

NEWS & VIEWS

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Dr. H.F. Reetz,
Midwest Director
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Research Programs in the Midwest Region

THE Potash & Phosphate Institute (PPI) and the Foundation for Agronomic Research (FAR) provide both financial and technical support for a broad spectrum of agricultural research and education programs. The following research and extension education programs received support from PPI/FAR during the 1997 cropping season. A brief description of each project is provided.

Illinois



Evaluation of Site-Specific Precision Farming Systems on Soybeans

Project Leader: Dr. Don G. Bullock, University of Illinois, W-203 Turner Hall, 1102 South Goodwin, Urbana, IL 61801. (217-244-8221).

Side-by-side comparisons of site-specific management with field average management systems are being made on 20 corn and soybean fields in Illinois and Indiana, with the expansion to 20 additional sites including addition of fields in South Dakota, Ohio, Iowa, Wisconsin, Minnesota, Michigan, and Missouri for the 1997-1998 season. Variable-rate phosphorus (P) and potassium (K) and lime treatments were applied for the first time in the 1997 growing season. Yield monitor data, along with soil survey information, soil tests (one-acre grid basis), and other observations are being analyzed with GIS analytical tools to develop management plans for the coming season. Significant yield differences as small as one bushel per acre can be detected in this system. One of the most

significant outcomes of this project to date has been that it has helped bring together a group of university and agribusiness specialists and farmers to work out problems of technical compatibility of software and hardware tools needed to evaluate site-specific data. With initial support from United Soybean Board (USB) soybean check-off funds, the project has attracted support in cash and in-kind from many other sources and has stimulated cooperation among scientists in several states.



Development and Evaluation of Internet-Based Decision Tools for Soybean Producers

Project Leader: Dr. John Schmitz, Agriculture Instructional Media Lab, University of Illinois, Taft House, 1401 S. Maryland Dr., Urbana, IL 61801. (217-244-2291).

A series of software decision tools is being developed for delivery and use on the internet. The PKMan program for determining optimum soil test P and K levels has been translated into the Java code for use with internet web browsers. Other decision tools will be completed in 1998. They will be packaged as a suite of decision aids for farmers and their advisers to aid in nutrient management and crop systems decisions.



Agronomic market development information provided by:

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Value of Ammonium Sulfate as a Nitrogen Source for No-Till Corn

Project Leader: Dr. Fred E. Below 1201 W. Gregory Dr., University of Illinois, Urbana, IL 61801. (217-333-9745).

Fall, winter and spring applications of ammonium sulfate $[(NH_4)_2SO_4]$ were compared at three central Illinois sites. All sites were in strip-till systems. Rates of 120 to 140 lb/A nitrogen (N) were broadcast on the surface. There was a significant response to N at all three locations, and there was a trend, though not statistically significant, toward higher corn yields for the spring applications. Response to timing of application appeared to be affected by local rainfall patterns. The general conclusion after the first year of the study is that surface application of $(NH_4)_2SO_4$ in the fall and early winter does not result in efficient utilization of the N, and that surface applications should be made as close to time of utilization as possible.



Nitrogen and Sulfur Fertilization of Wheat under Intensive Management

Project Leaders: Dr. Steve A. Ebelhar, University of Illinois, Dixon Springs Agricultural Center, R.R.#1, Box 256, Simpson, IL 62985. (618-695-2441).

and Dr. Ed C. Varsa, Southern Illinois University of Carbondale, Carbondale, IL 62901-4415. (618-453-2496).

University of Illinois and Southern Illinois University researchers are developing intensive wheat management systems, with a goal of consistently producing 100 bu/A yields. The project includes planting at the earliest hessian fly-free date, at a rate of 1.8 million seed per acre, which should provide about 38 plants per square ft., using a high-yielding variety. Rates of 30 lb/A N plus 200 lb 0-46-0 and 100 lb 0-0-60 were applied prior to seed-bed preparation. In the spring, 90 lb N/A was applied as a split application, using three N sources—UAN (28 percent), UAN+ammonium thiosulfate (ATS), and UAN+AS. A fungicide was applied at early head emergence to combat flag leaf and head diseases. Average yields at Dixon Springs, Brownstown and Belleville were 61, 71 and 82 bu/A, respectively. Yields were limited by high rainfall in March and April, causing N losses from the system. Also, high temperatures in early June caused premature ripening of the wheat crop. Nitrogen source had little effect on yields, but there was a 20 to 25 bu/A yield increase over the check plots (no spring N). The late April (Feekes GS 8) N addition increased yields at Dixon Springs and Belleville, an indication of N loss from earlier N applica-

tions. This study provides improved guidelines for intensive wheat management systems for high yields, essential to maintaining wheat as a viable crop. Successful implementation of these systems in southern Illinois, southern Indiana, western Kentucky and southeast Missouri will help maintain and expand fertilizer markets in these areas.

Indiana



Physiological Role of Potassium and Phosphorus in Alfalfa

Project Leader: Dr. Jeff Volenec, Department of Agronomy, Purdue University, West Lafayette, IN 47907-1150 (765-496-1368).

This project is attempting to determine why relatively high levels of K and P are essential for excellent winter survival and high yield of alfalfa. A new alfalfa seeding was established on a site where soil tests indicate that both P and K are limiting alfalfa production. Five K rates and four P rates are being applied in all possible combinations. Roots sampled in December will be analyzed for several attributes we know are important for alfalfa survival overwinter, including: Starch and sugar concentrations, root storage protein levels, and expression of several winter hardiness genes. Results will be used to better educate producers why P and K fertilization is necessary for maintaining high yield and stand longevity for alfalfa and other forage legumes.



Bioavailable Potassium in Corn/Soybean Production Systems

Project Leader: Dr. Sylvie M. Brouder, Purdue University, 1150 Lilly Hall, West Lafayette, IN 47407. (765-496-1489).

This study is designed to enhance our mechanistic understanding of factors and processes that govern K fluxes in the soil and improve our ability to predict the amount of fertilizer K required on a soil-specific basis. Field plots were established at five regional Purdue Agriculture Centers in 1997, using an annual rotation of corn and soybeans with both crops present in each year. The K rates are annual additions (0, 30, 60, 120, and 180 lb K_2O/A) or biennial K additions (0, 60, 120, 180, 360 lb K_2O/A) with K applied for the full two year rotation before either corn or soybeans. All other cultural practices including tillage and chemical inputs other than K followed best management practices (BMPs) for the soil

and region. Dry matter production, yield, and tetraphenylboron (TPhB) extractable K are being measured, with soil samples taken at 4-inch increments to a depth of 2 feet.

In a related study, repeated wetting and drying reduced exchangeable [ammonium acetate (NH_4OAc) extractable] K levels by 13 to 32 percent depending on soil fixation potential. For each soil and K treatment, TPhB extractable K was unchanged by moisture regime. Temperature regime did not significantly change either exchangeable or TPhB-extractable K. The TPhB-K test is being evaluated in reference to fixation, mineralogy and method suitability as a standardized protocol. This method is showing promise as an improved method to determine K availability and could have significant impact on the recommendations for K fertilizer in coming years.

Ohio



Potassium/Phosphorus on Soybeans and Corn

Project Leader: Dr. Jay W. Johnson, Department of Agronomy, Ohio State University, Columbus, OH 43210. (614-292-2047).

For 1997, grain yields increased by approximately 25 bu/A for each 50 lb/A increase in soil test K. Summarized over four years (1993-1997), increasing soil test K from 150 lb/A increased grain yields by approximately 20 percent. Increasing soil test P from 15 to 75 lb/A did not significantly increase corn yields, but did significantly lower grain moisture at harvest. The optimum soil test K was 285 lb/A. The soil P and the soil P/soil K interaction did not significantly affect corn grain yields.

Summary

Much of the Midwest Region research program is focused on collecting information needed to implement site-specific management systems. The interest in this new technology has renewed interest in basic P and K responses, in improving soil testing procedures, and in on-farm research to gain information on a more localized basis. Improved means of disseminating information is also a major component of the education and outreach program in the region. ■

Nutrient Management Planning Workshop

FAR and PPI will sponsor a **Nutrient Management Planning Workshop**, August 17-18, 1998 in Danville, IL, in cooperation with the Illinois Fertilizer & Chemical Association, the Indiana Plant Food and Agricultural Chemicals Association, the Conservation Technology Information Center, and the Natural Resources Conservation Service. Farmers, dealers and consultants will work in teams to step through the details of developing data sets, records and nutrient management plans for Midwest fields. Industry, government agency and university specialists will lead the workshops. Hands-on sessions will feature appropriate worksheets, computer programs, and other resources needed to develop comprehensive management plans for farms and individual fields. Each participant will receive copies of workshop materials and software that they can take home to help them develop their own nutrient management plans. There will also be a large exhibit hall featuring the latest technology for development and implementation of the plans. More information for participants and exhibitors is available from PPI, 111 East Washington Street, Monticello, IL 61856 (Phone: 217-762-2074; Fax: 217-762-8655; e-mail: hreetz@ppi-far.org). Or check out the NMP Workshop web site: <http://www.agcentral.com/nutrients>.

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