

**MANAGING WINTER COVER CROPS IN COTTON TO IMPROVE SOIL HEALTH IN A FIELD WITH
A HISTORY OF GLYPHOSATE RESISTANT WEEDS****Gene Stevens****Jim Heiser****Matt Rhine****University of Missouri Fisher Delta Research Center
Portageville, Mo.****Abstract**

In the 1990's, research at the Delta Center showed significant cotton yield increases from planting wheat cover crops in the row middles for wind protection. Cover crops protect cotton seedlings from blowing sand and minimize replanting. The Natural Resource Conservation Service is currently promoting soil quality programs with mixtures of cover crops. The idea is to have some type of live root growing in the soil 12 months a year. The objective of this project is to evaluate mixtures of cover crops including radishes and cereal rye for increasing rainfall and irrigation infiltration, enhancing nutrient availability, and reducing root knot nematodes.

Research was conducted on sandy soil at Clarkton Missouri at the MU Rhodes Farm in 2012. Cover crop treatments were applied in eight row strips with the rows running with the prevailing southwest wind. Cover crops used in the study include wheat, cereal rye, Austrian winter peas, crimson clover, canola, tillage radishes and two crop mixtures (pea/rye/radish and clover/wheat/canola). Cover crops were seeded in October but the low soil moisture delayed germination. Fortunately, we had a mild winter and the small seedling did not winter kill. In early March, we sprayed four rows with herbicides to help prevent palmer pigweeds. As expected, this killed most of the cover crops in these rows. Cover crops in the other four rows of each plot were allowed to continue growing until the week before planting. Cotton was planted May 15th, but suffered injury from an application of acetochlor in early June. This delayed the cotton but did not require replanting. The cotton crop developed normally after the setback and through harvest. Samples were collected for bulk density mid-season. Cotton was picked on the 8th of October. Water infiltration and soil CO₂ respiration measurements were taken after harvest using Draeger tube and single ring infiltrometer methods, respectively.

Cover crop burndown timing did not significantly impact cotton lint yields. However, cotton lint yields with crimson clover and the clover/wheat/canola mixture were significantly higher than both untreated checks when burndown was applied early preplant. Austrian winter peas burned down early preplant produced significantly higher cotton lint yield than the early preplant check. Numerically, lowest yields in this study were found with a cover crop of Abruzzi rye, as well as the untreated checks plots. Cotton yields were numerically highest when grown with a cover crop mixture of clover, wheat, and canola. Variations in both soil respiration carbon and water infiltration times were not significant. However, these factors should improve in subsequent years as soil organic matter and microbial activity increase.