

Mississippi Corn Promotion Board

2019 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 as it has become the second or third most popular row crop based upon acreage and value during the past ten years. Corn productivity is increasing rapidly and there is tremendous potential to improve our production systems. Thus, Mississippi State University Extension has established a Corn Verification Program supported by the Mississippi Corn Promotion Board using your checkoff funds. The Corn Verification Program is a multi-disciplinary outreach program that identifies limitations and integrates research findings into better, more profitable corn production systems. Both these program priorities are essential to the outcome derived from implementing state of the art technology and the quality of research Mississippi State University produces. We do so while keeping the foremost objective of increasing profitability of Mississippi's corn production systems, using innovative, sound principles and technology which are proven or have practical merit. This mission is achieved through methods distinct to an outreach demonstration program. We rely upon cooperation with growers who afford us management responsibility of one field on their farm in order to employ improved practices and assess limitations with the goal of increasing corn profitability in their on-farm production systems. We evaluate each grower's production system and develop strategies capable of accomplishing program goals, which may differ from that farm's core program. Through weekly field evaluation of grower cooperators' fields, we monitor crop response and identify vital issues capable of improving crop productivity or reducing risk. This not only allows us to pinpoint limitations and address them more efficiently, but also provides critical direction for future research projects. Furthermore, we develop and apply innovative or comprehensive systems to address those primary limitations to demonstrate value in grower fields. There is no stronger tool to encourage adoption of better practices than successful demonstration in the field.



Project Results/Outcomes

One of our focal areas is to improve corn water management working closely with our irrigation team. We have found a vast majority of growers apply far more irrigation than necessary while growing corn. This leads to incessant soil saturation, which has negative impacts on corn growth and development. Therefore, we have integrated soil moisture information with corn physiological needs to develop new irrigation strategies which address this issue and improve corn productivity. For example, corn is very tolerant to water deficit during vegetative stages, when crop water needs are relatively low. Conversely, as corn approaches the critical tassel and early reproductive stages, corn irrigation should be scheduled much more generously in order to fully support increasing crop needs when the crop is most sensitive. Consequently, we developed an innovative variable irrigation schedule which mirrors corn water demand through the season. A conservative irrigation threshold until just prior to tassel is critical because it will encourage root development. This strategy is successful in our rainy climate because it promotes soil aeration, and improves nutrient availability, which boosts plant health and tolerance of adverse environmental conditions. Implementation of this strategy in Verification fields is improving corn yields 10-25 bushels per acre, as well as reducing irrigation water use and expenses about 40 percent.

Project Results

Our experience with Corn Verification Fields has identified three fundamental areas which principally establish corn yield and affect profitability: hybrid selection, stand development, and plant nutrition. Thus, we strive to improve these goals by annually evaluating corn hybrids for superior yield, and traits which enhance plant health, so we can recommend hybrids better adapted for specific culture. Our abundant rainfall often presents intrinsic problems for corn planting and stand development in the Mid-South. Not only will wet soils restrict and delay corn planting, but may also increase stand failure and growth disparity, which reduces yield. Therefore, we developed planting guidelines based upon soil temperature and moisture, rather than relying solely on calendar date for early planting. New efforts are focused upon methods to mitigate stand issues, including raised beds and fine-tuning seeding depth. Additionally, wet soils restrict plant nutrition by promoting nitrogen loss, and create soil compaction during various fields operations, which restricts root growth. Thus, we tailor nitrogen fertility programs to ensure fertilizer sources are applied using suitable methods and timing capable of improving crop availability and reducing loss. Crop nutrient needs also continue to change as yields rise, different crops are grown, and other conditions evolve. These activities allow us to stay abreast of needs through routine field scouting, sampling and crop reports.



The Corn Verification Program offers tremendous opportunity to identify limitations and enhance our cropping systems.

Project Impacts/Benefits

The Corn Verification Program provides first-hand opportunity to identify many factors limiting corn productivity, so that we can develop educational programs and collaborate with scientists and industry to better direct research to address pertinent limitations in our region. Numerous findings documented through this program have developed into major Mississippi State University research projects, which train graduate students and thoroughly investigate limitations. Furthermore, there is no stronger tool to encourage adoption of new technology and better practices than successful demonstration in the field. Our efforts have addressed many corn production limitations for Mississippi corn producers. This has increased Mississippi corn productivity at rates far surpassing the national average. For example, our recent efforts have helped increase corn yields up to 25 bu/a compared to our cooperators', while reducing irrigation water consumption and expense over 40%. These benefits alone increase grower profitability over \$100 per acre. We believe the cumulative adoption of progressive practices identified, developed and demonstrated through this program offer tremendous possibility to enhance our systems and reduce risk. These activities substantially improve profitability and sustainability of growing corn in Mississippi.

Project Deliverables

- 47 Professional presentations, field days, workshops and other MSU Extension educational activities in 2019
- 29 Published activities on the Mississippi Crop Situation Blog and Mississippi Crop Situation Podcast in 2019
- 76 Publications on social media, such as Twitter, creating 218,745 impressions and 171 new followers in 2019
- 175 Unique field visits throughout the state of Mississippi in 2019