

Title: Developing Best Management Practices for N Fertilization in Arkansas Corn Production.

Investigators: T.L. Roberts, Project Coordinator UADAF, N.A. Slaton, UADAF, and Jason Kelley, UACES.

Status: Reporting on Year 2 of 3

2015 Report:

Fertilization continues to be a large portion of a producer's input costs and with lower prices predicted for the next growing season it is essential that proper steps are taken to maximize nutrient use efficiency. Producer profitability is the focus of these research projects and centers around identifying the most efficient and economical use of N fertilizer inputs. Previous research has shown that preplant N fertilizer has very low uptake and N use efficiency, but is essential for getting the crop started on the right track. The continued focus of this project is to gain insight as to how N use can be improved in our corn production systems while still maintaining yields and producer profitability. In addition to the N fertilization work, trials have been established to look at the response of corn to Zn fertilization over several locations with Zn application rates and timings that are often used by producers.

Continued work on N use efficiency and N rate timing on corn grain yield have indicated two things that can be addressed to increase the N use efficiency of corn while maintaining yields and potentially reducing costs: 1) Preplant N use efficiency in corn is much lower than all other N fertilizer application timings including sidedress and pretassel applications. Therefore, it is essential that preplant N fertilizer rate and application strategy are optimized for the greatest return on the input cost. Recommendations are to apply 45-60 units of N/acre and incorporate into the soil or bed prior to planting. 2) The window of corn response to sidedress N is much larger than we think. Recent studies looking at the timing of corn response to N fertilizer at sidedress N timings ranging from V4 to VT indicate that with adequate preplant N corn yields can be maximized with sidedress N applications as late as V12. The data suggests that waiting until later growth stages to apply sidedress N does not influence corn grain yield and encourages producers to consider waiting until optimal environmental and soil conditions occur before applying sidedress N applications to corn in order to maximize N use efficiency and profitability.

Work on the Cornstalk Nitrate Test (CSNT) has indicated that the N use in our corn production systems can be quite high and that the majority of the N fertilizer applied to production fields is being taken up and converted to grain. Although these results indicate that our current practices are doing well, there is always room for improvement. Results from this research are being developed to allow producers to utilize the CSNT in Arkansas to give them an end of year report card on the success of their N fertilization program that year. The thresholds that will be developed for Arkansas producers will be different than those currently available in the Midwest and will be better suited for our production conditions. Official recommendations on these thresholds and the use of the CSNT in Arkansas corn production should be near completion within the next year.

In addition to N response trials, a Zn fertilization study was conducted at Pinetree and the Rice Research Center near Stuttgart. This study was focused on preplant and early-season (>V4) Zn applications and their influence on Zn tissue concentration and corn yield. For both the Stuttgart and the Pinetree location there was a significant response to Zn fertilization and suggested that banding low rates of Zn in-furrow were as good as the traditional 10 lb Zn/acre broadcast and incorporated. Banding Zn in-furrow could provide a substantial cost savings for producers that require Zn fertilization to maximize corn yield. Other interesting results of this research included a significant response to Zn fertilization where the soil analysis and V6 tissue analysis might not suggest a significant yield response. Further investigation of this is needed to identify if changes are needed to the current soil test guidelines for Zn fertilization in Arkansas.