

**ECONOMICS OF COVER CROP AND SUPPLEMENTAL FERTILIZER IN STRIP TILLAGE COTTON****A. R. Smith****Department of Agricultural and Applied Economics****The University of Georgia****Tifton, GA****R. S. Tubbs****Department of Crop and Soil Sciences****The University of Georgia****Tifton, GA****W. D. Shurley, Jr.****Department of Agricultural and Applied Economics****The University of Georgia****Tifton, GA****M. D. Toews****Department of Entomology****The University of Georgia****Tifton, GA****G.D. Collins****G. H. Harris****Department of Crop and Soil Sciences****The University of Georgia****Tifton, GA****Abstract**

Cover crop selection plays an important role in strip-tillage cotton production in Georgia. Some benefits of growing a cover crop in row crop systems include reduced soil erosion and the possibility for reduced fertilizer inputs. An economic analysis was conducted using a partial budget approach to determine how cover crops and supplemental nitrogen application impact profitability. Field research was conducted in Tifton, GA from November 2011 to November 2012 where cotton was grown under strip-tillage management following a crimson clover, vetch, rye, or wheat cover crop or a no cover control and supplemental nitrogen (N) fertilizer applications of zero, 30, 60 or 90 pounds of nitrogen per acre. There were a total of 80 plots (5 cover crop treatments  $\times$  4 fertilizer treatments  $\times$  4 reps) in a randomized complete block design. Yield data were collected to determine gross revenue. Revenue was based on the southeast base price for November 2012. Gross revenue was highest when cotton followed the leguminous cover crops: crimson clover and hairy vetch. Gross revenue was also higher at 60 and 90 pounds of nitrogen per acre. Systems costs were collected for cover crop and nitrogen fertilizer. Adjusted revenue, defined as revenue adjusted for yield, cover crop cost and nitrogen fertilizer cost was calculated to determine the most profitable combination of cover crop and supplemental nitrogen fertilizer. Results indicate that plots following hairy vetch were the most profitable. Plots following hairy vetch had higher average adjusted revenues (\$80/ac) when averaged across all supplemental nitrogen rates. Additionally, supplemental nitrogen appeared to boost profitability of strip tillage cotton compared to zero supplemental nitrogen when averaged across all cover crops. Average adjusted revenues were \$53/ac higher at 30 lb N/ac, \$69/ac higher at 60 lbs N/ac, and \$103/ac higher at 90 lbs/ac than the adjusted revenue for zero supplemental fertilizer. Results by cover and fertilizer treatment indicate that cotton following rye, wheat and no cover appeared more profitable with supplemental nitrogen fertilizer with higher average adjusted revenues of at least \$106/ac for the rye plots, \$181/ac for the wheat plots and \$34/ac for the no cover plots. There was no profitability advantage of a grass cover crop (rye or wheat) over no cover crop, however the benefits of reduced soil and wind erosion were notable compared to the plots with no cover crop.

# ECONOMICS OF COVER CROP AND SUPPLEMENTAL FERTILIZER IN STRIP TILLAGE COTTON

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## Abstract

Cover crop selection plays an important role in strip-tillage cotton production in Georgia. Some benefits of growing a cover crop in row crop systems include reduced soil erosion and the possibility for reduced fertilizer inputs. An economic analysis was conducted using a partial budget approach to determine how cover crops and supplemental nitrogen application impact profitability. Field research was conducted in Tifton, GA from November 2011 to November 2012 where cotton was grown under strip-tillage management following a crimson clover, vetch, rye, or wheat cover crop or a no cover control and supplemental nitrogen applications of zero, 30, 60 or 90 pounds of nitrogen per acre. There were a total of 80 plots (5 cover crop treatments x 4 fertilizer treatments x 4 reps) in a randomized complete block design. Yield data were collected to determine gross revenue. Revenue was based on the southeast base price for November 2012. Gross revenue was highest when cotton followed the leguminous cover crops, crimson clover and vetch. Gross revenue was also higher at 60 and 90 pounds of nitrogen per acre. Systems costs were collected for cover crop and fertilizer. Adjusted revenue, defined as revenue adjusted for yield, cover crop cost and fertilizer cost was calculated to determine the most profitable combination of cover crop and supplemental N fertilizer.

## Introduction

- Cover crop selection important in strip tillage cotton
- Cover crops may reduce fertilizer inputs
- Cover crops and fertilizer impact profitability

## Objective

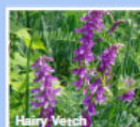
- Determine how cover crops and supplemental nitrogen impact profitability

## Data and Methods

- Field research in Tifton, GA from Nov. 2011 to Nov. 2012
- Strip-tillage management, under irrigation
- Split-plot design with random sub-treatments, 4 reps
  - Five cover crop treatments
    - Crimson clover at 18 lb/ac
    - Hairy vetch at 20 lb/ac
    - Rye at 90 lb/ac
    - Wheat at 90 lb/ac
    - No cover crop
  - Four fertilizer sub-treatments: zero, 30, 60 and 90 lb N/ac
- Partial budget approach for economic analysis
  - Revenue on Yield and Nov. 2012 Southeast Base Price
  - Systems costs on cover crop and fertilizer; all others constant
  - Adjusted revenue calculated to determine profitability

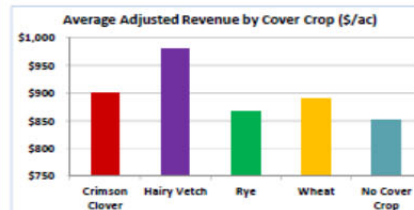


## Cover Crops

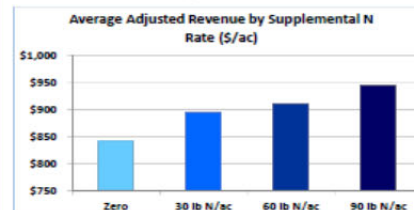


## Results

- Plots following Hairy Vetch appeared most profitable when averaged across all supplemental Nitrogen rates

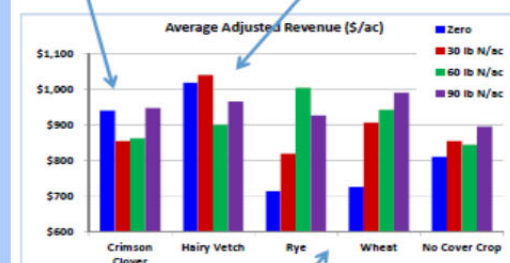


- Supplemental Nitrogen appeared to boost profitability of strip tillage cotton when averaged across all cover crops



## Results: Cover x Fertilizer

- Plots following Crimson Clover appeared more profitable at Zero and 90 lbs N/ac
- Plots following Hairy Vetch appeared more profitable regardless of supplemental Nitrogen rate



- Plots following Rye, Wheat and No Cover appeared more profitable with supplemental Nitrogen

## Conclusions

- Cotton following Hairy Vetch appeared to have the most profit potential
- There was no profitability advantage of a grass cover crop (rye or wheat) over no cover crop, however benefits like reduced soil erosion should still be considered
- Cotton following leguminous cover crops (crimson clover or hairy vetch) may allow for reduced sidedress Nitrogen applications



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