AGRNOMIC EFFICIENCY OF COVER CROP MIXES AND STRIP TILLAGE IN COTTON PRODUCTION IN SOUTHEASTERN VIRGINIA

Hunter Frame
Virginia Tech
Suffolk, VA
Sarah McClanahan
Mark Reiter
Charles Cahoon
Michael Flessner
Virginia Polytechnic Institute & State University
Blacksburg, VA

Abstract

Little research has been conducted on how cover crop mixes and conservation tillage affect nutrient cycling and uptake in cotton (*Gossypium hirsutum L.*) grown on the coastal plain soils of Southeastern Virginia. The objective of this study was to examine the influence of two tillage practices (no-till with precision planted radish and strip till), four cover crop mixes{fallow, legume mix [crimson clover (*Trifolium incarnatum*), hairy vetch: *Vicia villosa*, woolypod vetch: *Vicia villosa R. ssp. dasycarpa*)], cereal rye (*Secaele cereale*), and a legume mix/rye biculture; and four nitrogen (N) rates (0, 40, 80, and 120 lb N/A) on cover crop biomass, cover crop nutrient uptake, soil nitrogen cycling, in-season nutrient status of cotton, cotton response to N fertilization, and cotton lint yield. Cover crop mix and N rate responses were greater than tillage during 2017. Nitrogen cycling during the growing season was significantly different among cover crop mixes and sampling depth in all months except July. Overall the legume mix produced more soil nitrate-N within each month and sampling depth. Cover crop mix and N rate had a significant ($p < 0.001$) impact on lint yield, with the legume mix and legume/rye mix maximizing yields (1780-1800 lb/acre) at 120 lb N/acre. Cotton grown in unfertilized plots following a legume mix cover crop performed similarly to rye plots fertilized with 120 lb N/acre and fallow plots with 80 lb N/acre. This indicates that legume cover crops preceding cotton may allow for the reduction in fertilizer N recommendations.