USE OF ALTERNATIVE CHEMISTRIES FOR COTTON BOLLWORM CONTROL IN AREAS WITH POTENTIAL PYRETHROID RESISTANCE

M. J. Sullivan, A. Dunlap and D. M. Robinson
Clemson University
Edisto Research and Education Center
Blackville, SC

Abstract

Since the early 1990's, pyrethroids have become less effective for control of the cotton bollworm *Helicoverpa zea* (Boddie). In the beginning it was noticeable by an increased number of "escapes" following application and cleanup of these bollworms began to require higher rates. During the 1996 and 1997 growing seasons, we were involved with several reported field failures: upon investigation however, we were able to explain most of these as being attributed to delayed initial applications (bollworms were 2 - 5 days old), misapplications with rates and/or water volumes, inadequate coverage, or weather events. In 1996, we began utilizing the adult moth vial test and found individuals that survived, indicating resistance was present in the South Carolina population. The number of resistant individuals captured increased in 1998 and our state had several reported field failures; larvae collected from these fields were reared to adults and treated using the adult vial test. These data confirmed an increased level of resistance at each collection site. Based on these findings, South Carolina cotton bollworm recommendations were revised to include the following: A.) in areas with previous resistance problems or high resistance potential (Southern part of cotton growing area), we recommend planting the maximum amount of transgenic (Bt) cotton. This eliminates early season (June) application for tobacco budworm *Heliothis virescens* (F.) and reduces the potential number of applications for bollworm (July-August); B.) use alternative chemistries on budworms in June in conventional cotton AND for bollworms in July for conventional and Bt cotton for initial applications. Following this, look at bollworm control and secondary pest problems to date; choose chemistry accordingly; and C.) if pyrethroid applications were used in July for cotton bollworm control (both conventional and Bt), watch populations carefully for potential resistance.

The only two alternative chemistries currently labeled are Larvin and Tracer. Both growers and consultants are hesitant to use these; Tracer because of its cost and Larvin because of past variable results and washoff potential. To alleviate these concerns, we established nine split fields in 1999 to compare a pyrethroid against these alternative chemistries for cotton bollworm control on conventional cotton. In addition, beneficial species and secondary pests were counted where present in adequate numbers. Fields were established with the help of South Carolina crop consultants. The consultants scouted the fields using their individual scouting programs and recommended the initial bollworm application. Applications were made by individual growers. During this time the University was also scouting and taking baseline beneficial data. Following the initial application, the University took over the scouting with a second application automatically made 4 - 6 days after the first. The University continued scouting for 7 - 10 days following the second application; at this time we discussed each field with the consultant involved and turned the field back to them for the remainder of the season. These nine split fields covered our entire cotton growing region from north to south.

Treatments were as follows (rates in lbs. AI/Ac in parentheses): A.) Karate Z (0.033) versus Larvin (0.6) in four locations, B.)Karate Z (0.033) versus Tracer (0.067) in three locations, C.) Decis (0.02) and Decis (0.02) + Ovasyn (0.25) versus Tracer (0.067) in one location, and D.) Karate Z (0.033), versus Tracer (0.067) versus Steward (0.09) in one location. Last year, 1999, was one which produced very light bollworm pressure in extremely hot, dry growing conditions. The bollworm flight was 10 - 12 days later than usual with initial applications being applied July 19 - 27 instead of July 10 - 14.

Data collected from these fields provided the following conclusions:1.) labeled alternative chemistries (Tracer/Larvin) adequately controlled cotton bollworm as did the pyrethroid comparisons (Karate Z/ Decis/Decis + Ovasyn) under 1999 growing conditions, 2.) Tracer is less disruptive to the beneficial population compared to pyrethroids and Larvin, 3.) neither alternative chemistry, Larvin/Tracer, control plant bugs, pyrethroids give adequate control,, and 4.) Steward gave adequate control of bollworm in the one field it was used.

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