INSECTICIDE TREATED AND UNTREATED BT AND CONVENTIONAL COTTONS UNDER HIGH INSECT PRESSURE IN LARGE FIELD R. G. Luttrell R. E. Jackson K.C. Allen USDA ARS Southern Insect Management Research Unit Stoneville, MS

Abstract

As a component of studies to compare performance of commercial Bt and non-Bt (conventional) cottons under different insect management systems, seven cotton varieties were exposed to extreme densities of bollworm (Helicoverpa zea Boddie) and tobacco budworm (Heliothis virescens F.) in large (1/8 acre) field cages. Varieties included UA48, a high-vielding early-season non-Bt cotton from F. Bourland's breeding program at the University of Arkansas; DP121, an early-season commercial non-Bt cotton; DP01912 an early-season commercial BGII (Bollgard II® trait from Monsanto Company that expresses Cry1Ac and Cry2Ab2 Bt toxins) cotton; PHY375, an early-season commercial WS (Widestrike® trait from Dow AgroScience that expresses Cry1Ac and Cry1F); MD25, a high-yielding full-season non-Bt cotton from B. Meredith's breeding program at Stoneville, Mississippi); DP174, a commercial full-season non-Bt cotton; and DP1048, a commercial full-season BGII cotton. All seven varieties were planted as plots in three separate tiers in three 1/8 acre cages. Each cage was a replicate of the experiment. Each tier within a cage included randomized plots of the seven cottons and was managed under a single insect management system. The three tiers within a cage were managed as untreated with insecticide, treated with Karate® (lambda-cyhalothrin) at 0.04 lb ai/acre, or treated with Coragen® (chlorantraniliprole) at 0.088 lb ai/acre. Applications were made with a back-pack sprayer at 10 gpa. Applications were made at the first appearance of eggs following release of moths into the cages. On three separate dates (7/18/2011, 7/25/2011, and 8/2/2011), 400 bollworm and 400 tobacco budworm moths (~equal numbers of male and female moths) were released in the cages. Applications were made on 7/21/2011 and 7/28/2011 following the first two releases of moths. Applications were not made following the third release. Insect survival and fruit retention were monitored by whole-plant samples on a weekly basis. Five plants from each plot within each tier of each cage were destructively sampled at harvest with seedcotton yield recorded for each fruiting position on each plant. Resulting yields were converted to lint yield assuming a 40% turnout and cumulated over time of fruit initiation to provide an image of crop maturity as well as overall yield. Cumulative yield over time assumed 3 and 6-day fruiting intervals between mainstem and branch nodes on all cottons. Within season estimates of fruit retention generally matched the variability among treatments at harvest. Significant reductions in yield were observed on all untreated non-Bt cottons (UA48, DP121, MD255, and DP174). Differences between untreated and Karate treated cottons were not observed on Bt cottons (DP0912, PHY375, and DP1048). Coragen treated UA48, DP121, MD25 and DP174 produced vields statistically similar to those of Coragen treated Bt cottons, and in some cases greater than those of untreated Bt cottons.