



Mississippi Corn Promotion Board 2015 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 and 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 2015, we preplanned four trials for P research and Four Trials for K research. We were able to harvest half of the total preplanned trials. One preplanned trial was lost due to the aircraft over fertilizing the area we had selected to test at. The other site was lost due to a shift in planting intentions. Therefore we ended the year with two harvestable sites for P and two harvestable sites for K. there were no responses to K fertilization at both testing locations in 2015. Average corn grain yields across treatments ranged from 189-193 bu/ac at one site and 157-162 bu/ac 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. Averaged across P₂O₅ application rate, plots receiving triple super phosphate fertilizer yielded on average 30 bu/ac more than the untreated control (145 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 any thereafter. At the second location near Shaw, MS. We observed a more modest yield increase of 10 bu/ac when average across P rates and compared to the untreated control (200 bu/ac). Similar to what was observed at site one the first 30 units of fertilizer P₂O₅ maximized yield.

Overall since the project was initiated, we have observed a potash response on 40% of the trials established, and on 57% 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 13 % 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 phosphorus and potash testing locations within MS.



Project Results

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

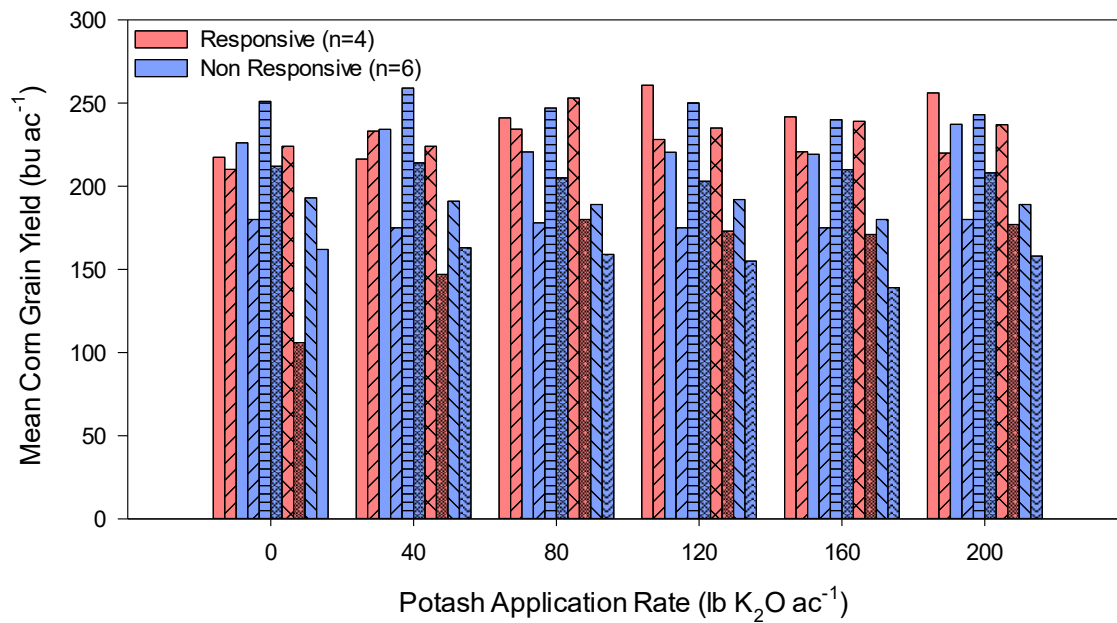
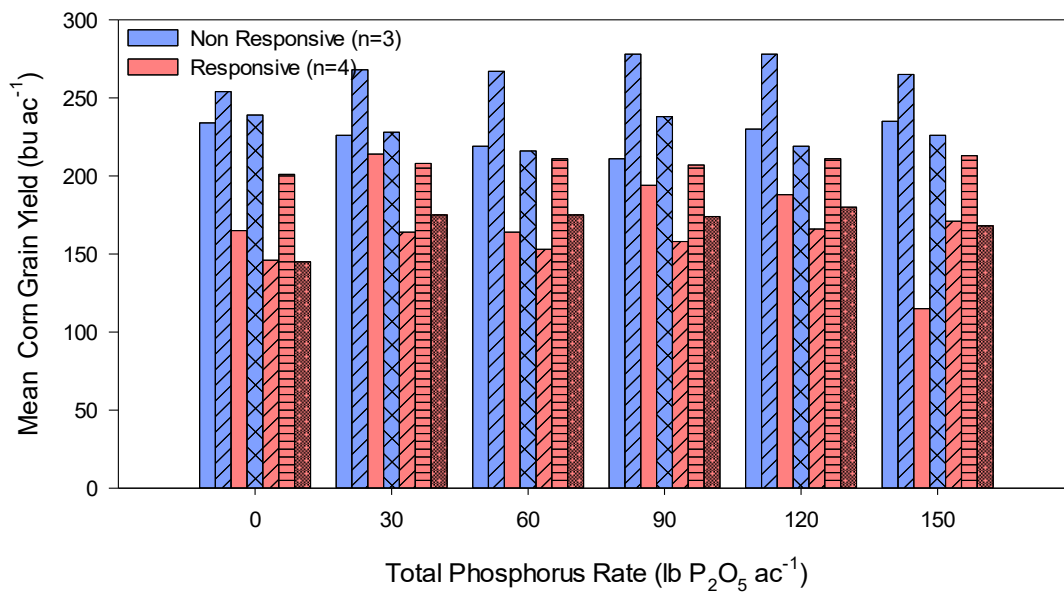


Figure 2. Corn Response to Phosphorus fertilization rate managed in Mississippi.



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. MS American Society of Agronomy Meeting; Soil fertility considerations for corn and soybean; Grenada, MS (November 13, 2013)

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

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

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

Golden, B.R. 2013. 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)

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)

Beck Ag Corn Educational Session – Early season issues impacting Corn yield; National call in radio show (Dec 16, 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 Commodity Directors Tour – Soybean and corn fertilizer management; Stoneville, MS (August 6, 2014)

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 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)

Ross, W.J., B.R. Golden, M.D. Furhman, T. Irby, G. Stevens, J. Lofton, C.B. Neely, R.W. Schnell, L. Falconer, D. Hathcoat. M. Rhine, and L. Bell. 2015. An evaluation of crop rotation and soil nutrients in the Midsouth. In Annual meetings abstracts [Online]. ASA, CSSA, and SSSA, Madison, WI. Minneapolis, MN. Nov 15-18, 2015. Available at: <https://scisoc.confex.com/scisoc/2015am/webprogram/Paper93703.html>

Jimmy Sanders Growers Meeting – Optimal fertilization schedules for maintain productive soil; Greenwood, MS (Mar 12, 2015)

Tri County Grower Meeting – Optimizing corn and soybean yield with soil fertility; Holly Springs, MS (Feb 27, 2015)

Calhoun Co Meeting – Soybean and Corn fertilization for optimal grain yield; Pittsboro, MS (February 3, 2015)

Monsanto Consultants Conference – Optimal fertility programs for corn and soybean; Memphis, TN (January 9, 2015)

Jimmy Sanders Agronomic Training – Fertilizer needs assessment for corn, soybean, and rice; Stoneville MS (January 6, 2015)



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