

# Nitrogen Management for Cover Crop Wheat in Ridge-till Cotton

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## Introduction

Early spring wind is a serious problem for cotton farmers in Southeast Missouri and Northeast Arkansas. Farmers need more information on cover crop options and their effects on optimum cotton nitrogen management. From 1992-96, a study showed that cotton yields were 136 kg lint per hectare greater with wheat ridge-till as compared to conventional till cotton. A more recent test showed that Robin crimson clover, a new early maturing variety, successfully reseeded itself each year before cotton planting. In low rainfall conditions, we found that allowing cover crops to mature produced increased water stress in young cotton seedlings.

**Objective:** Evaluate herbicide burndown and nitrogen timing with cover crop ridge-till cotton on sandy soils.

## Materials and Methods

In the fall of 2004, three ridge-till cotton cover crop experiments were begun at the University of Missouri-Rhodes Farm on a Malden sandy loam soil. The first two tests are focusing on nitrogen management for ridge-till cotton with wheat cover in the middles. We are studying tie up of preplant N and soil moisture by the wheat. Experiment 1 has eight wheat glyphosate burndown date treatments (April 19, April 26, May 3, May 10, May 17, May 24, May 31, and June 7). Experiment 2 has two burndown dates (April 19 and May 17) with three nitrogen rates (0, 34, 67, and 101 kg N per hectare). Experiment 3 is studying N contribution from clover. It has three cover crops (wheat, Robin crimson clover, and spring oats) in combination with four nitrogen rates (0, 45, 90, and 134 kg N per hectare).

## Results

- Wheat killed in early April was less effective in reducing wind damage to cotton seedlings than wheat killed after boot stage.
- Terminating wheat cover crop after May 9 caused reduced plant height and leaf area in cotton seedlings.
- Total nutrients in wheat straw increased as burndown termination was delayed. Wheat straw contained 28 to 50 kg N, 8 to 34 kg P<sub>2</sub>O<sub>5r</sub>, and 17 to 52 kg K<sub>2</sub>O per hectare.



Figure 1- Injury to cotton seedlings from blowing sand in upper Mississippi River Delta region.



Figure 2- Wheat cover in left cotton rows was killed at boot stage (May 9) and wheat in right cotton rows was allowed to mature.



Figure 3- Live wheat cover crop after cotton planting competed for soil water and nutrients.

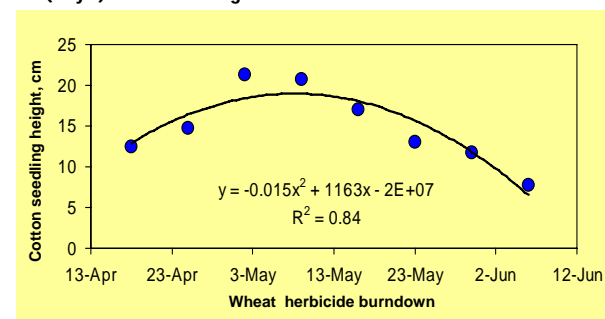


Figure 4- Effect of wheat herbicide burndown dates on cotton seedling height on June 7, 2006.

## Conclusions

- The highest yielding cotton treatment produced 1114 kg lint per hectare with wheat cover crop terminated on May 9.
- Plots with wheat terminated on April 18 produced 863 kg lint per hectare.
- Cotton yields declined when killing wheat was delayed after cotton planting (May 16- 975 kg lint, May 23- 654 kg lint, May 30- 781 kg lint, and June 6- 543 kg lint per hectare).
- Mid-season tissue tests did not show significant differences in petiole nitrate content or SPAD chlorophyll meter reading between treatments.



## Acknowledgement

Research supported by Missouri State Support Committee and Cotton Incorporated

