin. Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Nancy Cox, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort. Revised annually — 12/2016