

## **Evaluation of Fall Dry Band Application of Phosphorous and Potassium Nutrient Needs for a Corn/Soybean Rotation**

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### **Introduction:**

Many Missouri farmers find their profit margins being squeezed by increasing cash rent rates and high fertilizer costs. Land owners are not agreeing to share profit risk with renters, which leaves them at a high business risk. Farmers are looking for alternative methods to reduce fertilizer costs and are reading about information from states where fall band fertilizer research has shown that broadcast rates can be reduced while maintaining yields. While fall and sidedress banding systems in the northern Corn Belt have research data there is little Missouri data on the results of such an approach, where a two year fertilizer recommendation is applied to meet the nutrient needs of a corn-soybean rotation. This is routinely applied broadcast with variable rate equipment or with blanket application equipment.

Field information under Missouri soils and environment would indicate the value of such an approach by Missouri farmers and whether it could be recommended.

The objectives of this study are to determine:

- 1) The yield influence of fall 2 year band application of a  $P_2O_5/K_2O$  fertilizer recommendation for a corn and soybean rotation compared to a fall broadcast application.
- 2) Evaluate crop stand, vigor and yield results from planting directly over fall banded fertilizer using autosteer technology.
- 3) Evaluate fall strip tillage influence on corn/bean yield.
- 4) Evaluate the practicality of this approach by farmers to minimizing fertilizer costs, while maintaining or increasing yield environment.

### **Methods and Materials:**

In fall of 2008 four cooperators were with six with low phosphorus and low potassium test sites were identified. GPS referenced soil samples were taken on test sites for determination of composite sample averages and for use in geospatial statistical analysis of treatment interactions.

Composite sample averages were used to determine the broadcast  $P_2O_5/K_2O$  rate. Treatments consist of 4 replications of 0  $P_2O_5/K_2O$  (control), broadcast rate of soil test recommendation of  $P_2O_5/K_2O$ , broadcast rate in a band, and  $\frac{1}{2}$

broadcast rate of  $P_2O_5/K_2O$  in a band. Plots were sized to accommodate harvest equipment of individual cooperators, but will be approximately 0.5 acres in size.

Band application was with a 4 strip till fertilizer bar mounted with a Gandy Orbit-Air box, provided in cooperation Dr. Kelly Nelson and Randy Smoot, Director, of the Greenly Memorial Research Center, Novelty Missouri. Fertilizer bands were on 30" row spacing at 5" depth.

### **Observations and Results:**

Test fields were fall soil sampled. The six fields selected have lower than optimum fertility supplying power based on laboratory analysis. Three of the field sites chosen are rolling loess capped upland sites, one is a river bottom site and the remaining two are poorly drained claypan soil sites.

The plot application was completed at two of the loess upland sites were completed. However, delays in crop harvest due to higher than normal precipitation in East Central Missouri have prevented putting plots at the remaining four test sites.

### **Objectives for 2009:**

During the winter-spring time range the remaining four sites will have plot application completed as site conditions allow.

Plant emergence and harvest populations will be recorded for treatment effect Pest management with cooperators will be monitored during the 2009 cropping season.

Harvest will be with a GIS mapping equipped combine and yield data collected as part of the three-year project.