

## **INSECT MANAGEMENT - (*Roberts & McPherson*)**

A number of insect pests are capable of severely damaging soybeans. However, it is important to realize that soybeans can withstand considerable insect damage at certain times without economic yield losses. In Georgia, it is possible to produce a crop of soybeans without having to use any insecticides. In some years, however, several insecticide applications may be necessary to protect the crop. Because of this situation, soybeans are ideally suited to an insect pest management program. This program consists of two phases: (1) planning to prevent damage from insects and (2) periodic monitoring or scouting of the insect pest situation in each field so that control decisions can be made based on the kinds and numbers of insects found.

### **Prevent Early-Season Insect Problems**

Each year, try to anticipate seedling-insect problems and apply preplant, at-planting, or early post-emergence insecticides to prevent stand losses. The following generalizations should be considered:

#### ***Before Planting***

Check for soil insects such as wireworms, white grubs, and whitefringed beetle larvae in each field. Inspect soil closely when preparing land for planting (especially when turning land) for the presence of these insects. Since these insects will go back into the soil within seconds, inspections should be made immediately after turning. Inspect the soil and the root systems (and around the roots) of any weeds present for these insects and their feeding damage. Remember that these insects tend to build up in individual fields.

After cultivation, let fields remain fallow for as long as possible before planting. This practice reduces the risk of cutworms and lesser cornstalk borer which may have been established on weeds or the previous crop from infesting seedlings.

#### ***At-Planting***

Probably the best way to apply an at-planting insecticide (where the label allows) is to apply it in a narrow band over the row in front of the press wheel. This method of application incorporates some of the material in a band near the surface of the soil, and insects which feed at or near the soil surface (lesser cornstalk borer, cutworms, sugarcane beetle) will be more likely to come in contact with it.

Anticipate seedling-insect problems in the following situations and plan at-planting and/or an early postemergence insecticide application accordingly:

1. When late-planting for any reason, lesser cornstalk borer populations may increase as the season progresses.
2. When planting on light soils following periods of drought, lesser cornstalk borer damage is more likely under these conditions.
3. When planting behind burned wheat stubble, lesser cornstalk borer infestations are more likely to develop.

4. When planting in double-crop or minimum-till situations where previous-crop residue remains on the soil surface, cutworms or other soil insects may have built up in the preceding crop.

### **Check Crop Regularly to Prevent Insect Damage**

Soybeans should be checked at least once a week, twice a week under certain conditions, from the time plants begin emerging until the leaves begin to turn yellow and fall from the plants. Look for:

#### ***Seedling Pests***

Check seedlings very closely until the plants are about 12 inches tall. The stems become woody and severe damage from seedling pests becomes less likely at this time. Look for insects on the plant (three-cornered alfalfa hopper) or in the soil around the base of the plants (lesser cornstalk borer, cutworms, sugarcane beetle). Evaluate stand loss (percentage of dead or dying plants) and try to determine if future stand loss is probable (insects easily found and actively damaging plants).

#### ***Foliage Feeders***

Throughout the season, determine what insects are feeding on the foliage and how much defoliation they are causing. On small beans, it is possible to brush the insects off the plants into the row middle where they can be counted. On larger beans, it is better to use a shake cloth or sweep net. Place the shake cloth on the ground in the row middle ahead of you under undisturbed plants, because some insects fly or fall off plants quickly when disturbed. Quickly shake or beat the plants on the 3 feet of row so that foliage feeders (and pod feeders after pods are set) are dislodged onto the cloth where they can be counted and identified. With a sweep net, take a 25 sweep sample across a single row to capture insects into the net. After passing the net through the foliage take a step forward, then pass the net back across the foliage. Then identify and count the insects present in the net. At each sample point, estimate the percent of the foliage loss so that an average defoliation value can be calculated for the field.

#### ***Pod Feeders***

After full bloom (when pods are being set), look closely for any pod feeding caterpillars (corn earworm and fall armyworm) and stink bugs that are dislodged on the shake cloth or in the 25-sweep sample.

### **When to Treat**

**Important:** Reserve materials which are highly disruptive to beneficial insects for late season use. Conservation of beneficial insects and spiders, especially during early and mid-season, suppress some pest species.

#### ***Soil Insects (wireworms, white grubs, whitefringed beetle larvae):***

Treat fields with a history of infestation or if insects are found during land preparation at an average of one per square yard.

#### ***Seedling Pests***

Use preventive methods if damage is expected due to planting situation and/or treat if

stand is being threatened. From seedling emergence until plants are 12 inches tall treat for:

**Lesser cornstalk borer:** treat when 10% of seedlings are infested with larvae

**Cutworms:** treat when 10% of stand is lost and larvae are still present

**Sugarcane beetle:** treat when 10% of plants (regardless of plant size) are damaged or dead and beetles are still present

**Threecornered alfalfa hopper:** treat when 10% of plants are infested with nymphs and/or adults.

It is uncommon for the above pests (with the exception of sugarcane beetle) to damage soybeans larger than 12 inches.

**Foliage Feeders (beet armyworm, loopers, corn earworm, velvetbean caterpillar, green cloverworm, Mexican bean beetle, bean leaf beetle, blister beetles, Japanese beetle):**

Foliage feeders should be controlled based on defoliation and plant growth stage.

**Prior to full bloom:** foliage feeders should be controlled when the defoliation level reaches 30%.

**After full bloom (2 to 3 weeks after first blooms are noted) and up to full-pod-fill:** treat when the defoliation level reaches 15%.

**After full-pod-fill:** treat when the defoliation level reaches 25%. It usually requires an average of 8 or more beet armyworms, loopers or velvetbean caterpillars (½ inch long or longer) per foot of row to cause this much defoliation. It usually requires 4 corn earworms (½ inch long or longer) per foot of row to cause this much defoliation.

Fields should be scouted twice per week when insect pest populations and percent defoliation are within 50 percent of the treatment threshold, and the decision to treat is being delayed in order to derive maximum benefits from natural control factors.

The green cloverworm rarely requires control measures on soybeans in Georgia. It is very common on soybeans throughout the season but generally does not occur in sufficient numbers to cause economic defoliation losses. Green cloverworms infest soybeans early at low levels and serve as a host for numerous insect parasites and predators, spiders, and diseases. These beneficial insects in turn are of great value in suppressing subsequent infestations of insect pests.

**Pod Feeders: (stink bugs, corn earworm and fall armyworm):**

Pod feeders should be controlled based on number of pod feeding insects present and plant growth stage:

**Stink Bugs: Bloom to mid pod fill:** 0.33 stink bugs per row foot or 3 per 25 sweeps

**Mid pod fill to maturity:** 1 stink bug per row foot or 6 per 25 sweeps

\* *beans being grown for seed production, 1 stink bug per 6 row feet will justify control.*

**Pod Feeding Caterpillars:** Pod feeding caterpillars such as the corn earworm or fall armyworm should be controlled at any time after bloom when an average of 2 per row foot (1/2 inch or longer) are found.

### **Trap Cropping**

Trap cropping has been proven to be a cost effective means of managing insects in soybeans. Soybean producers have found that managing stink bugs using trap crops can often reduce insecticide applications and preserve yields. Soybean field borders (trap) are planted using a soybean variety at least 2 maturity groups earlier than the rest of the field. Early maturity group soybeans planted around late MG VII or MG VIII soybeans have been proven to be most effective in trapping stink bugs from the whole field. Treating only the trap area for stink bug controls the pest without disrupting beneficial insect populations in the rest of the field. Although a trap crop is used, be sure to scout the remainder of the field and treat on an as needed basis. Field evaluations indicate that trap cropping can be extremely effective in controlling stink bugs without flaring soybean looper or velvetbean caterpillar populations. Two or more insecticide treatments of the trap may be necessary.

### **Preventive Insect Control and Damage**

Historical insect data indicate that the probability for treating late season foliage feeding caterpillars in soybeans is extremely high in the Coastal Plain Region of Georgia. Growers often budget 1-2 insecticide spray applications for late season insect control. Heavy populations of velvetbean caterpillar and soybean looper migrate into Georgia during August and September. For this reason, growers have been applying protective treatments using Dimilin in combination with boron at the R2 - R3 stage.

Research with Dimilin and boron applied at the R2-R3 stage has consistently shown yield increases of 10%. A two ounce application of Dimilin controls velvetbean caterpillar and green cloverworm season long without disrupting beneficial insect populations. In most cases, fields treated with Dimilin at the R2 stage (full bloom) do not require an additional insecticide treatment for foliage feeders for the remainder of the growing season. However, soybean looper will sometimes require treatment and should be scouted closely. Fields that are not treated with Dimilin require an average of 1.5 treatments for late season insect control.

### **Sweep Net and Drop Sheet Sampling for Soybean Insect Pests**

Research indicates that the sweep net is just as efficient as using the drop sheet for detecting most soybean insect pest problems. It has been found to be especially effective in capturing the more mobile insect pests. It has also been found to be very effective in narrow row or lodged soybeans.

When using a drop sheet the scout typically makes 10 random 3-foot examinations for each 20 acres of soybeans being surveyed. If using a sweep net, the scout should also make 10 random checks of 25 sweeps for each 20 acres. Results of the drop sheet are reflected in the average number of larvae or insects per foot of row. The results of the sweep net should be averaged to reflect the number of insect pests per 25 sweeps.

## Early Soybean Production System

Planting an early maturing soybean variety (Maturity Group IV or V) in mid-April can be an effective production practice for avoiding high populations of defoliating caterpillars. By using this early production system, soybeans mature in late August to early September, before the peak populations of these major soybean insect pests occur. For information on the Early Soybean Production System (ESPS), refer to the section entitled, "Early Soybean Production System" in the Georgia Soybean Production Guide. This is a very useful system for reducing the risks associated with insect pests.

### Sweep Net and Drop Sheet Thresholds for Soybean Insects

<u>INSECT PEST</u>	<u>SWEEP NET</u> <u>Avg. no. per 25 Sweeps</u>	<u>DROP SHEET</u> <u>Avg. no. per 1 foot of row</u>
Stink bug (both adult and nymph)	3 bloom to mid pod fill 6 mid-pod fill to maturity <i>* beans being grown for seed production, 1 stink bug per 6 row feet will justify control.</i>	0.33 1
Velvetbean caterpillar	40	8
Green cloverworm	60	10
Corn earworm	5 normal growth	2
Soybean looper	20 small worms 15 large worms	8 6
Threecornered alfalfa hopper	25	3

**Mites:** Treat for mites if infestations become general over the field and leaf discoloration is becoming evident.

### Insecticidal Controls

If insect populations are present at the economic threshold levels, then an insecticidal control is justified. Check the most recent Georgia Pest Control Handbook for the current recommendations for Soybean Insect Control.