

ANNUAL REPORT

MONITORING BOLLWORM AND TOBACCO BUDWORM IN TENNESSEE COTTON Agreement No. 03-397TN Scott Stewart, University of Tennessee

Justification and Approach:

Despite the use of Bt-transgenic cotton on over 90% of the acreage in Tennessee, bollworm and tobacco budworm compose a very important pest complex. The bollworm/budworm complex was the most destructive pest group to Tennessee cotton in 2003, causing an estimated 2.6% reduction in yield, despite some fields being treated with insecticides for these pests on multiple occasions. Bollworms caused significant economic damage to many Bt cotton fields, and the bollworm/budworm complex was even more damaging to non-Bt cotton. Resistance to pyrethroid insecticides in tobacco budworm populations makes distinguishing between budworm and bollworm infestations very critical in non-Bt cotton. Using a pyrethroid insecticide on a “worm” infestation which contains a significant percentage of tobacco budworms often results in serious economic losses.

Area-wide monitoring remains a valuable tool in predicting the occurrence and size of pest populations. Pheromone trapping programs for bollworm, tobacco budworm, and beet armyworm provide insight into the timing and intensity of moth flights. For example, unusually high trap catches for a particular species can alert consultants and producers to the potential for impending outbreaks. When performed on a regional level and over a number of years, moth trapping can indicate historical and geographical patterns in the distribution of pest populations. Moth traps are also used to collect specimens for use in vial assays to monitor insecticide resistance. Moth monitoring improves the decision making process, helping crop managers in the selection of insecticides and to indicate the need for intensified sampling efforts. This ultimately helps to minimize control costs and/or yield losses incurred by producers.

Pheromone moth traps for bollworm (CBW), tobacco budworm (TBW), and beet armyworm (BAW) were run on a weekly basis from early May through August. Traps were located in cotton growing areas of each county and were usually placed on the borders of cotton fields. All pheromone lures were obtained from Great Lakes IPM (Vestaburg, MI) and were changed weekly. At least one, and usually two, sets of bollworm and tobacco budworm traps were run in each of the following 12 counties in West Tennessee: Carroll, Crockett, Dyer, Fayette, Gibson, Hardeman, Haywood, Tipton, Lake, Lauderdale, Madison, and Shelby. One beet armyworm trap was located in each of the above counties.

We also offered an egg identification service to clientele groups using ELISA techniques (Hel ID Kit, Agdia Inc., www.agdia.com/helid/). Despite soliciting the involvement of county agents, consultants and other agricultural professional, no egg samples were submitted in 2004. This effort will be discontinued due to lack of interest caused by the very high adoption of Bt cotton. Bt cotton reduces the need and importance of distinguishing between bollworm and tobacco budworm infestations.

Results, Progress, and Accomplishments:

Moth catches for each trap were reported weekly in the Tennessee IPM Newsletter, as were with the results of any egg samples which were submitted for identification using ELISA techniques. The newsletter is also posted on the internet at www.UTcrops.com and distributed to agents, cotton producers, consultants and other agricultural business professionals.

Catches of beet armyworm, tobacco budworm and corn earworm moths in pheromone traps were unusually low during 2004 (Fig. 1). Even more so than in 2002 and 2003, corn earworm (i.e., bollworm) moths were caught more frequently than either tobacco budworm or beet armyworm. Bollworms composed 93% of all moths caught based on average trap catches made from early June through early September. In contrast, tobacco budworms and beet armyworms composed about 7 and 0% of the moths caught, respectively. Only one beet armyworm moth was collected during the entire season. Infestations of beet armyworm in cotton fields were nearly non-existent in 2004, corresponding to these low trap catches.

Average weekly tobacco budworm moth catches peaked in early June but never exceeded 19 moths in any single trap. Only four tobacco budworms were captured after 16 June. The majority of tobacco budworm moths were caught in Shelby County (Fig. 2). The high adoption rate of Bt cotton in Tennessee appears to suppress overall populations of tobacco budworm. To my knowledge, no fields of cotton were treated for tobacco budworm infestations in 2004.

The corn earworm (i.e., bollworm) is Tennessee's most significant caterpillar pest in cotton because this species is able to cause economic injury to Bt cotton, which composes the vast majority of the acreage. Compared to the other species, more corn earworm moths were caught. Two small peaks of bollworm moth catches were recorded on 9 June and 4 August. However, peak catches never exceeded an average of 10 moths per trap. The largest single bollworm trap capture was 45 moths in Gibson County on 2 June. The highest bollworm moth catches were recorded in Gibson, Dyer, Lake and Shelby counties (Fig. 3). The August moth catches coincided with the generally low infestations that were being observed in cotton.

Overall tobacco budworm and bollworm moth catches were roughly one-fourth of those caught in 2003. Trapping did not necessarily reflect all local variations in population densities observed in cotton fields, in part because trap density was not high and because other factors influence oviposition and survival of these pests in cotton. However, the pheromone trapping program did an excellent job of predicting the usually low pest populations observed in 2004. For example, after June, trapping did not indicate the presence of tobacco budworm moths, which corresponded well to field observations.

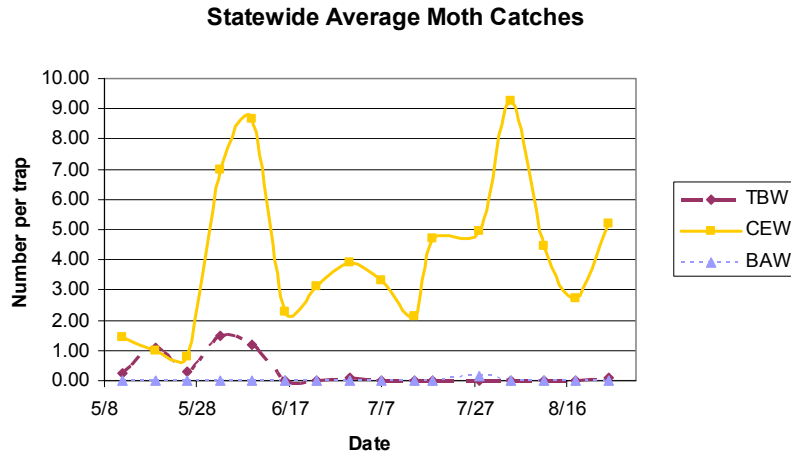


Fig. 1. Average number of tobacco budworm (TBW), corn earworm (CEW), and beet armyworm (BAW) moths caught per trap in pheromone traps across West Tennessee during 2004.

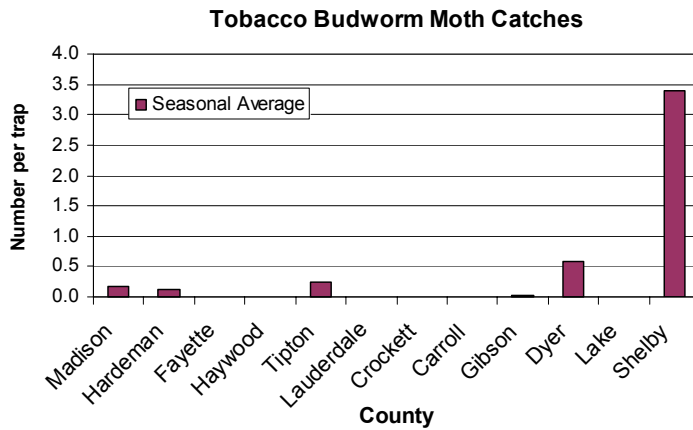


Fig. 2. Seasonal, county average number of tobacco budworm moths caught per week during 2004 in West Tennessee.

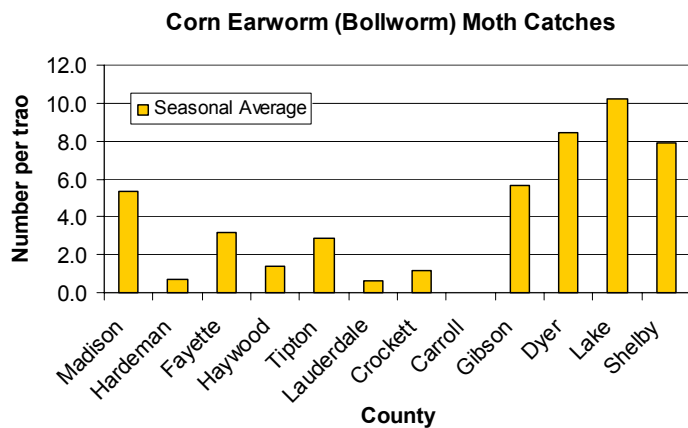


Fig. 3. Seasonal, county average number of corn earworm moths caught per week during 2004 in West Tennessee.