LEPIDOPTERAN INSECT MANAGEMENT IN MISSISSIPPI COTTON D. R. Cook

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Abstract

Historically, the bollworm, Helicoverpa zea (Boddie), and tobacco budworm, Heliothis virescens (L.), have been major pests of cotton in Mississippi. Prior to the introduction of transgenic Bt cotton (1986 to 1995), growers in Mississippi made ca. four insecticide applications on average for bollworm/tobacco budworm management. Following the introduction of transgenic Bt cotton (1996 to 2007), the number of applications for bollworm/tobacco budworm dropped to 1.4. However beginning in 2008, the average number of insecticide applications for bollworm management in Mississippi cotton has increased to 1.6 despite widespread adoption of dual gene Bt cotton. Studies were conducted at the Delta Research and Extension Center at Stoneville, MS during 2010 to 2013 to evaluate the impact of insecticide oversprays to dual gene transgenic Bt cotton. During 2010, an application of chlorantraniliprole (Coragen) significantly reduced numbers of bollworm larvae and boll damage in Bollgard II cotton. This application also significantly increased lint yield (133 lbs/ac difference) compared to the non-treated control. Studies were initiated during 2012 to evaluate the impact of supplemental insecticide applications on bollworm/ tobacco budworm infestations on yield of Bollgard II, WideStrike, and non-Bt cotton. The insecticide treatments included two diamides, chlorantraniliprole (Prevathon) and flubendiamide (Belt), spinosyn, spinosad (Tracer), and a non-treated control. The first application was applied during the first week of bloom, with subsequent treatments based on treatment thresholds. During 2012, in the non-Bt plots treated with Belt, Tracer, or not treated, percent damaged squares was \geq 35%, on the first sampling date. These levels were significantly higher than that observed in the non-Bt plots treated with Prevathon or any of the Bt plots. Square damage in the nontreated non-Bt plots exceeded 70%. Boll damage in the non-Bt plots treated with Belt, Tracer, or not treated, percent damaged squares exceeded 50%, and was significantly higher than that in the non-Bt plots treated with Prevathon or any of the Bt plots. On the second sample date one week later, there were no significant differences among insecticide treatments for square damage. Square damage ranged from 25 to 41%, 7 to 15%, and 10 to 15% for the non-Bt, Bollgard II, and WideStrike plots, respectively. On the second sampling date, boll damage in the non-Bt plots treated with Belt was significantly higher than that in all other plots, except the non-Bt plots treated with Tracer. Boll damage in the non-Bt plots treated with Prevathon was similar to that observed in the Bollgard II or WideStrike plots, regardless of insecticide treatment. The Bollgard II plots treated with Prevathon, Belt, Tracer, or not treated and the WideStrike plots treated with Prevathon or Tracer produced significantly more lint compared to non-Bt plots treated with Belt and the non-treated non-Bt plots. During 2013, bollworm/ tobacco budworm infestations were extremely low. No significant differences in boll damage were observed among treatments. Regardless of Bt traits and insecticide treatment, boll damage did not exceed 1%. Also, no significant differences in yield were observed among treatments. In these studies yield responses to supplemental insecticide applications on Bollgard II cotton were variable. During 2010, significant differences in yield were detected while no differences were detected during 2012. During both years substantial bollworm pressure did occur. Significant yield increases were observed when WideStrike cotton was treated with Prevathon during 2012. A detailed economic analysis is warranted to determine the profitability of supplemental insecticide applications to dual gene cotton under situations of substantial bollworm pressure.