SURFACE RESIDUE MANAGEMENT INFLUENCES USE OF INSECTICIDES FOR CONTROL OF THRIPS AND SHORT-HORNED GRASSHOPPERS IN COTTON

John All[1] and William Vencill[2]
1/ Department of Entomology
2/ Department of Crop and Soil Sciences
University of Georgia, Athens

Objective and Methods

The research objective was to examine the influence of different surface residue management procedures on management of early season cotton pests. Replicated field tests were conducted at the UGA Southeastern Branch Research and Education Center (SEBREC) near Midville and at the UGA Plant Sciences Farm (PSF) near Athens. During fall 2014, rye was planted as a cover crop at the SEBREC and crimson clover was used at the PSF. At the SEBREC, four surface residue management procedures were established in randomized 50 ft blocks. One type of conservation tillage procedure had a glyphosate (1 qt/A) application 21 days before planting to kill the rye cover. The second conservation tillage procedure involved spraying Gramoxone (1 qt/A) + Reflex (16 oz/A) + pendmethalin (20 oz/A) on the rye cover the day after planting. The third conservation tillage regime had the rye incinerated five days before planting. The fourth surface management procedure used conventional plow tillage (disk harrow) of the rye residue at 14 days and one day before planting. The entire field was strip-tilled one day before planting the test.

In the SEBREC test, *Bt* cotton (DPL 1252) was planted on 10 June. The seed had a commercial insecticide seed treatment of Cruiser (thiamethoxam) at 0.35 mg AI/seed. Plots were established as 8 rows x 36 inches wide x 40 ft long with 6 ft alleys in the four different types of tillage blocks. Treatments with planting time insecticide applications included Thimet 20G @ 1# AI/A applied in the seed furrow or Orthene 90S broadcast spray @ 1# AI/A. Four rows of cotton in each treatment were sprayed with Orthene @ 1# AI/A 21 days after planting in conjunction with a broadcast application of glyphosate (1 qt/A) + Warrant (3 pts/A). The timing of the insecticide and herbicide applications was similar to using an insecticide/herbicide tank mix. The insecticide was applied separately to four rows of each plot to minimize spray overlap and drift that was anticipated if four rows were sprayed with the herbicides + Orthene and the adjacent four rows were sprayed with the herbicides only.

The tests were sampled for thrips 14 and 28 days (seven days after the Orthene @ 1# AI/A spray had been applied to four rows of each plot) after planting, and the field was monitored for short-horned grasshopper infestations every one or two weeks by walking 2 x 4 ft wide transits down the middle of each plot while counting all short-horned grasshoppers. Plots were monitored during the season for bollworm, stink bug, and infestations by other pests. Yields were taken at the end of the season in the tests by harvesting the two middle rows of each plot.

In the PSF test, DP 1137 B2RF *Bt* cotton was planted in the crimson clover cover on 22 May, with all treatments using conservation tillage practice. Herbicide treatments were Roundup WeatherMax 5.4 SC @ 0.75# AI/A 14 days before planting or Gramoxone 2 SC @ 0.56# AI/A applied on the day of planting. Herbicide + insecticide treatments at planting time were the above herbicide regimes tank mixed with Orthene @ 1.0# AI/A. Roundup WeatherMax 5.4 SC @ 0.75# AI/A was applied with or without Orthene @ 1.0# AI/A tank mixed with the herbicide. Plots were two rows x 36 inches wide x 20 ft long x 3 ft alleys arranged in a RCBD. Thrips and grasshopper sampling and identification were performed on the same schedule as the SEBREC test.

Results and Discussion

The tests were designed to isolate various surface residue management practices: (1) Roundup burndown several days before planting, (2) Gramoxone burndown at planting time, (3) Incineration of surface residues, and (4) Conventional (plow) tillage, as well as to determine each regime's influence on insect population dynamics. General results that occurred in the tests at the SEBREC and PSF were the following.

1. Seven days prior to planting, short-horned grasshopper populations were significantly higher in all the conservation tillage treatments as compared to plow treatments.

2. None of the planting-time insecticide treatments reduced short-horned grasshopper populations within the four surface residue management regimes.

3. Use of Orthene @ 1# AI/A in a tank-mix with Roundup in a post-emergence application significantly reduced short-horned grasshopper populations in all the surface residue regimes in which it was used.

4. Both Thimet and Orthene @ 1.0 # AI/A used at planting time in conjunction with Cruiser @ 0.35 mg AI/seed treatment reduced thrips (primarily tobacco thrips) populations as compared to plots planted solely with Cruiser @ 0.35 mg/seed.

5. Thrips populations were highest in the plots where the rye had been burned off prior to planting. The numbers were statistically similar to thrips populations in plow tillage treatments. Thrips numbers were significantly less in the two conservation tillage regimes where surface residues remained intact. These trends were similar in most of the insecticide systems that were evaluated within the four surface residue management regimes.

6. Thrips control in the different surface residue regimes followed similar trends with Cruiser + Thimet @ 1# AI/A > Cruiser + Orthene @ 1# AI/A > Cruiser alone. Thrips numbers that were sampled following the Roundup + Orthene @ 1# AI/A applications that were made 21 days after planting were greatly reduced in all surface residue systems as compared to the treatments that received Roundup alone.

7. Yield of cotton was not significantly different among the different surface residue regimes, but trends for increased yield occurred in the treatments that received supplemental insecticides in addition to Cruiser seed treatment.