Fertilizer & Lime 2008 Proposal

1. Title: Evaluation of Fall Dry Band Application of Phosphorous and Potassium Nutrient needs for a Corn/Soybean Rotation

2. Investigators: Rich Hoormann, Region Agronomy Specialist, Charlie Ellis, Region Natural Resources Engineer, Peter Scharf, Associate Professor of Agronomy, University of Missouri Extension

3. Objectives: The objectives of this study are to determine: The influence of fall band application of a two year application of P$_2$O$_5$/K$_2$O fertilizer recommendation for a corn and soybean rotation, when compared to the broadcast rate. Yield results, crop stand and vigor will be measured to evaluate the practicality of this approach by farmers to minimizing fertilizer costs, while maintaining or increasing yield environment.

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 done broadcast by variable rate application and blanket applications.

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

4. Procedures: A site with low phosphorus will be selected and confirmed using GPS referenced soil samples. The field test plot will be positioned within an existing field based on phosphorus tests. Composite sample averages will be used to determine the broadcast P205/K20 rate. Treatments will consist of 4 replications of 0 P205/K20 (control), broadcast rate of soil test recommendation of P205/K20, broadcast rate in a band, and ½ broadcast rate of P205/K20 in a band. Bands will be on 30” row spacing at 4” depth. Band application will be with a modified planter with dry fertilizer boxes and planter units removed. Plots will be sized to accommodate harvest equipment, but will be field size (~.5 acres), not small plots. Harvest will be with a GIS mapping equipped combine. This will be a three-year project because of the nature of the crop response to a two year fertilizer rate and the need to track yield and crop response.
6. **Timetable for proposed research:** We propose to begin this study in the spring of 2008 with application equipment purchase and modification, site selection and soil sampling (March through April). Field layouts will be in September following 2008 crop harvest. A field day will be held demonstrating application in the fall of 2008. Year 2 will involve planter setup with RTK equipment and harvest with combine equipped with yield mapping capability. Data collected will be presented at date at Soils & Crops Conferences and intermediate report write up. Year 3 will repeat the field day and final write up of data. PowerPoint presentations will be constructed and distributed.

7. **Strategy for application/transfer of knowledge:** The results of this study will be disseminated at field days to be held on site each year of the project and at region Soils & Crops Conferences and other local events. In addition to the reports required by the Fertilizer/Ag Lime program, a summary will be written for use by University of Missouri Extension staff and other interested organizations. PowerPoint presentations of the information will be provided for use by other Extension professionals in the State. Information will also be used in radio formats that cite research done in the state.

8. **Budget:** Proposed budget by years and by category.

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<tr>
<th>Item</th>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td>RTK/GIS equipment</td>
<td>cables/ maintenance</td>
<td>300</td>
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<tr>
<td>Fertilizer purchase</td>
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<tr>
<td>Soil Tests</td>
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<tr>
<td>Equipment: Applicator</td>
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<td>Modification costs</td>
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<tr>
<td>Equipment Maintenance</td>
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<tr>
<td>Supplies</td>
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<td>Field Days/Meetings</td>
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<tr>
<td>Travel/transport</td>
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<td>Sub total by year</td>
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</table>

Three year Grant total: $12440

**Resumes of researchers:**

**Richard G. Hoormann**  
310 Salisbury St., Suite E  
Montgomery City, MO 63361  
hoormannr@missouri.edu

**Summary:**
I am a professional agronomy educator, with a strong record of combining consultation, research, field work and electronic tools with teaching, to meet the needs of the farm audience. I have educational leadership experience in the wholesale, USDA agencies and retailer setting. I am able to successfully manage time and resources to achieve planned goals.

**Career History and Selected Achievements:**

**Region Agronomy Specialist,**
Present
University of Missouri

Responsible for the development of an overall agricultural education programs to meet the agricultural needs identified in the needs assessment process. Program management included developing logic models to produce desired changes and carry out the work necessary to evaluate markers identified in logic models.

Programs involve using a series of learning events such as meetings, newsletters, web base electronic news, demonstrations, field days, consultation and workshops to achieve program goals as assigned.

Leadership of the Universities of Missouri’s mission in the assigned area of work includes working closely with a variety of stakeholders including: commodity groups and volunteer and/or elected boards.

**Agronomist,**
2003-2005
RGH Agronomics
St. Peters, MO

Independent offering agronomy services to retail dealers.

**Region Agronomist,**
2000- 2003
Agriliance LLC
St. Paul, MN

As a region agronomist, I maintained close support of sales staff in states of MO, IL, KY and parts of IA. Duties included conducting proprietary product training for key customer staff and their key growers. Training was conducted in Field Days, plot tours, at retailer plants and one-on-one. The region agronomist facilitated business marketing planning with the sales team using the discovery process to position training and products.
Field diagnostic work and product support was carried out for the Croplan Genetics seed division. This included teaching in demonstrations and research field days, dealer plot tours, and on site problem solving. In addition, field data collection and product performance issues were part of field duties.

Region Agronomist,
1995- 2000
Farmland Industries, Inc
Kansas City, MO

Extension Region Agronomy/Natural Resources Specialist,
1983- 1995 University of Missouri Outreach & Extension

Extension Instructor,
1980- 1983 University of Nebraska Cooperative Extension

Research Assistant,
1978- 1979 Southern Illinois University

Certifications:
Certified Crop Advisor (ARPACS), 1996

Education:

Bachelor of Science Southern Illinois University at Carbondale 1978
Major: Plant & Soil Science

Masters of Science Southern Illinois University at Carbondale 1981
Major: Plant & Soil Science

Charles Ellis
Natural Resource Engineering/County Program Director
Lincoln County Extension Center
Troy, MO 63379
Ph. 636-52804613

PROFESSIONAL PROFILE
Since July 1, 1991 has been the Natural Resource Engineer for the East Central Extension Region. Duties have included working in the areas of crop production, livestock production, on-site septic systems and watershed quality issues. Beginning in 1996 have been involved in precision farming practices in the East Central Region as well as state wide.
PROJECTS AND PAPERS
Assisting farmers in adopting precision farming practices that include yield mapping, grid soil sampling, light bar usage and sensing technology.

The Northeast Missouri GPS equipped fertilizer cart to convert a commercial tractor drawn fertilizer cart to variable rate capabilities.

Evaluation of “Low Cost” GPS receivers for yield mapping and presentation at ASAE conference.

Variable rate applications of nitrogen in corn using Greenseeker technology.

Nitrogen management in corn using new sensing technologies.

Conversion of CRP ground to no-till crop production.

Assisting local grain producers in developing yield mapping experience on approximately 5000 acres per year.

CERTIFICATIONS
CCA
Vegetable Oil Extraction Short Course

Peter Clifton Scharf
Nutrient Management Specialist and Associate Professor
Plant Sciences Division
108 Waters Hall
University of Missouri
Columbia, MO 65211

Research and Extension education interests
C developing, evaluating, and promoting tools to predict crop N needs, including variable-rate N management
C minimizing environmental impacts of agricultural nutrients
C optimizing nutrient and lime management for crop production
C tailoring nutrient recommendations to account for soil properties

Education
Degree Date Institution Major
Ph.D. May 1993 Virginia Polytechnic Inst. Crop & Soil and State University Environmental Sciences
M.S. July 1988 Virginia Polytechnic Inst. Agronomy and State University
B.S. August 1982 University of Wisconsin Biochemistry,
Genetics

Selected Research Publications

Selected Extension Publications
Scharf, Peter. 2006. Color of corn leaf shows needed nitrogen for crop. MidAmerica
Scharf, Peter and Harlan Palm. 2005. The color of green: sensors cast light on how corn growers can use less nitrogen. Press release through MU Extension & Ag Information.
Using information from Peter Scharf.