

ARKANSAS CORN/SORGHUM BOARD
Final Progress Report 2009

Title: Site-specific determination of in-season corn (*Zea mays* L.) nutrient and pH variability under Arkansas growing conditions.

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Crop: Corn

Status: Started in 2008

Progress:

During the 2009 corn growing season, experiments were conducted on three fields at two locations, Rohwer and Keiser, in the eastern part of Arkansas. Two varieties, Pioneer 33M5 and DeKalb 6478, were planted in each field. A total of eight nitrogen rate treatments ranging from 0 lbs/ac as control to 350 lbs/ac Nitrogen in 50 lb increments were planned with five replications. The short term goal of this study is to determine the optimum nitrogen rates for corn using optical remote sensing sensor.

Seed germination of both the varieties in Rohwer location was poor resulting in lower yield and correspondingly lower Normalized Difference Vegetation Index (NDVI) values. Comparatively better germination was observed at Keiser location resulting in both the higher yield and NDVI. Corn yield at Keiser did not increase appreciably beyond 200 lbs/acre of nitrogen application. At Rohwer, both varieties required above 250 lbs/acre of nitrogen application to reach maximum yield.

NDVI values at V6 growth stage in Rohwer were affected by poor seed germination. However, DeKalb6478 had better vegetative growth compared to Pioneer33M5. Rate of nitrogen application was not pronounced at V6 stage except for DeKalb6478 that showed a lower NDVI value at 100 lbs/ac likely due to poor germination. At V10 stage, NDVI reached plateau suggesting that sensor got saturated.

N-Rate compared to yield in all varieties and fields show a good linear regression. With the exception of the DeKalb variety in Rohwer, there does not seem to be an effective increase in yield above 200-250 lbs/acre N-Rate. This one exception showed a higher response up to 300 lbs/acre.

In conclusion, the results from this preliminary study showed that there is a potential to use mid-season specific plant NDVI data for variable-rate application of N fertilizer for corn production in Arkansas. The Normalized Difference Vegetation Index (NDVI) measured during corn growth, using a GreenSeeker™ optical sensing technology, can be successfully correlated with corn grain yields to determine optimum side-dress N rates.