

NE

U.S. Department of Agriculture Accomplishments Report AD-421 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month, Day, Year) 01/10/2013
1. Accession	Agency Identification No.	5. Work Unit/Project No.	6. Status
0228256	2. NIFA 3. LAB	LAB94126	Final Report
7. Title			
Cotton yield improvement and enhanced environmental stewardship through soil fertility evaluation and plant nutrient optimization			
12. Investigator Name(s) (Last Name and Initials)			
Kruse, J. S.; Tubana, B.			
20. Termination Date 12/31/2012		40. Period Covered (mo/da/year): 01/01/2012 TO 12/31/2012	
Outputs:			
<p>The project generated outputs in the form of presentations at professional conferences and published abstracts. Additionally, potassium management strategies developed from this project were provided to crop producers and other stakeholders in Louisiana as recommendations.</p>			
Outcomes/Impacts:			
<p>A trial at the Northeast Research Station in 2012, quantified yield and physiological responses to various forms and rates of K. The field was tested for Mehlich-3 extractable K prior to trial initiation and found to be in the lower end of the medium category for a Commerce silt loam. Three granular K rates (0, 50, and 100 pounds of actual K per acre from muriate of potash) were applied to three cotton varieties. Additionally, foliar K was applied from potassium nitrate (KNO₃) at ten pounds of product in 15 gallons of solution per acre three times (first bloom (FB), FB + 2 weeks, FB + 4 weeks). Those plots not receiving KNO₃ received calcium nitrate at the equivalent nitrogen rate per acre. Results indicated a significant difference in yield by variety (P=0.0233) but not by K (P=0.0649). Soil test K levels post-harvest were positively correlated with K rate applied. Incidence of disease (<i>Alternaria</i> leaf spot) was inversely correlated with yield by variety. Louisiana producers can manage modern cotton cultivars with similar K rates and experience no yield loss, despite visible deficiency symptoms. A trial also determined effects of surface-applied gypsum and lime on soil acidity. Prior to planting, gypsum (G) was applied at 2 tons per acre, lime (L) was applied at 1 ton per acre, and some plots received both G and L at their respective rates. In this initial year under conventional tillage, G and L + G treatments were greater than untreated plot yields, but L alone yields were less than the untreated treatment. Under no-till, G and L treatment yields were greater than the untreated check yields, but yields from the combination of G + L were the same as the untreated check. Under a stale-seed bed (reduced tillage) regime, yields from the G treated plots were greater than the untreated check, but the L treated plot yields were slightly less. The combination of G + L increased yields over the untreated check. The one consistent yield response across tillage regimes was an increase in yields from G over the untreated check. The results of this ongoing trial will be important to Louisiana producers that farm in acid-prone soils because it will provide them products they can apply to ameliorate subsoil acidity, even under no-till or reduced tillage regimes. The benefit will be to improve nutrient availability and increase yields.</p>			
Publications:			
<p>Kruse, J.S. and B. Tubana. 2012. Cotton potassium deficiency, cosmetic or real? In Proc., Beltwide Cotton Conf., National Cotton Council, Memphis, TN.</p> <p>Kruse, J.S., B. Tubana, and D. Boquet. 2012. Soil type and fertility effects on cotton performance. In Proc., National Soil Conservation Cotton and Tillage Conf., MidAmerica Farm Publications, Perryville, MO.</p> <p>Kruse, J.S. 2012. Effects of long-term no tillage and reduced tillage on nutrient stratification. In Proc., American Society of Agronomy Southern Branch., Amer. Soc. Agron., Madison, WI.</p>			

POSTED

Participants:		
John Kruse (PI), Brenda Tubana, LSU AgCenter.		
Target Audiences:		
The target audience for the research is cotton industry stakeholders in Louisiana, including producers, consultants, seed manufacturers, dealers, agents and others.		
Project Modifications:		
Nothing significant to report during this reporting period.		
Approved (Signature)	Title	Date