

Wheat Yields Following Layby Herbicide Applications to Cotton Grown With Reduced Tillage

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Abstract

This experiment was conducted to quantify herbicide carry-over effects on wheat, after plowing the cotton down with conventional and reduced tillage systems. Cotton layby applications of cyanazine, diuron, and prometryne at 1.5 lbs/Ac active ingredient did not result in wheat yields that were significantly different from the untreated checks within any of the tillage systems.

Introduction

This experiment is part of a larger study on reduced tillage systems for cotton (1). The reduced tillage systems are the Sundance System (developed by Sundance Farms of Coolidge) and the Uprooter-Shredder-Mulcher (USM). The Sundance and USM systems save time, energy, and money; mainly because they do not move as much soil as do conventional tillage systems. Growers are concerned that without the deep mixing of soil that is achieved with conventional tillage, layby herbicides could carry over and damage a grain crop.

Materials and Methods

The experiment was conducted in our cotton tillage plots in field D-1 of the Marana Agricultural Center (1). The soil type is a Pima 1 clay loam with mechanical analysis of approximately 28% sand, 40% silt, and 32% clay (2).

The tillage test of the Sundance, USM, and conventional systems is set up as four replications of randomized complete blocks. The lay-by herbicide plots were sub-plots within each tillage plot. These sub-plots were 5-40" furrows wide by 30 feet long.

Herbicide treatments were cyanazine, prometryn, and diuron; each applied at 1.5 pounds active ingredient per acre. Non-ionic surfactant was added to the spray solutions at 0.5% of total volume. We applied the herbicides to the cotton on July 19, 1990 with a backpack sprayer with 25 GPA water, using a single floodjet nozzle per furrow. Check plots received no herbicide.

After the cotton was harvested, each tillage plot was to be worked using the respective tillage equipment for each system. The very wet weather of December 1990 - January 1991 prevented us from completing all of the normal tillage operations and delayed working of the Sundance plots. To meet the plowdown deadline, we had to work the Sundance plots in the mud.

These problems delayed the wheat planting until February, well past the optimal planting date. The entire field was planted to 881 durum wheat.

On June 24, 1991, we harvested the center 5x20 feet of each herbicide plot with a plot thresher. We lost the data from one replication while learning the idiosyncracies of the thresher, so this paper reports the results from only three replications.

Results and Discussion

Herbicides had no effect on wheat yields: We did not detect any significant differences in wheat yields due to herbicide treatment within any of the tillage treatments (Table 1.). We regard these results as inconclusive, because of the weather conditions under which the experiment was conducted. The very wet conditions could have accelerated breakdown of the herbicides, and the delayed planting of the wheat also allowed more time for them to breakdown.

Table 1. Main effect of cotton lay-by herbicides on durum wheat yields.

Herbicide Treatment	Wheat Yield --lbs/Ac--
Cyanazine	3568 a*
Diuron	3427 a
Check	3311 a
Prometryn	3224 a

*Means followed by the same letter are not significantly different at the 0.05 level.

There were significant differences between the tillage treatments: We do not believe that any of these differences were necessarily caused by the tillage systems themselves. (Table 2.). The conventional and USM plots were worked under ideal weather conditions. However, we did not get as good of a wheat stand in the USM plots because the USM beds were much taller than the conventional beds, resulting in the wheat being planted too deep on the tops of the beds. A bed shaper or different lister setup could solve the problem.

To meet the plowdown deadline, we worked the Sundance plots in the mud. This resulted in a very poor seedbed, and a poor stand of wheat.

Table 2. Main effect of tillage treatment on durum wheat yields.

Tillage Treatment	Wheat Yield --lbs/Ac--
Conventional	3927 a*
USM	3472 b
Sundance	2749 c

*Means followed by the same letter are not significantly different at the 0.05 level.

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References

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