



Mississippi Corn Promotion Board 2014 Progress Report

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

PI: Bobby Golden

Department: Delta Research & Extension Center

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.

Project Results/Outcomes

In 2014, we encountered a tough year for testing. Due to environmental conditions we lost two of the preplanned five research locations. We also lost a third site due to the trial being harvested through before the cooperators could shut down his combine operator, we have tissue samples from this site. We were left with two harvestable sites for both P and K response trials. On sites where K was the nutrient of interest we did not observe a yield increase to K fertilization in 2014.

For P we did observe a yield increase at one of the two harvestable sites. A significant yield increase was observed at the Flowers site in Coahoma, Co. Averaged across P₂O₅ application rate, plots receiving triple super phosphate fertilizer yielded 47 bu/ac more than the untreated control (133 bu/ac). However, the increase in yield did not increase with increasing application rate. That is the first application rate (65 lb TSP; 30 lb P₂O₅ ac) gave us the largest gain and then plateaued thereafter.

Overall since the project was initiated, we have observed a potash response on 50% of the trials established, and on 60% of the trial evaluating phosphorus. Averaged over all potash sites, when corn responded positively it led to a 20% yield increase (41 bu/ac). For phosphorus, yield response was slightly less at 11.5% increase equating to 24 bu/ac 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 and 2. Which represent yield results from the phosphorus and potash testing at locations within MS.

MISSISSIPPI STATE
UNIVERSITY™



Project Impacts/Benefits

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.

Project Deliverables

B.R. Golden, Soil Fertility update. MAIC Conference July 24, 2013, Orange Beach, AL.

Golden, B.R. 2013. Current soil test correlation and calibration research in Mississippi. Southeast Regional Information Exchange Group-6. Baton Rouge, LA June 16-18, 2013.

Golden, B.R. 2013. Grower Meeting: Itawamba county mid-season crop update – 2013 soil fertility update on correlation calibration; Baldwin, MS (July 16, 2013)

Golden, B.R. 2013. Grower Meeting: Agronomic crops extension retreat – 2013 soil fertility update on current corn and soybean issues; Hamilton, MS (June 6, 2013)

Golden, B.R. 2013. Technical Meetings/Training Sessions: MS American Society of Agronomy Meeting; Soil fertility considerations for corn and soybean; Grenada, MS (November 13, 2013)

Golden, B.R. 2013. Technical Meetings/Training Sessions: Jimmy Sanders/Pinnacle Ag Inc., Certified Crop Advisor Training – Current issues in row crop fertility; Monroe, LA (Aug 7, 2013)

Golden, B.R. 2013. Technical Meetings/Training Sessions: Jimmy Sanders/Pinnacle Ag Inc., Certified Crop Advisor Training – Current issues in row crop fertility; Birmingham, AL (Aug 1, 2013)

Golden, B.R. 2013. Technical Meetings/Training Sessions: Jimmy Sanders/Pinnacle Ag Inc., Certified Crop Advisor Training – Current issues in row crop fertility; Stoneville, MS (July 31, 2013)

Golden, B.R. 2013. Technical Meetings/Training Sessions: Mississippi Agricultural Consultants Association – Soil test correlation and calibration for soybean and corn; Starkville, MS (Feb 5-6, 2013)

Lowndes county crop update – 2014 fertilizer considerations for soybean and corn; Hamilton, MS (July 8, 2014)

Agronomic crops extension retreat – 2014 soil fertility update for soybeans, corn and rice; Hamilton, MS (June 26, 2014)

Mississippi Agricultural Consultants Association – Soybean and Corn Fertility Management; Starkville, MS (Feb 5-6, 2014)

United Soybean Board – Optimal Rotation Intervals for Soybean and Corn; Little Rock, AR. (Feb 3, 2014)

Pillow Planting Company; Nutrient Management Plans for Corn and Soybean; Stoneville, MS (Sept 30, 2014)

Silent Shade Plantation; Nutrient Management planning for whole farm with emphasis on Corn, Soybean, and Rice. Belzoni, MS (Oct 1, 2014)

Beck Ag Corn Educational Session – Early season issues impacting Corn yield; National call in radio show (Dec 16, 2014)

Beck Ag Corn Educational Session – Early season issues impacting Corn yield; National call in radio show (Dec 11, 2014)

Mississippi ASA Meeting – Soil fertility Concerns for Soybean and Corn; Grenada MS. (Nov 12, 2014)

Delta Research and Extension Center Early-season field day – Corn and Soybean Fertility; Stoneville, MS (April 30, 2014)

Farm Bureau young farmers and ranchers field tour – Row Crop Research at the DREC; Stoneville, MS (August 15, 2014)

Farm Bureau Commodity Directors Tour – Soybean and corn fertilizer management; Stoneville, MS (August 6, 2014)

Mosaic Fertilizer Information Exchange – Soil Fertility Status in Mississippi; Plymouth, MN (November 10, 2014)

Mississippi Agriculture Consultants Information Exchange; What's going on in the Fertility world; Stoneville, MS (Oct 2, 2014)



Project Deliverables (continued)

Mississippi Agriculture Industries Council; Certified Crop Advisor Training – 2014 fertility challenges for rice, corn and soybean; Orange Beach, AL (July 30, 2014)

BASF Technology Training for Helena Chemical Group – Fertilizer management for high yield corn; Leland, MS (June, 19 2014)

BASF Technology Training for Green Point AG Group – Fertilizer management for high yield corn; Leland, MS (June, 19 2014)

BASF Technology Training for Jimmy Sanders Group – Fertilizer management for high yield corn; Leland, MS (June, 18 2014)

BASF technology Training for CPS Group – Fertilizer management for high yield corn; Leland, MS (June 18, 2014)

Mississippi Agricultural Consultants Association – Soybean and Corn Fertility Management; Starkville, MS (Feb 5-6, 2014)

Turner, R., B.R. Golden, M.W. Ebelhar, and E.J. Larson. 2014. Corn's Response to Potassium and Phosphorus. In Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI. Long Beach, CA. Nov 2-5, 2014. (Volunteered)

Graphics

Figure 1. Corn Response to Potash fertilization rate managed in Mississippi

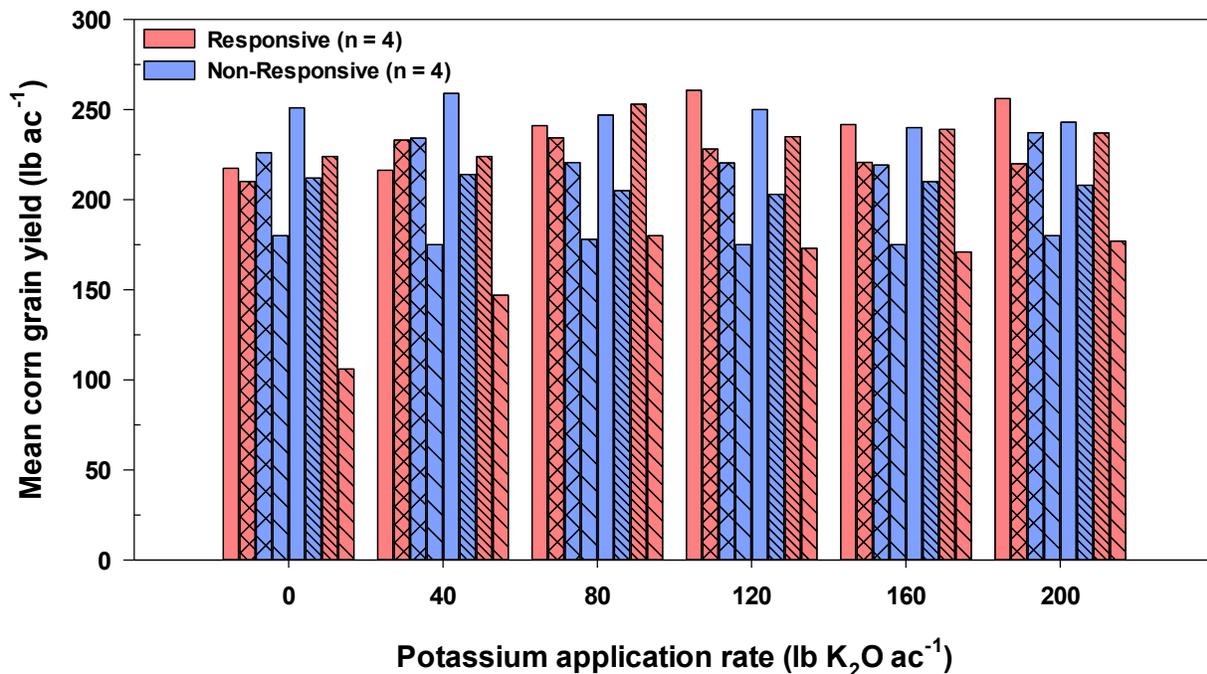
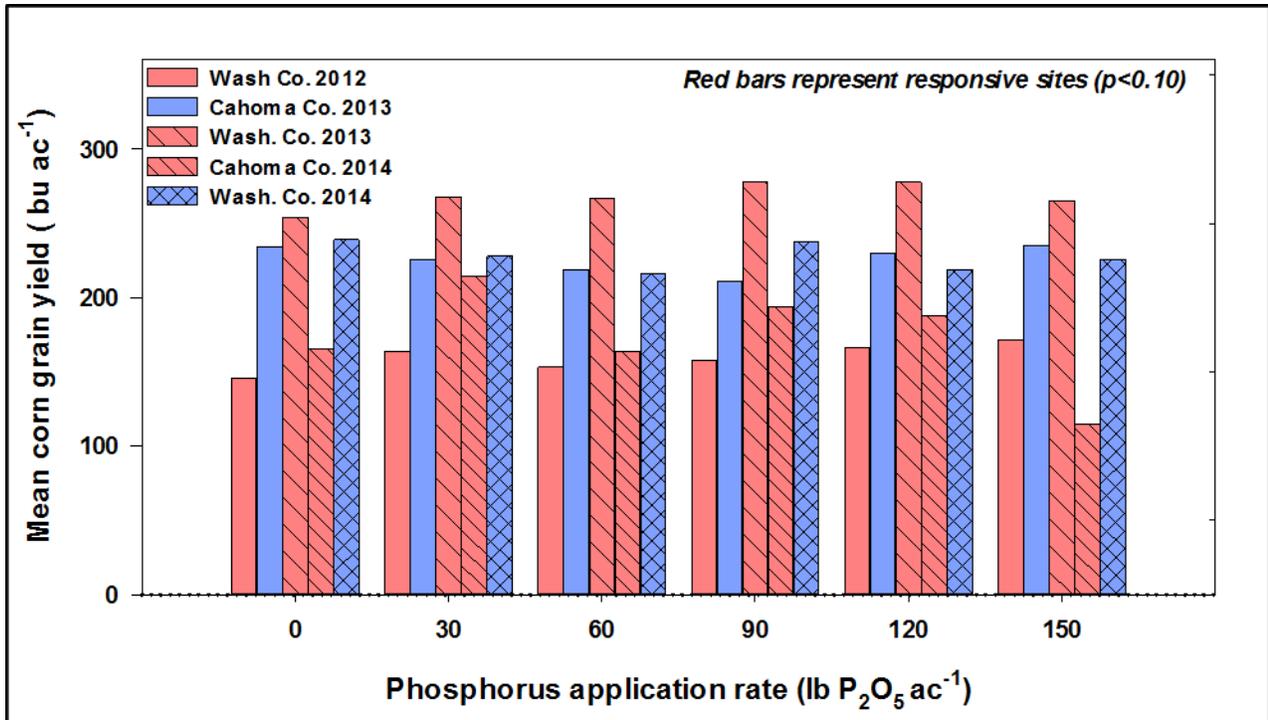


Figure 2. Corn Response to Phosphorus fertilization rate managed in Mississippi



Plot receiving 0 K Fertilizer

