



# Mississippi Corn Promotion Board 2023 Progress Report

## Project

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

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## 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.



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## Project Results/Outcomes

Phosphorous, potassium, and sulfur rate trials were successfully conducted at seven of the eight locations. One location had to be abandoned due to extensive hail damage at approximately the R4 growth stage which resulted in complete crop failure. Of the remaining seven locations, five were irrigated and two were rainfed. Soil textures were mixed with two locations classified as a silty clay loam, one classified as a very fine sandy loam, and the remaining five classified as a silt loam.

In the phosphorous studies, initial soil available P levels ranged from 11 to 68.5 ppm. Analysis indicated that one of the seven locations was responsive to P fertilizer treatments. The responsive site had an initial soil available P level of 15 ppm which would classify it as low testing based on current P fertilizer recommendations. Initial analysis though has shown little correlation between P fertilizer rates and corn grain yield at this one location. This lack of correlation is due to there being only one responsive site in the 2023 crop year.

In the potassium studies, initial soil available K levels ranged from 104 to 236 ppm. Based on these initial K levels and the soil CEC for each location, all locations were at a medium soil test range or above based on current recommendations. Two of the seven sites were responsive to K fertilizer treatment. As both of these sites would have a soil test recommendation of high based on current recommendations this is an indication that updates to current recommendations are indeed necessary.

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## Project Results

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In the sulfur studies, initial soil available S levels ranged from 6 to 10 ppm. As Mississippi State University Extension personnel do not currently have soil test recommendations for sulfur applications it cannot be stated if any of these locations were high or low testing. Three of the seven sites were responsive to S fertilizer treatments in 2023. At all three sites S fertilizer rates at 40 lbs S/a produced maximum yield.

Continued research with more site years is required to update current fertilizer recommendations. However, the 2023 data does indicate that updates and revisions are needed for P, K, and S fertilizer recommendations.

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## Project Impacts/Benefits

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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.

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## Project Deliverables

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Preliminary results from this trial will be presented at the Mississippi Agricultural Consultants Association meeting in February.