Mississippi Corn Promotion Board
2013 Progress Report

Project Title: Correlation of Soil Test Potassium and Phosphorus 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.

Project Results/Outcomes

For 2013, three of the five preplanned sites for K response were harvestable. The harvestable sites were located at the Douglas Farm in Boyle, MS, the Craig Farm near Friars Point, MS, and at the Delta Research and Extension Center. Two of the harvestable sites showed response to K fertilization (Fig 1). At the Craig Farm, we received a 10.3 % yield increase when comparing the untreated control to the greatest yielding plot, which resulted in a 24 bu/ac yield increase. The Douglas Farm site also responded positively to K fertilization resulting in a 16.5 % yield increase or a 43 bu/ac yield increase when comparing the untreated control and the fertilized plots. Plots at the DREC did not respond to K fertilization. Early attempts at correlation can be observed in (Fig 2). This data provides a good to start to the correlation/calibration process, but more data is needed to accurately determine a critical concentration of soil K to produce maximal yield.

Project Results/Outcomes (continued)

Trials evaluating corn response to Phosphorus fertilization were preplanned at four locations within the Mississippi Delta. Two of the four trials were harvestable, one was lost due to planting intentions changing, and the other trial was lost due to a poor stand in the area where the trial was placed. Of the two harvestable trials none were responsive to potash fertilization (Fig 3). This is not uncommon for research with phosphorus; soil test phosphorus is much harder to anticipate responsive sites, than utilizing soil test K to anticipate responsive sites. However, accurate representations of both non responsive and responsive sites are required when correlating soil test indices with plant yield. Thus these two point will be valuable to the overall goal of refining soil test recommendations.

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

Publications:

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; Baldwyn, 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)

Graphics

Figure 1. Corn Response to Potash fertilization rate managed at three locations in Mississippi during 2013.

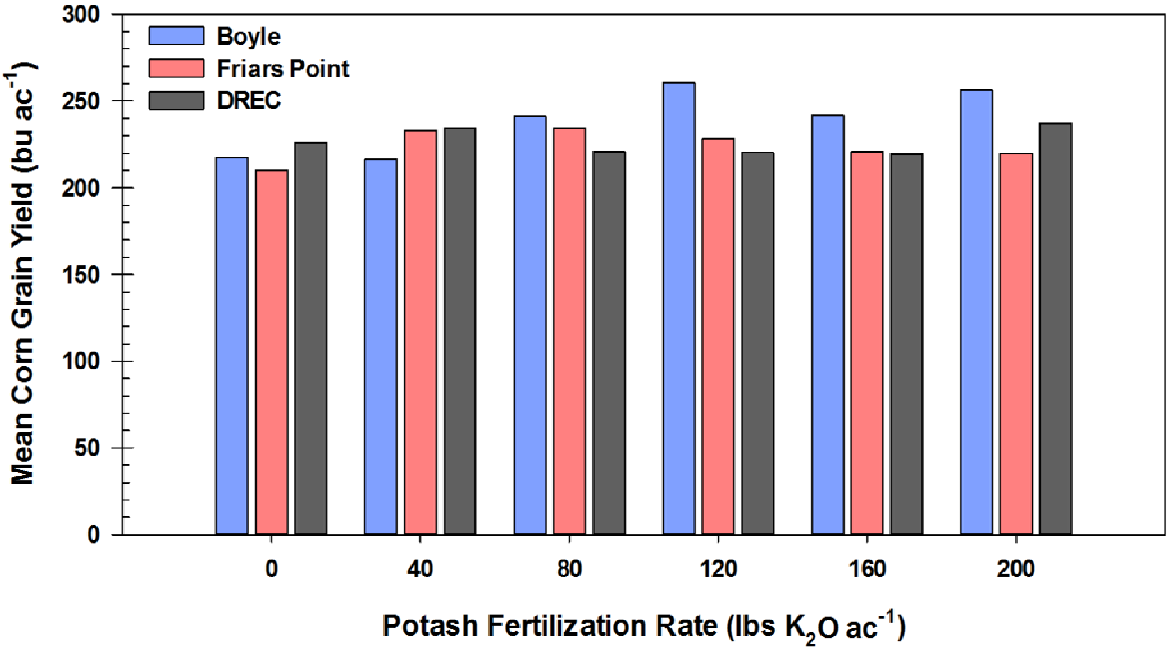

Figure 2. Initial Correlation data describing relative grain yield as a function of soil test K for research trials established in Mississippi during 2012-2013.

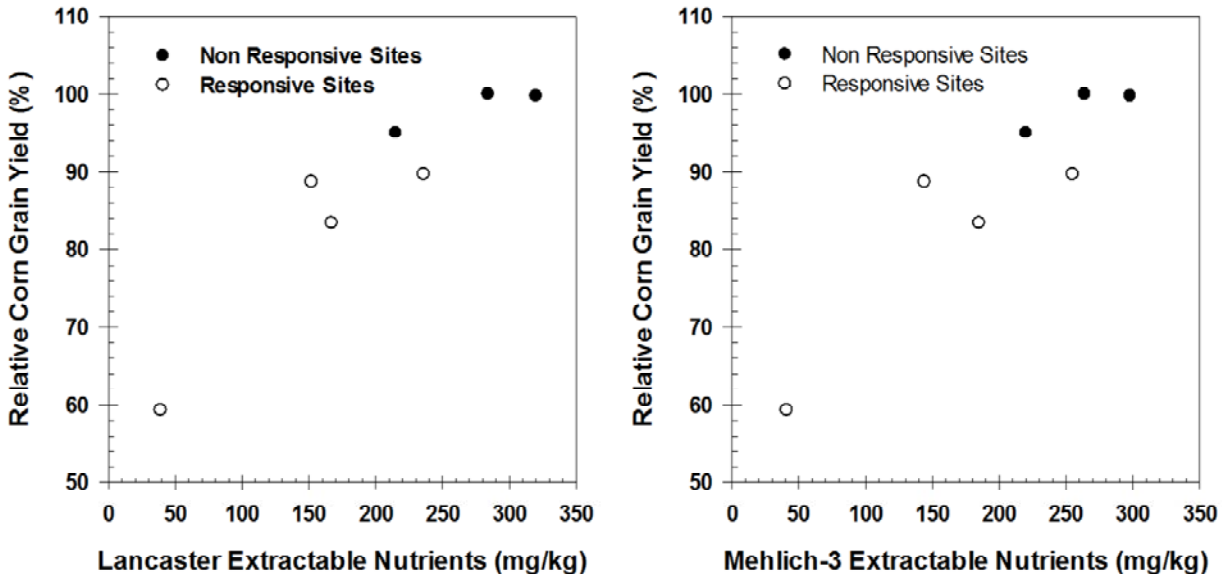

Figure 3. Corn Response to Phosphorus fertilization rate managed at three locations in Mississippi during 2013.