



Mississippi Corn Promotion Board 2024 Progress Report

Project

Title: Revision and Validation of Mississippi State University P,K,&S Fertilizer Recommendations

PI: Dr. Corey Bryant

Department: Delta Research and Extension Center

Project Summary (Issue/Response)



Continual updating of University produced fertilizer recommendations is necessary to ensure that producers are applying the proper amount of fertilizer. The current recommendations utilized by Mississippi State University Extension personnel were developed in the 1960's and have had minimal updating since. In this same time period MS corn yields have continually increased as newer and more efficient hybrids have been introduced. Therefore, it is important to ensure that current fertilizer recommendations reflect the increased yield potential and nutrient use efficiency of these newer hybrids. The objectives of this research were to update and revise current phosphorous, potassium, and sulfur fertilizer recommendations in Mississippi. To accomplish these objectives small plot trials were conducted at 8 locations throughout MS representing multiple soil textures and production environments. Phosphorous and potassium rates included 0, 40, 80, 120, 160, and 200 lbs/a of P_2O_4 and K_2O , respectively. Sulfur rates were 0, 10, 20, 30, 40, and 50 lbs/a S. Soil samples were collected prior to fertilizer application to determine initial soil nutrient levels and fertilizer applications were made between the V1 and V2 growth stages. All other field operations were conducted per the growers standard practices.



Project Results/Outcomes

Phosphorous, potassium, and sulfur rate trials were successfully conducted at ten locations throughout Mississippi. Of the ten locations seven were irrigated and three were rainfed. Soil textures ranged from a loamy sand to clay loam.

In the P trials, initial soil available P levels ranged from 19 to 63 ppm. Analysis indicated that none of the ten locations were responsive to P fertilizer application. Lack of response at any site when five of the sites were expected to be responsive based on current recommendations is an indicator that current recommendations do need to be updated to align with modern genetics and production practices.

In the K trials, initial soil available K levels ranged from 89 to 335 ppm. Analysis indicated that only one of the locations was responsive to K fertilizer applications even though current recommendations would expect three of the sites to be responsive. At this one location an application of 120 lbs/a K_2O increased corn grain yield 13% compared to no fertilizer.

In the S trials, initial soil available S levels ranged from 4 to 22 ppm. It was expected that all sites would be responsive to S fertilizer but only one location was responsive. At this one site, an S fertilizer rate of 20 lbs/a produced maximal yield.

Project Results

Continued research with more site years is needed update current fertilizer recommendations. However, the 2024 data does indicate the updates and revisions are justified..

Project Impacts/Benefits

This project has verified that updating and revising current Mississippi State University Extension fertilizer recommendations is necessary. Results from this project will benefit all MS corn producers as they will ensure that the maximum return on investment is achieved for fertilizer applications.

Project Deliverables

Preliminary results from these trials will be shared at local producer meetings throughout the state.