

BURNDOWN TIMING OF CRIMSON CLOVER OR WHEAT SURFACE RESIDUES IN CONSERVATION TILLAGE AND ASSOCIATION WITH THRIPS MANAGEMENT IN COTTON

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Introduction

Use of conservation tillage in cotton production has economic advantages for growers. Increased hazard for pest problems in reduced tillage cotton occurs during the seedling plant stages, with enhanced risk for problems with cutworms, beet armyworms, aphids, and plant bugs. On the other hand, tobacco thrips, *Frankliniella fusca* (Hinds), infestations are reduced in conservation tillage cotton systems. Use of legume (crimson clover) over grass cover crop prior to conservation tillage cotton may have agronomic advantages, but influence on seedling pests such as thrips, cutworms, and plant bugs is not well understood. Seedling pests can be controlled with insecticides, but efficacy of various products in conservation tillage is not well understood. Temik^R (15% granule) is a common planting time insecticide for thrips management in cotton at a rate of approximately 3.5 lbs product/acre, with the granules applied in a continuous stream in the seed furrow during planting. The insecticide also has some benefit for management of plant feeding nematodes using in-furrow placement of granules. Temik^R rates can be reduced by half or more using precision or spot placement of the insecticide with seed, and thrips control is as good or better than seed furrow application of the insecticide. The objective was to study the influence of legume (crimson clover) vs grass (wheat) cover crops on thrips infestation of seedling cotton. The influence of selected glyphosate burndown timing regimes on the two cover crops and precision placement of Temik^R with cotton seed on thrips management was evaluated in each cover crop system.

Materials and Methods

An experiment was established at the University of Georgia Plant Sciences Farm near Athens. A field was tilled 2/12/2007 and randomized into six sections, of which three were planted in crimson clover and three in wheat. Each of those sections was then split into four blocks to serve as the 1st, 2nd, and 3rd burndown (conservation tillage), and a conventional tilled block. Three glyphosate applications @ 13 ounces/acre were made to wheat or clover in plots at 32, 15, and 5 days before planting cotton. Temik^R @ 0.64 lbs/acre was applied on top of each seed with a bazooka applicator device (precision placement) prior to closing the seed furrow, and untreated check plots (4 rows each) were established in each conservation tillage burndown or conventional tillage block. Cotton, DP164BIIRF, was planted 05/15/2007 with a John Deere vacuum planter. Burndown plots were 8 rows x 20 ft long x 38 in row width with 3.5 inch seed spacing.

One-hundred milliliter specimen cups were filled half full of alcohol and labeled for use in collecting thrips from seedling cotton. Ten plants were taken at random from the two middle rows of each plot at 21 and 28 days after planting and immersed in alcohol to remove thrips. Thrips samples were returned to the laboratory where immature and adult thrips were identified and counted using a dissecting microscope. It was not possible to irrigate the test field after midseason, so yield was not taken due to severe drought damage to the cotton. Data was analyzed using SAS GLM ($P < 0.05$) procedures and t-tests LSD for separation of means.

Results and Discussion

The thrips data from the samples taken at 21 and 28 days in each plot were combined for analysis. The alcohol samples contained mostly tobacco thrips (less than 5% western flower thrips, *F. occidentalis* (Pergande), and flower thrips, *F. tritici* (Fitch)) adults (30%) and immatures (70%) and there was a trend for higher numbers of both life stages in wheat (1.5 thrips/plant) as compared to clover (1.1 thrips/plant) when comparing all the conservation tillage treatments. A similar trend occurred in noninsecticide treatments of conservation tillage wheat (3.3 thrips/plant) as compared to crimson clover (2.3 thrips/plant). Overall, precision placement of Temik^R @ 0.64 lbs/acre reduced thrips numbers on plants by 81.4% compared to check plants (difference significant @ $P < 0.05$).

Table 1 shows that thrips populations were significantly less on cotton planted in conservation tillage with either crimson clover or wheat cover when sprayed with glyphosate either 15 or 5 days before planting. Thrips numbers were similar in either crimson clover or wheat plots of conservation tillage. There was no significant difference in thrips on cotton in the conservation tillage plots with burndown applications as compared to conventional tillage at 32 days before planting.

Table 2 shows that the precision placement treatment of Temik^R @ 0.64 lbs product per acre did significantly reduce thrips populations in either tillage system. This rate is substantially lower than conventional rates (2.5 to 5.0 lbs/acre) of Temik^R used in in-furrow application of granules along the entire length of rows. There was no indication of an additive effect in reducing thrips populations in conservation tillage with Temik^R, as evidenced by the insect control that occurred at the different burndown application dates. This is because the thrips control by Temik^R in conservation tillage plots with the 32 day glyphosate burndown application (where there was no effect by conservation tillage in reducing thrips numbers) was similar to efficacy of the insecticide in the plots with either the 15 or 5 day glyphosate burndown applications.

We have observed the increase in thrips numbers on cotton planted in conservation tillage residues with longer burndown timing (30 or more days) before planting in other tests and it is difficult to explain. Some regrowth of weedy plants in the plots had started at the time the cotton was germinating and these plants may have attracted or sustained thrips populations. These data indicate that waiting longer than 15 days to

plant cotton after glyphosate burndown of surface residues in conservation tillage increases hazard for thrips infestations.

Table 1. Timing of glyphosate burndown of clover or wheat on thrips infestations in conservation tillage cotton not treated with insecticide.

Tillage Regime	Burndown Timing (days before planting)		
	\bar{x} no. thrips/plant		
	32	15	5
Conservation Till Wheat	4.8 a	1.3 a	2.0 a
Conservation Till Clover	3.8 a	1.5 a	1.5 a
Conventional Till	4.2 a	4.2 b	4.2 b

Means within columns with the same letter are not significantly different in analysis of variance $P < 0.05$.

Table 2. Thrips control with Temik at 0.64 lbs/acre applied by precision placement with cotton seed planted in either different glyphosate burndown regimes in conservation tillage with crimson clover or wheat cover or in conventional tillage plots.

Tillage Regime	Burndown Timing (days before planting)		
	\bar{x} no. thrips/plant		
	32	15	5
Conservation Till Wheat	4.8 a	1.3 a	2.0 a
Temik Precision Placement	1.2a	0.7 b	0.9 b
Conservation Till Clover	3.8 a	1.5 a	1.5 a
Temik Precision Placement	0.6 b	0.5b	0.7 b
Conventional Till	4.2 a	4.2 a	4.2 a
Temik Precision Placement	0.8 b	0.8 b	0.8 b

Means within columns with the same letter are not significantly different in analysis of variance $P < 0.05$.