

(Preliminary Report 2010)

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 rental 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 P₂O₅/K₂O 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 minimize fertilizer costs, while maintaining or increasing yields.

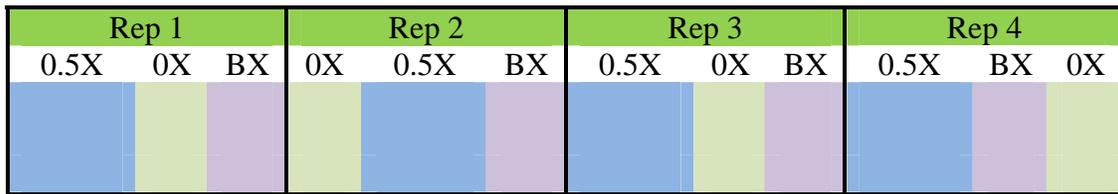
Methods and Materials:

In fall of 2008 cooperators 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. Due to heavy rainfall in the fall 2009, strip tillage was not conducted until the spring of 2010.

Composite sample averages were used to determine the broadcast P₂O₅/K₂O rate. Treatments consisted of four replications of 0 P₂O₅/K₂O (control), broadcast rate of soil test recommendation of P₂O₅/K₂O, and ½ broadcast rate of P₂O₅/K₂O in a band. Recommendations called for 80 lbs. phosphorus and 100 lbs. potassium for a two

rotation of corn at 150 bu./ac. and soybean at 45 bu./ac. Nitrogen applications were: 40 lbs./ac at planting with Urea and DAP with 30 gal./ac. of 32% (141 lbs. N) side dressed at V7. Plots were sized to accommodate harvest equipment of eight rows with plot size being approximately 0.2 acres.

2010 band application was with a 4 row strip-till fertilizer bar mounted with a Gandy Spread-Air box. Strip-till units were Yetter Maverick model units. Fertilizer bands were on 30" row spacing at 5" depth. Plot tillage and fertilizer application was completed at one site on April 21, 2010. Planting was conducted the same day as strip-tillage. Planting rate was 29000 seeds per acre of LG Seed 2614VT3 variety. Below is the plot layout.



Observations and Results:

The 2010 crop growing season provided excellent planting conditions, rapid seedling emergence, and adequate growing season moisture with a late season dry period providing quick dry down. Harvest was conducted on September 30, 2010. Treatment yields ranged from 196 - 220 bu./ac. with the mean being 208.6 bu./ac. There were no significant yield differences between treatments at the 5% probability level. Stand and emergence were uniform with no significant population differences between treatments. The high yields raise questions about possible tillage benefits that will be addressed in 2011.

Objectives for 2011:

1. Two sites were completed on November 18 with banded and broadcast fertilizer.
2. A tillage interaction plot was completed on November 18.
3. Plant soybeans on the rows of 2010 corn plots.
4. Additional sites are under consideration with weather permitting.

Results of Corn Yield 2010 Analysis					
	Replication 1	Replication 2	Replication 3	Replication 4	Treatment Mean
Treatment	-----Bu/A-----				
0X	210.0	219.2	206.8	220.4	214.1
0.5X	213.1	207.4	196.2	212.2	207.2
B 1X	210.9	207.0	198.7	201.5	204.6
Block Mean	211.3	211.2	200.6	211.4	208.6
No significant treatment differences (P=0.05)					LSD 8.6