



## Mississippi Corn Promotion Board 2016 Progress Report

Project Title: Correlation of Soil Test Potassium and Phosphorous Indices with Plant Tissue Concentrations and Corn Yield

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### Project Summary (Issue/Response)



The adoption of grid soil sampling by producers in the Mississippi delta has increased. In general, producers who employ grid sampling on their farms do so through consultant services, which utilize private laboratories in the area for soil analysis. Private laboratories and numerous surrounding states utilize the Mehlich-3 soil test extractant. Currently, Mississippi utilizes the Lancaster extractant to determine soil nutrient availability. Producers and consultants have expressed concerns over different soil test based fertilizer recommendations between Lancaster and Mehlich-3 extracted samples. Little to no data is available that correlates Mehlich-3 extractable nutrients to corn yield in Mississippi. The proposed research would provide updated Lancaster soil test correlation/calibration data to Mississippi corn producers that are corn specific, as well as provide data for producers who would like a University recommendation for soil extracted with Mehlich-3.



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### Project Results/Outcomes

In 2016, we preplanned four trials for P research and four Trials for K research. We were able to harvest half of the total preplanned trials. The trials that were lost were due to early season weather and harvest logistics. Therefore we ended the year with two harvestable sites for P and two harvestable sites for K. There were no responses to K fertilization observed at both testing locations in 2016. Average corn grain yields across treatments ranged from 210-217 bu ac<sup>-1</sup> at one site and 168-176 bu ac<sup>-1</sup> at the second location.

For P we observed a significant yield increase at the two harvestable sites. A significant yield increase was observed at the location near Webb. The location near Webb was in a field in close proximity to the field we chose for testing in 2015. Averaged across P<sub>2</sub>O<sub>5</sub> application rate, plots receiving triple super phosphate fertilizer yielded on average 19 bu ac<sup>-1</sup> more than the untreated control (164 bu ac<sup>-1</sup>). However, the increase in yield did not increase with increasing application rate. That is the second application rate (130 lb TSP; 60 lb P<sub>2</sub>O<sub>5</sub> ac<sup>-1</sup>) yielded the largest gain and then plateaued thereafter. At the second location near at DREC, We observed a yield increase of 13 bu ac<sup>-1</sup> when averaging across P rates and comparing to the untreated control (204 bu ac<sup>-1</sup>). Similar to what was observed at site one, 60 units of fertilizer P<sub>2</sub>O<sub>5</sub> was required to maximize yield.

Overall since the project was initiated, we have observed a potash response on 40% of the trials established, and on 65% of the trial evaluating phosphorus. Averaged over all potash sites, when corn responded positively it led to a 20% yield increase (38 bu ac<sup>-1</sup>). For phosphorus, yield response was slightly less at 11 % increase equating to 20 bu ac<sup>-1</sup> on average. This data underscores the need for proper soil testing and fertilization to maintain high yielding corn production in MS. Accompanied are Figure 1, 2, and 3 which represent yield results from phosphorus and potash testing locations within MS.

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## Project Impacts/Benefits

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All corn acres in Mississippi could be impacted by research results if revision of soil test recommendations is warranted. Initially impact will be limited to acres that are currently receiving P and K fertilization. Potential changes in recommendations with regard to P and K could also impact the current acreage that receives Zn fertilization.

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## Project Deliverables

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Coahoma County Production Meeting – Row crop panel discussion; Clarksdale, MS (March 8, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in Mississippi; Verona, MS (February 22, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Sumner, MS (February 17, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Belzoni, MS (February 15, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Tunica, MS (January 25, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Stoneville, MS (January 19, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Cleveland, MS (January 6, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Hollandale, MS (January 5, 2016)

Jimmy Sanders Grower Meeting – Soil Fertility Management in the Mississippi Delta; Yazoo City, MS (January 4, 2016)

Row Crop Short Course – Nutrient Management considerations for 2016; Starkville, MS (Dec 6, 2016)

Mississippi Agriculture Industries Council Certified Crop Advisor Training – Rice Update and Soil Fertility issues in Mississippi row crops; Orange Beach, AL (July 27, 2016)

BASF Technology Tour, Helena Chemical Company – Cotton, corn, soybean, and rice Soil Fertility in Mississippi; Stoneville, MS (July 7, 2016)

BASF Technology Tour, Crop Production Services – Cotton, corn, soybean, and rice soil fertility in Mississippi; Stoneville, MS (July 7, 2016)

BASF Technology Tour, Jimmy Sanders, Inc. – Cotton, corn, soybean, and rice soil fertility in Mississippi; Stoneville, MS (July 6, 2016)

BASF Technology Tour, Green Point Ag – Cotton, corn, soybean, and rice soil fertility in Mississippi; Stoneville, MS (July 6, 2016)

Agronomic Crops Retreat – What’s new in the fertility world; Hamilton, MS (June 14, 2016)

Mississippi Agricultural Consultants Association Meeting – Stretching your fertilizer Dollar in 2016; Starkville, MS (February 4, 2016)

Beck Ag Corn Educational Session – Mid season issues impacting Corn yield National call in radio show (Jan 26, 2016)

Beck Ag Corn Educational Session – Mid season issues impacting Corn yield National call in radio show (Jan 18, 2016)



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# Project Results

Figure 1.

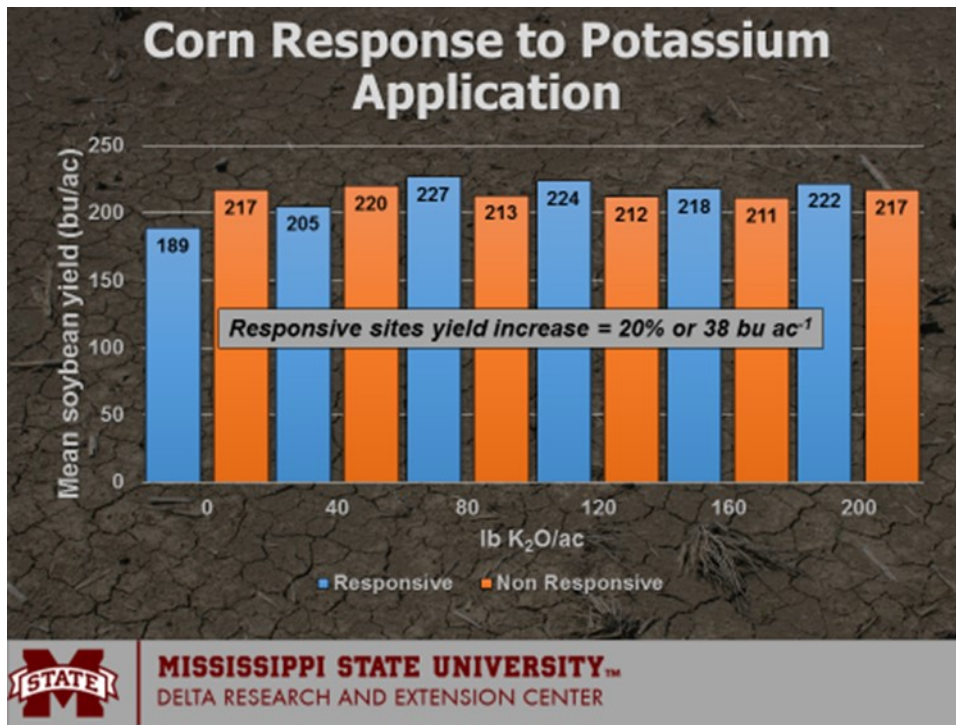


Figure 2.

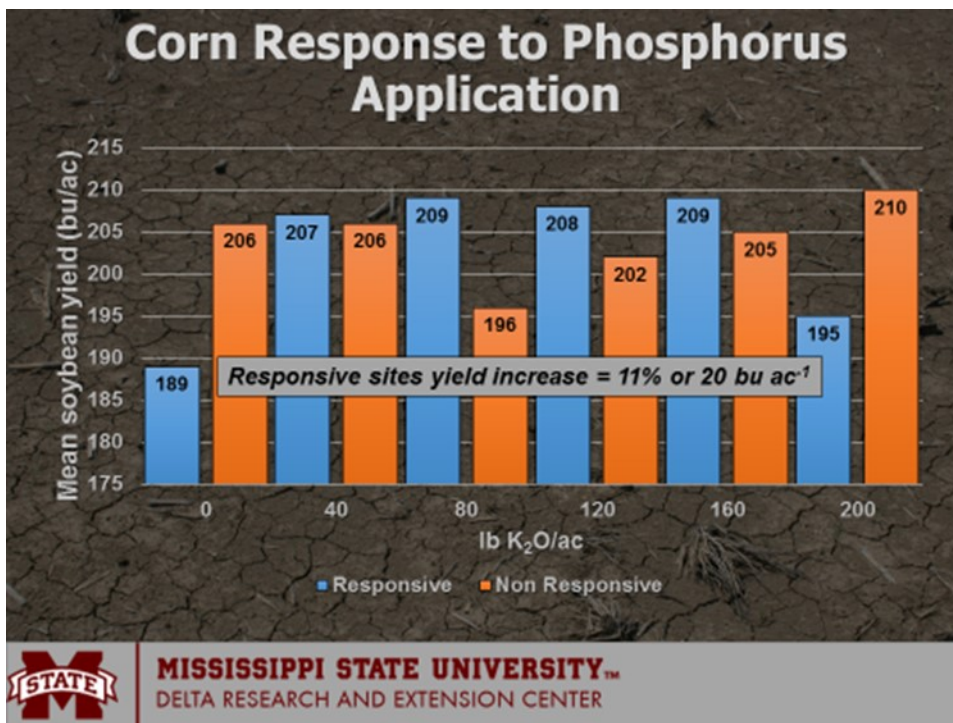


Figure 3.

