Winter annual cover crops can provide multiple benefits in conservation production systems. Most important is the physical protection of the soil surface from the erosive forces of rain and wind. Cover crops also contribute organic matter (carbon) to soils, which helps improve soil physical properties that affect water infiltration. This reduces loss of water and nutrients from fields, thus maintaining or improving availability to subsequent crops. Cover crops can also reduce weed emergence and provide habitat and food sources for beneficial insects as well as forage for livestock.

Even with the known benefits, cover crop use continues to be limited in most of the USA because of concern by producers about the direct cost of establishment and potential negative effects on subsequent crops (late-season water use, cooler soil temperatures, and reductions in plants due to poor planting conditions or allelopathy). Previous research in the Southeast demonstrated that grazing winter cover crops by cattle can provide net positive returns. Much of this research was conducted in the Coastal Plain where the majority of row crop production is located. Although less row crop production occurs in the Southern Piedmont region of north Alabama, north Georgia, and the western Carolinas, the abundance of cow-calf operations in the region increases the potential for grazing winter cover crops to offset the cost of establishment and increase net returns. Risks associated with this option are not fully understood for producers in the Southern Piedmont or in areas with similar soils and climate.

To determine if grazing a rye cover crop prior to cotton planting could increase economic returns without increasing risks, scientists from the USDA-ARS, North Carolina State University, and Oklahoma State University conducted a four-year study where a rye cover crop was grazed by cattle or roller-crimped prior to planting cotton.

Results of the study were published in the May–June 2014 issue of *Agronomy Journal*. In the grazed treatment, rye was mob-grazed in the spring by 35 to 40 heifer cattle weighing 225 to 300 kg over an approximately 10-day period. Cover crop biomass was estimated by clipping 10 to 15 quadrates (0.5 m$^2$) in each field before and after grazing. Year-to-year climate variability greatly influenced results primarily due to highly variable rainfall among years. Rainfall for the cotton growing season was below average all four years.

On average, the rye cover crop provided about 2.4 Mg ha$^{-1}$ of forage annually, but yearly amounts varied due to weather conditions. Rye cover crop residue in the non-grazed treatment at cotton planting averaged 6.7 Mg ha$^{-1}$, which was much greater than the 1.7 Mg ha$^{-1}$ in the grazed treatment. Cotton yields were greater in the non-grazed treatment most years, but this was significant only in 2009 when yields were reduced in the grazed treatment due to negative effects associated with the cattle. The very wet spring in 2009 resulted in significant soil compaction. Cotton lint yields averaged 120 kg ha$^{-1}$ greater for the non-grazed treatment, and fiber quality parameters were generally better in the non-grazed treatment. Differences between grazed and non-grazed returns ranged from $–26 to $355 and averaged $81 ha$^{-1}$ when based on market year prices. The difference in average return increased to $110 ha$^{-1}$ when based on 2012 market year prices. Although negative effects of soil compaction were observed in the final year, returns from grazing generally had the potential to offset establishment costs for the rye cover crop. Cotton producers in the Southern Piedmont who already have cow-calf operations would benefit from using cover crops and grazing them on areas of row crop production.