

Beet Armyworm: *Spodoptera exigua*

Beet armyworm is an occasional pest of Mississippi cotton. Most years it is either uncommon or does not build to high numbers until late in the growing season, when there is less potential for economic damage to occur. However, beet armyworms will occasionally build to high numbers by mid-season, resulting in outbreaks that can potentially cause severe crop injury. Such outbreaks occurred in 1988, 1993, and 1995. Conditions thought to be favorable for beet armyworm outbreaks include: mild winters, heavy early season insecticide use, and hot dry growing conditions. Of these, heavy early season use of organophosphate and/or pyrethroid insecticides is most important. Beet armyworm populations are normally kept in check by predators and parasitoids, which are adversely affected by these types of insecticides. Because wide spread adoption of Bt cotton and progress of the boll weevil eradication effort have resulted in substantial reductions in the number of early season insecticide treatments, the potential for beet armyworm outbreaks has declined in recent years. Also, the availability of new, more effective insecticides has improved the potential to effectively control beet armyworm outbreaks when, and if, they do occur.

Biology: Beet armyworms do not diapause and do not normally overwinter in Mississippi. However, it is possible to capture moths in pheromone traps throughout most of the winter, indicating continuous migration from more southerly regions. This caterpillar has a relatively wide host range, occurring on cotton, soybeans, and corn, as well as many vegetable crops and weeds.

Eggs are deposited in masses of 30 to more than 100 eggs. These egg masses, which are covered with white scales from the body of the moth, are normally attached to the undersides of leaves. Upon hatching, the small larvae remain near the egg mass and feed gregariously for several days. Small larvae consume the bottom layers of the leaf, but leave the upper epidermis intact, resulting in a 'window pane' effect. These 'window panes' or 'hits' are one of the primary signs used in scouting for beet armyworms. After several days the developing larvae scatter and begin feeding individually. The larvae feed on leaves, as well as on squares, blooms, and bolls. Depending on temperature, approximately 10 to 15 days are required to complete the larval stage.

Mature larvae dig a very shallow pupal chamber in the soil and form a naked pupa. This pupal stage lasts approximately 7 days. Newly emerged moths have a pre-ovipositional period of approximately 2 days.

Damage: Beet armyworms are primarily leaf feeders, but defoliation is not the only type of injury caused by this pest. Under some conditions they will attack squares, blooms, and bolls. Feeding on squares and bolls may be confined to the bracts, but beet armyworms are capable of chewing into squares and bolls, causing loss of the fruit. Feeding on blooms is often confined to the anthers, but this often results in failure to set a boll. During severe outbreaks, beet armyworm numbers may exceed 10 to 20 larvae per foot of row and the combination of defoliation and damage to squares, blooms, and bolls by this number of caterpillars can result in severe yield losses.

Yield effects: Over the past five years yield losses attributed to beet armyworms have ranged from 0 to 0.12%. However, these were all years of low beet armyworm infestations. During the severe outbreak of 1993 this pest caused an estimated 4.4% yield loss to Mississippi cotton and some individual fields were totally destroyed by beet armyworms. The potential for severe outbreaks of beet armyworm to cause catastrophic yield losses is evidenced by the 50% yield loss that was attributed to it in the Lower Rio Grande Valley of Texas in 1995.

Control: Until recently beet armyworms were difficult and costly to control because of resistance and/or tolerance to most available insecticides, which resulted in the need for multiple applications of costly insecticides. However, during the past few years several new insecticides have been introduced which are very effective against beet armyworms. Availability of these more effective insecticides greatly reduces the potential for catastrophic yield losses and/or excessive control costs due to beet armyworm outbreaks. Although the current lines of transgenic Bt cotton, which express the Cry IAc endotoxin, provide limited suppression of beet armyworms, Bt cotton can be damaged by beet armyworms and supplemental insecticide treatments may be required to control beet armyworms in Bt fields. The second generation Bt-cotton, which is currently under development and expresses both the Cry1Ac and Cry IIAb endotoxins exhibits much higher activity against beet armyworms. Treatments currently recommended for control of beet armyworms are listed in Table 11. In addition Denim (emamectin benzoate), received a Section 18 Emergency Exemption for use against beet armyworm during 2002.

Table 11: Insecticides Recommended for Control of Beet Armyworms

Insecticide	Trade Name	Lbs ai/acre
Indoxacarb	Steward	0.09 - 0.11
Methoxyfenozide	Intrepid	0.1 to 0.16
Spinosad	Tracer	0.067 - 0.089
Thiodicarb	Larvin	0.60 -0.90
Tebufenozide	Confirm	0.125 to 0.25

Source: Cotton Insect Control Guide, 2003, Publication 343, Mississippi State University Extension Service



Beet Armyworm: A complete absence of body hairs is one of the most notable traits of beet armyworm caterpillars, a trait that they share with yellowstriped armyworms. The presence of a small dark spot directly over the middle pair of true legs is also helpful in identifying the lighter color phases of beet armyworm (this dot is obscured or difficult to see in the darker color phases, and is barely distinguishable in this caterpillar). The beet armyworm moth (below) is about 1/2 inch in length and has grey forewings with a distinct light colored spot near the center. The hind wings are white, making moths that are flying appear lighter in color.

