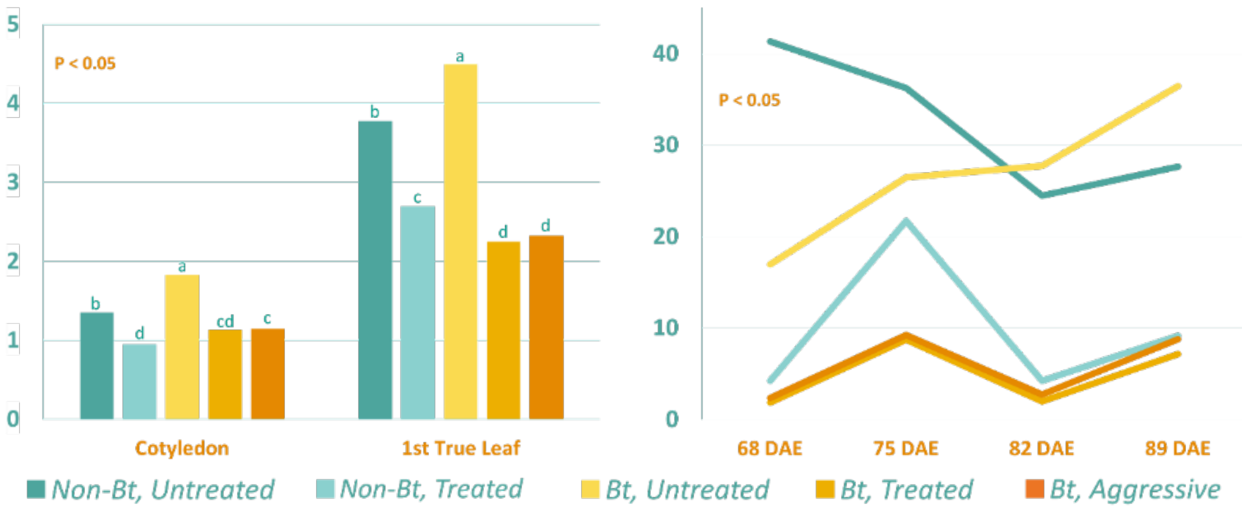
VALUE OF IPM IN PROTECTING COTTON PROFITABILITY IN TENNESSEE

Claire Cooke
Scott Stewart
Sandy Steckel
Matthew Williams
The University of Tennessee, West TN Research & Education Center
Jackson, TN

Abstract

Integrated pest management (IPM) is a means of protecting crops from yield-reducing insect damage using biological and cultural control, variety selection, and insecticides. Through IPM, insect populations can be kept below economically damaging thresholds in a way that is both profitable for the farmer and sustainable for the environment. The goal of this project was to collect data on how various pest management regimes affect insect pest populations, insect injury, and yield on both a Bt (PHY 400 W3FE) and non-Bt (PHY 425 RF) cotton variety. In 2021, a test was established at the West Tennessee Research and Education Center in Jackson. Insecticides were either not applied either on the seed or foliarly (Not Treated), or insecticides were applied at typical use rates as needed according to recommended treatment thresholds and including an insecticide seed treatment (IPM), or insecticides were applied more aggressively (Aggressive). Individual plots were 8-rows wide by 35 ft in length, and each treatment was replicated four times in a randomized complete block. Pest infestations were assessed using a variety of methods, including sweep nets, drop cloths, and injury ratings. Including a seed treatment, 10 and 9 insecticide applications were made on the non-Bt and Bt plots, respectively, when applied according to UT recommended treatment thresholds. The IPM treatment included an imidacloprid seed treatment and foliar sprays of Intrepid Edge (spinetoram + methoxyfenozide), Centric (thiamethoxam), Alias (imidacloprid), Transform (sulfoxaflor), Orthene (acephate), and Bifenture (bifenthrin) either applied alone or in various tank mixtures. The Aggressive treatment contained these same insecticides plus an additional application of Diamond (novaluron) within a tank mix. An application of Prevathon (chlorantraniprole) was also made to the non-Bt variety.

The primary pests observed in this experiment included thrips, tarnished and clouded plant bug, stink bug, and bollworm; with severe infestations of thrips and tarnished plant bug. Bollworm infestation levels were relatively low, and there was no statistical separation in bollworm damage among treatments. However, there was substantially more thrips injury and higher numbers of tarnished plant bugs, clouded plant bugs, and stink bugs observed in plots not treated with insecticide. Thrips injury and the incidence of immature tarnished plant bug are shown in Figure 1 and Figure 2. The utilization of both insecticide seed treatments and foliar-applied insecticides in the IPM and aggressive treatments resulted in a substantial increase in yield when compared with plots not treated with insecticide, regardless of whether the variety was Bt or non-Bt (Fig. 3). IPM and Aggressive treatments yielded similarly, showing the addition of Diamond was not needed, perhaps because even plots managed under the IPM regime were frequently treated with insecticide.



Figures 1 and 2. Thrips injury (left) at the cotyledon and first true-leaf stage for Bt and non-Bt cotton managed with different insecticide regimes. Thrips injury is presented on a scale of 0 – 5, with 5 representing plant death. Tarnished plant bug incidence (right) is numbers per 10 row ft based on drop-cloth sampling. Difference between treatments was statistically significant (P < 0.05, Fisher's LSD). DAE = days after emergence.

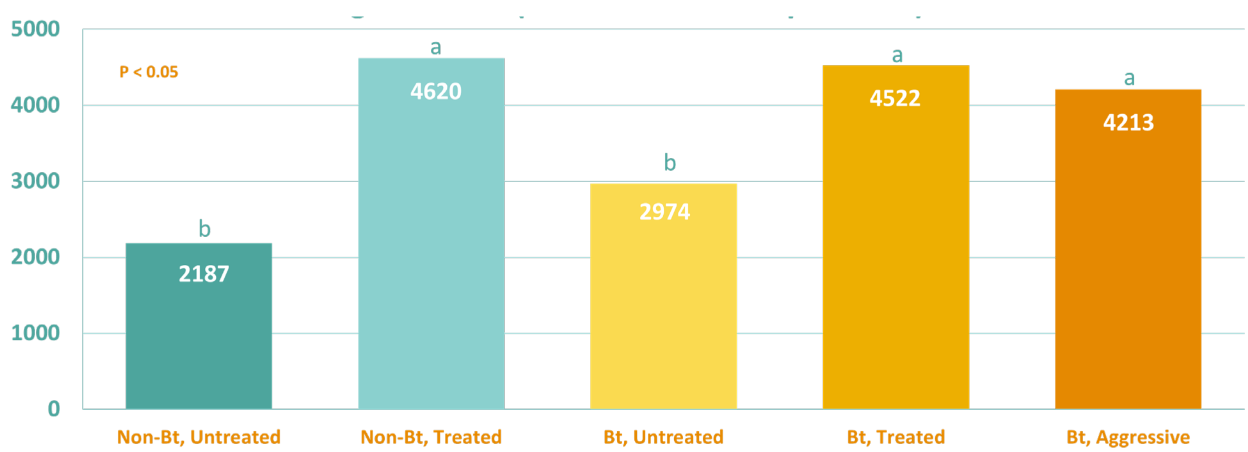


Figure 3. Seed cotton yield per acre for cotton managed with different insecticide regimes. Letters above bars indicate significant differences (P < 0.05, Fisher's LSD).