Mississippi Corn Promotion Board
2013 Progress Report

Project Title: Corn Verification Program

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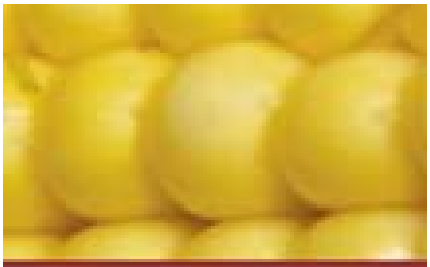

Project Summary (Issue/Response)

Corn is an integral component of Mississippi's agricultural production systems. During the last few years, corn has become the second most popular Mississippi row crop based upon planted acreage and value. Although corn productivity has increased more than any other Mississippi row crop during the past twenty years, we believe there is potential to substantially improve our production systems. Thus, the Mississippi State University Extension Service has established a Corn Verification Program supported by the Mississippi Corn Promotion Board using your checkoff funds designed to assist with the implementation of better management practices and technology and to identify limitations in our corn production systems. We do so while keeping the foremost objective of increasing profitability of Mississippi's corn production systems – not just trying any and all methods, some of which may have little scientific merit and ultimately be unprofitable. We seek to accomplish these goals through the gracious cooperation of producers who grant us an opportunity to execute management practices in one field on their farm, to evaluate compared to their normal production system. Thus, we develop a management plan uniquely tailored for each individual field and cooperator. We also thoroughly evaluate Verification fields on a weekly basis to monitor crop response, potential limitations and ensure timely and prudent implementation of in-season practices.

Project Results/Outcomes

Our teamwork with Dr. Jason Krutz, MSU Extension Service Regional Irrigation Specialist, has revealed substantial opportunity to improve corn profitability through adoption of better irrigation practices. Our surveys with crop producers and consultants indicate limited use of fundamental irrigation scheduling techniques. Implementation of soil moisture sensors confirmed several key findings. As the crop developed through vegetative stages and spring moisture reserves declined, corn roots grew much deeper than anticipated (as deep as 36"), when soil compaction or saturation did not impede growth. Often growers tended to initiate irrigation well earlier than what our soil moisture sensors and crop water demand indicate as necessary. Likewise, the soil moisture sensors helped quantify appropriate irrigation as the crop neared maturity, and water demand fell. The soil moisture sensors also revealed water infiltration was limited on many of our "sealing" silt loam soils. Our cooperative efforts with growers increased corn yield 6 bu./a. and reduced irrigation water usage 47% during the first year. Therefore, we believe the utilization of scientific soil moisture sensors and irrigation management tools has tremendous possibility to improve crop response to irrigation, as well as greatly enhance efficiency of this valuable resource.

Project Results/Outcomes (Continued)

Verification fields have been closely evaluated for the past several years to document stand variability and identify causal factors. Issues can be related to uneven plant spacing as well as delayed seedling emergence. These issues sometimes develop when planting extremely early or during adverse environmental conditions. Thus, we developed guidelines which monitor soil temperature and moisture, rather than relying solely on calendar date for initiating corn planting. John Wallace, Corn Verification Program Research Assistant, evaluated causal factors which may influence variability as part of his Master's research program. This study evaluated crop response to planter speeds from 3 to 6 mph and type of planter metering system. Results showed corn grain yield was reduced 4.2 bu/a for each mph increase in ground speed of a John Deere planter. Retrofitting a John Deere planter with a Precision Planting e-Set metering system increased corn yields an average of 5.9 bu/a and improved crop response to increasing ground speed by 17%. Furthermore, we are also evaluating the effect of delayed seedling emergence on productivity. Our research showed irregular seedling emergence will reduce corn yield about 30% for each leaf stage delay. This results in severe yield loss which can be as important as reduced plant population. Thus, we intend to focus efforts upon optimizing planter performance to improve plant uniformity, emergence and ultimately corn productivity.

Glyphosate and ALS resistant ryegrass populations have rapidly developed over the past few years throughout the Delta and other crop producing areas, and present significant challenges for corn production. The Corn Verification Program has documented that emerged ryegrass is extremely competitive with young corn, and our ryegrass populations, which are often resistant to both glyphosate and ALS herbicides, cannot be reliably controlled after corn plants emerge. Therefore, MSU scientists have developed a specific management plan for controlling ryegrass competition in Mississippi's corn production systems. The three-part system includes the use of a fall-applied residual herbicide designed to limit population of resistant ryegrass, followed by two separate spring-applied postemergence herbicides with different modes of action to completely control ryegrass before corn emergence. Thus, successful implementation and demonstration of this specific plan is imperative to successfully controlling this key limitation and enhancing widespread adoption.

The Corn Verification team often finds substantial insect damage during early corn vegetative stages. Plant damage has occurred, despite the presence of insecticide seed treatments designed to limit seedling injury. One of the pests identified causing damage is the Sugarcane beetle, which is a unique pest found in our region. Awareness created from the Corn Verification Program has led to considerable MSU Entomological research investigating these issues. Our research has evaluated enhanced levels of seed treatment insecticides and documented merit in many cases. We have also identified an alternative and potentially more viable pest control alternative (liquid in-furrow insecticide) and improved our understanding of Mississippi's corn seedling insect pests.

Project Impacts/Benefits

The Corn Verification Program provides first-hand opportunity to identify many factors limiting corn productivity in Mississippi, so that we can better direct research efforts and develop strategies or implement new technologies pertinent to our region and specific systems. Each of the issues identified in the previous section have developed into major research projects conducted by Mississippi State researchers training graduate students. Of course, an on-farm verification program also is a tremendous method to demonstrate value associated with adoption of improved strategies and new technology. For example, our irrigation efforts increased corn yield 6 bu./a. and reduced irrigation water usage 47% during the first year of the program. We believe the cumulative adoption of improved practices addressing multiple issues identified through this program offer tremendous possibility to improve production systems and reduce risks which influence profitability and sustainability of growing corn in Mississippi.

Project Deliverables

Professional Presentations and Outreach

MSU Row Crop Short Course, 2 presentations, MSU, MS 12/2-4/2013.

Alabama Corn and Wheat Short Course, 2 presentations, Auburn, AL 12/16/2013.

Farm Journal Corn College, 2 presentations, Murfreesboro, TN 1/7/2014.

National Conservation Systems Corn and Soybean Conference, 2 presentations, Robertsdale, MS 1/15-16/2014.

Delta Agricultural Exposition, 2 presentations, Cleveland, MS 1/23-24/2014.

Mississippi Farm Bureau Winter Commodity Conference, Jackson, MS 1/27/2014.

Farm Journal Corn College, Vicksburg, MS 1/8/2013.

Delta Agricultural Exposition, Cleveland, MS 1/16-17/2013.

Arkansas Crop Management College, 2 presentations, Little Rock, AR 1/22/2013.

National Conservation Systems Corn and Soybean Conference, 2 presentations, Baton Rouge, LA 1/31-2/1/2013.

Mississippi Agricultural Consultants Association Annual Conference, MSU, MS 2/5/2013.

National Corn Growers Association Commodity Classic – University Extension Specialists' Roundtable, Kissimmee, FA 2/28/2013

Mississippi Farm Bureau Commodity Corn, Wheat and Feed Grains / Soybeans Summer Commodity Conference, Grenada, MS 6/25/2013

Mississippi State University Delta Research and Extension Center Row Crops Field Day, Stoneville, MS 7/18/2013

Mississippi Agricultural Industry Council Certified Crop Advisor Training Session, Orange Beach, AL 7/24/2013

National Corn Growers Association – Corn Utilization and Technology Conference, Indianapolis, IN 6/4-6/2012

Mississippi State University Row Crops Field Day, MSU, MS 7/19/2012

Louisiana Agricultural Consultants Association Certified Crop Advisors Program, Alexandria, LA 10/10/2012.

Published Materials

Published regularly on www.Mississippi-Crops.com

Educational Training

Research Associate John Wallace assists with the Corn Verification Program in conjunction with his training associated with pursuing a Master's degree at Mississippi State University

Three students at Mississippi State University work part time to assist activities in the Corn Verification Program

MISSISSIPPI MAFES AGRICULTURAL & FORESTRY EXPERIMENT STATION

MISSISSIPPI STATE UNIVERSITY EXTENSION SERVICE

Photos

Caption: The Corn Verification Program offers tremendous opportunity to identify limitations and develop more productive cropping systems.

Caption: Ryegrass can be a very troublesome issue for corn producers and successful demonstration will greatly enhance adoption of new systems to control this weed.