The tarnished plant bug, *Lygus lineolaris*, is a very serious pest of cotton. Its most familiar damage is aborting pinhead squares, but it also feeds on larger squares, tender bolls, and even the terminal of the plant. Damage caused by plant bugs may occur any time during the fruiting season. Losses of 50 to 150 pounds of lint cotton are common in a normal year. However, the impact on cotton yields can be more than 50 percent of the yield potential if these pests are abundant and left uncontrolled.

At one time, the tarnished plant bug was an erratic pest of cotton that was common in the northern third of the state and that primarily occurred in June. Plant bug populations still vary from year to year, but their occurrence is now common all over the state; infestations are more consistent, and serious damage is as apt to occur in July as in June. The plant bug has become a common mid- and late-season pest because of a reduction in the use of foliar sprays brought about by the effort to eradicate boll weevils and because of the increased use of Bt cotton.

**Description and Life Cycle**

The tarnished plant bug is a typical plant bug with piercing-sucking mouthparts. The adult is predominantly brown, mottled with red, yellow, and black, and measures about 1/4 inch in length (Figure 1). Tarnished plant bug eggs are laid in plant tissue and require 1 to 2 weeks to hatch. The five nymphal stages, which are green, are completed in 2 to 3 weeks (Figure 2). Thus, 3 to 5 weeks are required for each generation, and in Alabama, there is ample time for five or more generations a year.

Figure 1. Tarnished plant bug adult

Figure 2. Tarnished plant bug nymph

Tarnished plant bugs overwinter as adults and become active in early spring. Eggs are laid in a variety of wild hosts, including docks, fleabanes, wild carrots, mustards, and many legumes. Two generations are completed before tarnished plant bugs enter cotton. Typically, tarnished plant bugs migrate to cotton from surrounding wild hosts in early to mid-June and immediately begin feeding and laying eggs. Nymphs appear in mid-to late June. If left uncontrolled, development of the plant bugs continues, and several generations can occur within a single field.

**Damage**

The first plant bug damage to cotton usually occurs in early to mid-June and is caused by migratory adults entering fields. The most common plant bug damage results from direct plant bug feeding on pinhead squares (Figure 3). (The term *pinhead square* as used here refers to squares that are about 1/8 inch in diameter, including the bracts.) After being fed upon, the small squares turn yellowish, dry up, turn dark brown, and finally fall off the plant several days later.

In addition to feeding on pinhead squares in June, plant bugs sometimes feed in the terminal of the plant. This behavior is less common, but the resulting damage can be devastating because of the toxins injected into the plant when the bugs feed. Plant bugs have sucking mouthparts and cannot feed on solids. The feeding process
involves injecting saliva into the plant to dissolve tissue so that it can be ingested. When the toxins in the salivary secretions are injected into a small square, an internal portion of the square dissolves, an abscission layer forms, and the square aborts. When the toxins are injected into the meristematic tissue of the plant terminal, devastating physiological changes occur. These physiological changes include aborted terminals, dominance of fruitless lateral branches, shortened internodes, lesions on stems and leaf petioles, and enlarged nodes and petioles. In general, a tall, spindly, relatively fruitless plant results (Figure 4). This condition is sometimes referred to as “crazy cotton,” and if it is not remedied, it can cause huge yield losses. Plant bug damage to cotton terminals is usually caused by adults and normally occurs when cotton is between the eighth and twelfth nodes and bug populations are high. Most often, this coincides with cool, wet conditions in June.

Plant bugs may also damage large squares, especially as nymphs become common in late June and July. Plant bug feeding on large squares may leave a slight brownish discoloration, but this damage is largely inconspicuous from the outside. When the bloom opens, darkened anthers and warty spots can be seen on the petals. This type of damage is referred to as a “dirty bloom” (Figure 5) and can be found prior to bloom by pinching the ends off of larger squares. Heavy feeding by tarnished plant bugs on large squares can cause abortion, but most often the results are poor pollination and deformed bolls.

Direct boll feeding by tarnished plant bug nymphs and adults does occur. The bugs prefer soft, immature bolls. Boll injury appears as small, dark sunken spots on the outside of the boll (Figure 6). Internally, the damage appears as brownish discoloration on and near the developing seeds (Figure 7). A warty growth may also be present where the bug penetrated the boll wall. Not all bolls with small black spots have been damaged by plant bugs. The inside of the boll must be examined to confirm that the boll has plant bug damage. Severe boll feeding can cause the young bolls to shed, but, more often, localized lint and seed damage causes hard-locked bolls (Figure 8).
Evaluating and Managing Plant Bug Infestations

Evaluating and managing plant bug infestations can be problematic. The mobility of adult plant bugs makes sampling difficult, and even though the nymphs do not fly, they are difficult to count. Plant bugs are more active during certain times of the day and under certain weather conditions, and their damage varies over time and can be subtle. Both numbers of plant bugs and the amount of damage present can be important in making management decisions for this pest; however, evaluating plant bug damage is usually the more efficient method of assessing the problem.

In preblooming cotton in June, plant bug control should be considered when pinhead square damage reaches 20 percent. When damage exceeds 20 percent, plant bug populations are usually greater than 50 bugs per 100 row feet, and adults are easily observed. In areas of Alabama where the threat of caterpillar pests, particularly tobacco budworms, is great and conserving beneficial insects is critical, it may be more appropriate to change the threshold and tolerate a little more plant bug damage. These conditions usually coincide with areas of the state that have the longest growing season and therefore more time for the plant to compensate for plant bug damage. Nevertheless, caution should be exercised in changing thresholds. Slight adjustments to thresholds can be appropriate for many reasons, but larger adjustments may lead to excessive damage.

To determine the level of pinhead square damage, examine a number of pinhead squares located on the first differentiated limb, about 1 inch beneath the terminal. Damaged squares are yellowish or brown and fall from the plant at the slightest touch. No holes are associated with plant-bug-damaged squares.

In blooming cotton in July and August, plant bugs should be controlled when damage levels are at 15 percent dirty blooms or 10 percent damaged bolls. These levels of damage usually equate to at least 100 plant bugs per 100 feet of row, and plant bug nymphs are commonly observed in blooms and squares. To sample dirty blooms, examine ten consecutive blooms in several locations, and to sample for damaged bolls, examine ten consecutive 12- to 15-day-old bolls in several locations. Burst or slice bolls open to reveal internal damage.

The best way to determine field populations of tarnished plant bugs is to shake plants over a drop cloth at several locations. Shake the plants well, noting any adults that fly away and being careful not to overlook the small nymphs. Record the number of tarnished plant bugs, both adults and nymphs, on a row-foot basis. A sweep net can sometimes be used to sample adult plant bugs; however, the numbers given above relate to drop cloth sampling only. After much trial and error, most entomologists in Alabama have learned to use the sweep net in a slightly unconventional way—the net is held horizontally, and the plants are beaten over it as the sampler moves quickly down the row.

For current insecticide recommendations, consult Extension publication ANR-415, “Cotton Pest Management,” or contact your county Extension agent.

Other Related Species

The cotton fleahopper, *Pseudatomoscelis seriatus*, and the clouded plant bug, *Neurocolpus nubilus*, can also present problems for Alabama cotton producers. The cotton fleahopper damages cotton in much the same way that the tarnished plant bug does and is common in central and southern Alabama. The cotton fleahopper is much smaller than the tarnished plant bug and is very pale green with small black spots.

The clouded plant bug is slightly larger than the tarnished plant bug, is more common in July and August, and is often associated with boll damage (Figure 9). For these reasons, clouded plant bug damage may be confused with stinkbug damage. The presence of these two insects should also be considered when making decisions about treating tarnished plant bugs.

Figure 9. Clouded plant bug adult, top; nymph, bottom