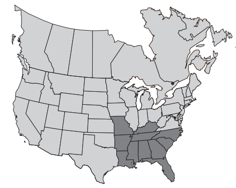
INSIGHTS
IPNI
International Plant Nutrition Institute



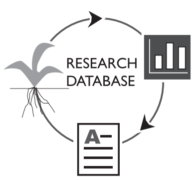
August 2007
Part 1 of 2

2006 Research Program Summaries – Southeast Region

Soybeans, Rice and Wheat

CHANGE is inevitable and has become an integral part of our world today. With this new issue of *INSIGHTS,* we have some important information on recent changes to highlight. The Potash & Phosphate Institute (PPI) ceased to exist at the end of 2006 and the International Plant Nutrition Institute (IPNI) was introduced at the beginning of 2007. At that time, **Dr. Cliff Snyder** was named Nitrogen Program Director for the new organization, with responsibility across North America and other IPNI program regions. He had served as Southeast Region Director for PPI over the past several years. Effective June 1, **Dr. Steven B. Phillips** joined the IPNI staff and is now the Southeast Region Director for IPNI. Contact information for both Dr. Snyder and Dr. Phillips appears with their photos.

In the past, you have probably received information from PPI through a publication called News & Views. That title has been discontinued and *INSIGHTS* is a new publication from IPNI.



Economic and environmental pressures have increased in recent years, making it more important than ever that nutrient rate, source, timing, and placement decisions are made correctly. Sound economic and environmentally responsible decisions are impossible in the absence of current nutrient management research. This report (Part 1) and its companion (Part 2) advance the science of nutrient management for the variety of food, fiber, and forestry crops produced in the Southeast U.S. The Foundation for Agronomic Research (FAR) is now affiliated with IPNI. The research projects reported here are supported in part by IPNI, FAR, and other cooperators. More information about the projects summarized here is available at these websites: >**www.ipni.net/research**< or >**www.farmresearch.com**<.

Please refer to the second INSIGHTS (Part 2 of 2) for a report from other studies conducted in the Southeast Region in 2006.

Dr. C.S. (Cliff) Snyder
Nitrogen Program Director
International Plant Nutrition Institute (IPNI)
P.O. Drawer 2440
Conway, AR 72033-2440
Phone: 501-336-8110
Fax: 501-329-2318
e-mail: csnyder@ipni.net
website: www.ipni.net

Dr. Steve Phillips
Director Southeast Region
International Plant Nutrition Institute (IPNI)
18182 Airport Drive
Melfa, VA 23410
Phone: 757-787-4045
Cell: 757-999-2839
e-mail: sphillips@ipni.net
website: www.ipni.net

Arkansas

Soybean and Rice Response to Boron Fertilization in Arkansas

Project Leader: Dr. Nathan Slaton, University of Arkansas, Crop, Soil & Environmental Science Dept., 115 Plant Science Bldg, Fayetteville, AR 72701. Telephone: 479-575-3910. e-mail: nslaton@uark.edu

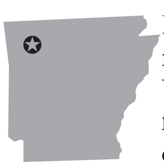
Project Cooperator: R. DeLong, S. Clark, M. Mozaffari, J. Schaeffer, and R. Thompson

The objective of five studies conducted in 2006 with soybean was to evaluate boron (B) fertilizer application time and rate on the seed yield of soybean grown on alkaline silt loams in northeast Arkansas. Also, we sought to evaluate whether trifoliate leaf B concentrations changed appreciably with time during the growing season. Boron fertilizer was applied before emergence using granular B at 1.0 and 2.0 lb B/A, at the V5 stage using foliar-applied B at 0.37 and 0.75 lb B/A, or at the R2 stage using foliar-applied B at 0.37 and 0.75 lb B/A. These treatments were compared with an unfertilized control. Several different B fertilizers were used, but most treatments were with Granubor® or Solubor DF®. Each study was a randomized complete block with six replicates of each treatment. Recently matured trifoliate leaves (15 to 20) were collected at and between the V5 and R3 stages and grain yield was measured at maturity. One additional study was conducted to evaluate yield response of B deficient soybean to foliar B applied at one week intervals, which would hopefully provide information concerning the benefit of (or lack of) mid- to late-season B fertilization to stressed soybean plants.

One site has not yet been harvested due to wet soil conditions. Soybean yields were increased by B fertilization at only one site in 2006 and showed a non-significant positive at one other site. At these two sites, soybean yields were greatest when B was applied at planting, or the V5 stage, and showed little or no response to B applied at R2. Both sites had tissue B concentrations between 11 and 19 ppm during the growing season (V5 to R3 stage). The unresponsive sites all had tissue B concentrations >20 ppm and sometimes exceeded 60 ppm depending on B rate, but B fertilization had no significant negative influence on soybean yield. In general, leaf B concentrations were increased more by granular B applied at planting and at higher rates than by B sprayed to soybean foliage at the V5 stage. Tissue B concentrations increased as B application rate increased. Collecting trifoliate leaf samples during early vegetative growth is not currently recommended as a means of identifying fields that need B fertilization. Data from the last 3 years of research suggest that tissue B concentrations may increase or decrease during soybean development, which is due in part to development of the plant's root system and B uptake as a function of soil moisture status. *AR-23F*

Glyphosate Effects on Soybean Phosphorus Response and Soil Microbiology

***Project Leaders:** Dr. Larry Purcell, University of Arkansas CSES, 1366 W. Altheimer Dr., Fayetteville, AR 72704. Telephone: 479-575-3983; e-mail: lpurcell@uark.edu and Dr. Mary Savin, University of Arkansas, Crop, Soil & Environmental Science Dept., 115 Plant Science Bldg., Fayetteville, AR 72701. Telephone: 479-575-5740; e-mail: msavin@uark.edu*



Roundup Ready® (RR) crops account for the majority of soybean, corn, and cotton in the United States. Although glyphosate has no effect on RR crops, beneficial microorganisms can be sensitive to glyphosate. Our research addresses whether glyphosate effects on mycorrhizae in roots of RR crops changes P nutrition. RR soybean, corn, or cotton seeds were planted in low P (22 lb/A Mehlich 3 P) silt-loam soil in 2.4 gallon pots. Treatments included two levels of P nutrition: (i) no additional P, and (ii) the equivalent of 90 lb P_2O_5/A. There are two glyphosate treatments: (i) no glyphosate (control), and (ii) glyphosate [1 lb active ingredient (a.i.)/A] applied at 10 and 20 days after emergence. Treatments were replicated six times. Soil was not pasteurized, and mycorrhizal infection was dependent on the indigenous community. Soybean was inoculated with *B. japonicum* and did not receive N fertilizer; corn and cotton received 100 lb N/A. Six weeks after emergence, plants were harvested, dried, ground, and analyzed for N and P. Root colonization by mycorrhizal fungi was measured after washing, clearing, and staining roots.

Phosphorus fertilization significantly decreased mycorrhizal infection in soybean and significantly increased shoot biomass and plant P in all three crops as compared to no P additions. No significant effects of glyphosate or interactions of P and glyphosate were apparent for any variable. These results are in contrast to a previous study on pasteurized and inoculated soil where mycorrhizal infection in corn was 40% lower, while mycorrhizal infection in cotton was twice as high, following one glyphosate application. Thus, while glyphosate may affect mycorrhizal infection in soil with a compromised microbial community (i.e., pasteurized soil), these greenhouse results indicate that glyphosate application to RR plants in a healthy soil may not need to be considered in management decisions related to P nutrition. *AR-28F*

Soybean Response to Phosphorus and Potassium Fertilization in Arkansas

***Project Leader:** Dr. Nathan Slaton, University of Arkansas, Crop, Soil & Environmental Science Dept, 115 Plant Science Bldg., Fayetteville, AR 72701. Telephone: 479-575-3910. e-mail: nslaton@uark.edu*

***Project Cooperators:** R. DeLong, J. Branson, S. Clark, M. Mozaffari, R.J. Norman, J. Schaeffer, and R. Thompson*

The objective of studies conducted in 2006 was to evaluate yield response of soybean grown on silt loam soils in eastern Arkansas to P and K fertilization rate. Seven short-term study sites were established for P and K fertilization trials. Before or shortly after soybean was planted, P (triple superphosphate) or K (potassium chloride) fertilizers were applied at rates of 0, 40, 80, 120, and 160 lb K_2O or P_2O_5/A. At each site, P and K studies were in adjacent plot areas. Each experiment was a randomized complete block with six replicates. Other fertilizer nutrients besides the nutrient being studied... i.e., boron (B), P and/or K...were added to each study site. A composite soil sample (0 to 4 in. depth) was collected from each replicate and extracted with Mehlich-3 solution. Recently matured trifoliate soybean leaves (15 to 20) were collected at the R2 growth stage for elemental analysis. Grain yield was measured at maturity.

Soybean yields were significantly increased by K fertilization at three sites, which had <102 ppm Mehlich-3 extractable K, the lowest soil test K values of the 2006 research sites. Yields at a site testing 104 ppm were not significantly different, but were consistently and numerically higher when K was applied, a trait common to all harvested sites in 2006. At the responsive sites, yields of soybean receiving K fertilizer rates >80 lb K_2O/A were similar, but significantly greater than yields of soybean receiving 0 lb K_2O/A. Application of >80 lb K_2O/A increased soybean yields by 14 to 53% compared to the unfertilized control. Potassium concentrations in recently matured trifoliate leaves at the R2 growth stage were significantly affected by K rate at six of 7 sites. Tissue K concentrations increased linearly as K rate increased with the greatest range of tissue K among K fertilizer rates occurring at the two sites with the lowest soil test K (46 and 86 ppm) values and greatest yield responses. The K concentrations of the unfertilized control were <1.5% for both sites.

Soybean yields were significantly affected by P fertilization rate at only two of six harvested sites which had soil test P values of 3 and 12 ppm. At both sites, near maximal yields were produced by application of 40 lb P_2O_5/A which represented yield increases of 19 to 20% above the unfertilized controls. Other sites had Mehlich-3 P from 8 (unharvested site) to 46 ppm and showed no tendency to respond to P fertilization. Phosphorus concentrations in recently matured trifoliate leaves at the R2 growth stage were significantly affected by P application rate at two of seven sites. The two sites with different tissue P concentrations were the same sites that showed positive yield responses to P fertilization. Trifoliate leaf P concentrations of the unfertilized control treatments were 0.22 and 0.40%, suggesting the critical P concentration at R2 may need to be refined.

The revised University of Arkansas (2006) K fertilizer recommendations for soybean appear to be reasonably accurate in identifying soils that respond to K fertilization. Recommendations for P require some adjustments to improve their accuracy for predicting soybean yield response to P fertilization. *AR-30F*

Agronomic Evaluation of Two New Sulfur Sources for Direct-Seeded, Delayed Flood Rice in Arkansas

Project Leader: Dr. R.J. Norman, University of Arkansas, Crop, Soil & Environmental Sciences, 115 Plant Science Bldg, Fayetteville, AR 72701. Telephone: 479-575-5738. Fax: 479-575-7465. e-mail: rnorman@uark.edu

Most sulfur (S) deficiencies in rice are found on: 1) sandy and sandy loam soils which possess very low amounts of organic matter (OM) and have high permeability, 2) precision graded fields which have had their topsoil removed and consequently have low OM, and 3) fields that are continuously flooded for rice production and waterfowl habitat. The objective of this study was to compare two new S fertilizers to ammonium sulfate for alleviating S deficiency on a permeable, sandy soil. The study was conducted in a commercial rice (Wells variety) field on a Ruston fine sandy loam soil (thermic Typic Paleudult) in Lincoln County, Arkansas, during the 2006 cropping season. Plots were flooded on May 22 at the 4 to 5-leaf growth stage and remained flooded until mature. Nitrogen was applied as urea using a split application of 105 lb N/A at pre-flood and 45 lb N/A at mid-season. Phosphorus and K were applied pre-plant by the farmer according to University of Arkansas recommendations. The experimental design used was a three source x three rate factorial with four replications. The S sources, applied a few days before establishment of the permanent flood, were a Simplot 13-33-0-15 (N-P_2O_5-K_2O-S), a Mosaic 13-33-0-15, and ammonium sulfate (AMS, 21-0-0-24) at 0, 15, and 30 lb S/A. All treatments, including the untreated control, were normalized for N and P rates by applying the appropriate amounts as urea and triple superphosphate, respectively.

Results found no interaction of S fertilizer rate with S fertilizer source. Rice grain yield increased significantly from 127 bu/A when no S was applied to 146 and 154 bu/A when 15 and 30 lb S/A were applied, respectively. Rice grain yield response to S was statistically similar for the three different S sources at the $p = 0.05$ level of confidence, but at $p = 0.10$ a higher rice grain yield was achieved using the 13-33-0-15 source compared to AMS.
AR-32F

Florida

Evaluation of Chloride and Other Nutrients for the Control of Soybean Rust in North Florida

Project Leader: Dr. David Wright, University of Florida, North Florida Research and Education Center, 155 Research Road, Quincy, FL 32351-5677. Telephone: 850-875-7119. Fax: 850-875-7188. E-mail: wright@ufl.edu

Project Cooperator: Jim Marois and Tristan Mueller

Soybean variety NK S57-A4 was planted at the North Florida Research and Education Center in Quincy on August 23, 2006, in 4-row plots. Plots were 20 ft. long with 36 in. row spacing. The experimental design was a randomized complete block with four replications. The objective of this experiment was to determine the efficacy of chloride (Cl^-) applied in-furrow at planting as potassium chloride (KCl) or calcium chloride ($CaCl_2$). Micronutrient application included boron (B) at 0.25 lb/A and manganese (Mn) at 0.5 lb/A as a foliar application for the control of soybean rust. The KCl was applied with a Gandy spreader and the $CaCl_2$ was applied in-furrow with 33 gallons per acre (gpa) of water. Foliar application was on October 4 at R2 growth stage with a platform sprayer using 15 gpa of water. Soybean plants were rated for soybean rust on

October 11 and 20 and on November 2, 9, and 17. The rating from these dates was used to calculate rust severity. The middle two rows of each plot were harvested on December 11 and the yield was adjusted to 13% moisture content.

Soybean rust was first observed on October 9 at the R3 growth stage. Thus, Mn and B were applied just before soybean rust was observed. There was no effect on soybean rust severity or yield for the treatments with $CaCl_2$ and KCl when compared to the untreated control. The effect of Mn and B was much more significant in almost all of the treatments. Foliar application of Mn and B had significantly lower soybean rust severity and higher yields. Treatments with Mn, B, and KCl had the highest seed weights, while $CaCl_2$ had the lowest seed weight. No phytotoxicity was observed for any treatments. *FL-23F*

Louisiana

Effect of Potassium, Manganese, and Boron on Asian Soybean Rust and Other Diseases in Soybean

***Project Leader:** Dr. Raymond Schneider, Louisiana State University, Department of Plant Pathology & Crop Physiology. 302 LSB, Baton Rouge, LA 70803. Telephone: 225-578-4880. e-mail: rschnei@lsu.edu*

***Project Cooperator:** Jim Wang*

Asian soybean rust (ASR) was first discovered in North America in Louisiana in November 2004 and was confirmed in eight other states within a few weeks of the initial discovery. This disease has been documented to cause in excess of 80% yield losses in Brazil and elsewhere. The only weapon available to U.S. producers at this time is fungicides, which have not been evaluated under our environmental and agronomic conditions. Other control or disease mitigation options are desperately needed. The objective of this project is to determine if there is an effect of potassium chloride (KCl), along with manganese (Mn) and boron (B), on ASR and other diseases in soybean. In addition, treatments will be included to assess the role of Cl^- without K because Cl^- is known to affect disease development in other host:pathogen systems. If there are positive responses to these treatments, subsequent experiments will investigate application rates in more detail and their interactions with fungicides. It may be possible to reduce fungicide rates and frequencies of application if one or more of these nutritional regimes reduce the rate or severity of disease development. Potassium chloride will be applied at a low (60 lb K/A) or high (112 lb K/A) rate to the soil surface and then lightly incorporated just before planting at the Louisiana State University research station near Baton Rouge. Manganese and B will be applied at 0.5 and 0.25 lb/A, respectively, via foliar application at the V4 and V10 growth stages. There will be four replications per treatment with plot dimensions of 4 rows by 40 ft. The center two rows of each plot will be harvested with a plot combine, and yields will be calculated on a per acre basis. Calcium chloride ($CaCl_2$) will also be evaluated at a low (86 lb Cl^-/A) and high (172 lb Cl^-/A) rate, with and without the foliar Mn and B. Low (30 lb Cl^-/A) and high (90 lb Cl^-/A) rates of ammonium chloride (NH_4Cl) will also be included to evaluate the effects of ammonium-N nutrition during vegetative growth. Leaf samples will be collected for complete nutrient analyses, and disease evaluations for ASR, frogeye leaf spot, and Cercospora leaf blight will be made periodically during the season so that rates of infection can be calculated. One evaluation at the end of the season will be made for pod and stem diseases, and grain quality also will be assessed.

Unfortunately, after three attempts to establish the study in 2006, it was abandoned for the year because of repeated failure to establish a soybean stand because of very severe drought. The test is being conducted again in 2007. The principal investigators of this project are working in collaboration with scientists at the University of Florida in coordinating similar tests where the soybean rust potential is high each year. *LA-22F*

Missouri

Use of Pre-Plant or Foliar-Applied Potassium Chloride with Fungicides to Improve Soybean Response and Disease Resistance

***Project Leaders:** Dr. Kelly Nelson and Dr. Peter Motavalli, University of Missouri, Greenley Research Center, PO Box 126, Novelty, MO 63460. Telephone: 660-739-4410. Fax: 660-739-4500. e-mail: nelsonke@missouri.edu*

An increased occurrence of K deficiency in soybeans and the potential widespread on-set of Asian soybean rust (ASR, *Phakopsora pachyrhiza*) in soybeans have stimulated interest in new management practices that may improve K nutrition and lower incidence of disease. In 2004, ASR was reported in nine states including Louisiana, other Gulf Coast and southeastern states, and Missouri. Combining K, chloride (Cl^-), and other nutrients either as a pre-plant or foliar application with a fungicide may improve disease management. The objectives of this study were to: 1) determine soybean yield response, disease incidence and K and Cl^- tissue concentrations from application of KCl alone or in combination with several fungicides, 2) examine the effects of application timing of KCl or the fungicides on crop response and disease incidence, and 3) evaluate the cost-effectiveness of applying KCl with fungicides for soybean production. The first of 2 site-year field trials was established at the Greenley and Delta Centers on soils with medium to low soil test K. Roundup-Ready® soybeans were no-till planted at

180,000 seeds/A in 15 in. rows. Treatments consisted of a non-treated control, a recommended pre-plant rate of KCl based on soil test (one-year buildup rate), or a foliar application of 16 lb K_2O/A (as KCl) in a factorial arrangement combined with and without fungicide applications of 6 oz/A of pyraclostrobin (Headline®), 6.4 oz/A of azoxystrobin (Quadris®), or 6.4 oz/A Quadris® + 2.6 oz/A of Warrior® (i.e., lambda-cyhalothrin insecticide) applied either at V4 or R4 growth stages. Foliar injury was rated 3, 7, and 28 days after foliar application. Treatments were evaluated for the incidence of septoria brown spot (*Septoria glycines*), frogeye leaf spot (*Cercospora sojina*), sudden death syndrome (*Fusarium solani*), and ASR.

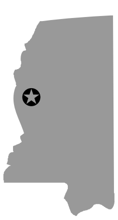
Soybean injury was minimal except when fungicides were tank mixed with KCl at Portageville. Leaf necrosis was the primary symptom and plants recovered by 10 days after treatment. Asian soybean rust was not present at either location in 2006. The incidence of septoria brown spot, frogeye leaf spot, or sudden death syndrome was less than 10% in 2006. Interactions between application timing and fungicide treatment were common. This research indicates that KCl fertility reduced the incidence of septoria brown spot and frogeye leaf spot at Novelty, but no differences were observed at Portageville. Preplant KCl increased yield when compared to the non-treated control and foliar applied KCl at Novelty and Portageville, which could be related to the combined effects of disease tolerance and fertility. Fungicide treatments applied at the R4 stage of development increased grain yield at Novelty, but had no effect on grain yields at Portageville in 2006. The cost-effectiveness of the treatments will be determined following research in 2007. *MO-32F*

Mississippi

Rice Response to Phosphorus and Potassium

Project Leader: Dr. Timothy Walker, Mississippi State University, Delta Research and Extension Center, PO Box 69, Stoneville, MS 38776. Telephone: 662-686-3278. e-mail: twalker@drec.msstate.edu

Project Cooperators: J.E. Street, W.L. Kingery, M.S. Cox and J.L. Oldham



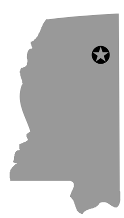
In 2006, two studies were conducted that investigated P rates and application timing in Mississippi. Study 1 was conducted in the cut (leveled) area of a newly land-formed field near Hollandale. Forestdale silt loam was the predominant soil type and it had a pH of 5.9 and a Lancaster extractable P concentration of 15 lb/A. Study 2 was conducted on a field near Drew, that was leveled in the fall of 2001 and produced its third rice crop with soybean planted every other year. Dundee silt loam is the predominant soil type and it had a pH of 5.8 and a Lancaster P concentration of 22 lb/A. Substantial vegetative responses to P fertilizer were observed at both locations. However, the yield response was greater in Study 1. Study 1 consisted of three application timings (Fall, Spring 1-leaf and Spring 5-leaf growth stage), three P rates (25, 50, and 100 lb P_2O_5/A), and a non-treated control.

The treatment producing the greatest yield response (14%), compared to the non-treated, was 50 lb P_2O_5/A applied at the 1-leaf growth stage. Yield response to P was not as great at Study 2. When 50 lb P_2O_5/A was applied at 5-leaf growth stage, grain yields were increased by only 4%. This research is on-going with the goal of correlating and calibrating our current soil test method for determining optimum P fertilizer rates for high yielding rice varieties and hybrids grown on different soil types with varying pH. In 2006, two studies investigated K rates and application timing in Mississippi. Study 1 was conducted near Drew on a Dundee silt loam with a Lancaster K concentration of 184 lb K/A and a CEC of 14 $cmol_c$/kg. Study 2 was also conducted on a Dundee silt loam near Merigold, and had a Lancaster K concentration of 228 lb K/A and a CEC of 15 $cmol_c$/kg. Four K rates (i.e., 30, 60, 90, and 120 lb K_2O/A) were applied at two timings (1-leaf and 5-leaf stage) and compared to a non-treated control. No yield response was obtained in Study 1. However, in Study 2, a 5% yield response was obtained with an application of 60 lb K_2O/A at the 5-leaf growth stage. *MS-10F*

Evaluation of Fungicides in Combination with Urea Ammonium Nitrate or Urea Solution at Various Rates and Application Timings for the Control of Soybean Diseases and Increased Yield

Project Leader: Dr. Alan Blaine, Head, Northeast Mississippi Research and Extension Center, Mississippi State University, Box 1690, 5421 Hwy. 145 S., Verona, MS 38879. Telephone: 662-566-2201. e-mail: ablaine@pss.msstate.edu

Project Cooperators: Normie Beuhring, Billy Moore, Dan Poston, Ben Spinks, Brian Ward, and Mitt Wardlaw



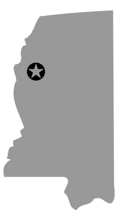
Research was conducted at Pontotoc and Verona, Mississippi, in 2006 to evaluate foliar fungicides for the control of soybean diseases and determine the effects on soybean yields. Maturity Group IV soybeans were planted in a field following corn near Pontotoc (P 94M80 RR) and in a field following soybean near Verona (DPL 5634). Plots were sprayed using a CO_2 tractor-mounted sprayer at 15 to 20 gal. of spray volume/A (gpa) traveling at a speed of 3.2 mph at 32 PSI, and using 8002 VS spray tips. Treatments were replicated four times at each location in a randomized complete block design. At Pontotoc, there were 10 treatments with combinations of different fungicides, two of which included urea ammonium nitrate (UAN) solution, Headline SBR® plus UAN 32%; 7.8 oz/A + 4.2 gpa, applied at R3 or R5 growth stage. At Verona, the treatments were: Headline plus Penetrator® plus Borosol® (5 oz+8 oz+0.25 lb/A), Headline SBR + urea

(7.8 oz+12 lb urea/A) at R3-R4, Headline SBR + urea (7.8 oz+12 lb urea/A) at R5, and an untreated control.

Due to extremely dry and hot conditions, disease development did not take place until late in the season at Pontotoc. The dry growing season also produced yields that fell well below average (<13 bu/A), prevented accurate disease ratings, and resulted in no differences in yield at Pontotoc. At Verona, ratings were taken for injury, late season Cercospora, greening effect, and Septoria brown spot. There were no statistical differences among treatments for greening effect or Septoria brown spot at Verona. However, there were slight differences in late season Cercospora control. Each treatment was slightly better than the check (i.e., 3.3 to 4.0 vs. 5.5 rating, with nine being a severe infection). Headline plus urea at R3-R4 resulted in a foliar spray injury rating of 0.8 on a scale of 0 to 9, with 9 being severe injury. No foliage injury was observed with the other treatments at Verona, and there were no differences in soybean yield. *MS-14F*

The Evaluation of Sulfur Fertilizer Sources in Rice

Project Leader: Dr. Timothy Walker, Mississippi State University, Delta Research and Extension Center, PO Box 197, Stoneville, MS 38776. Telephone: 662-686-3278. e-mail: twalker@drec.msstate.edu



Rice sulfur (S) uptake is approximately 23 lb S/A for a 9,000 lb/A grain yield. Sulfur deficiency symptoms can sometimes be detected during the vegetative growth stage of rice when soils have recently been leveled and/or the clay pan has been compromised, or symptoms may be detected during the reproductive stage as biomass production is rapid and the panicle is forming. A field near Tunica, Mississippi, with a recent history of late-season S deficiency was selected for a field trial to evaluate S fertilizer sources including: Simplot, 13-33-0-15; Mosaic, 13-33-0-15; and ammonium sulfate (AMS), 21-0-0-24 at three S rates of 0, 15, and 30 lb/A. Triple superphosphate and urea were applied to the control, AMS, and to the lower application rates of the 13-33-0-15 treatments so that N and P_2O_5 rates were equal across all treatments. All S treatments including the control were applied when rice had two to three leaves. Urea was applied at the rate of 120 lb N/A at first tiller and the field was flooded within 3 days after application.

Though S deficiency symptoms were observed in the 2005 rice crop, deficiencies were not apparent in the 2006 crop. Mineralization of S from organic matter may have provided sufficient S to overcome the deficiency. No differences were obtained between S sources, though AMS provided numerically higher yields compared to all other sources.

Another field study was conducted on a Sharkey clay soil (i.e., very-fine, smectitic, thermic chromic Epiaquert) at the Delta Research and Extension Center, near Stoneville, Mississippi, using the Cocodrie semi-dwarf cultivar. The study involved a factorial combination of treatments replicated four times in a randomized complete block design. Factor A consisted of six early season N sources including: AMS, DAP, urea, Mosaic 13-33-0-15, Simplot 13-33-0-15, and none. Factor B consisted of preflood N rates of 90, 120 and 150 lb N/A as urea. The early season N sources were broadcast at 20 lb N/A on three-leaf rice on May 31. The fertilizer was incorporated with approximately 0.5 in. of precipitation which fell on June 2. On June 8, preflood N rates of 90, 120, and 150 lb/A were broadcast-applied and a permanent flood was established on June 10.

Early season N source did not affect early season plant growth in 2006. Preflood N rates affected total N uptake, biomass, and yield. When averaged across early season N sources, biomass, total N uptake, and rice grain yield were greatest when 150 lb N/A was applied. Early season N sources have been shown to affect early season growth in recent studies in Arkansas, Mississippi, and Missouri. The Simplot 13-33-0-15 source appears capable of providing early season N to stimulate vegetative growth when applied under conditions that support uptake and utilization by seedling rice. This product should be further evaluated in this situation because it would eliminate distributor blending of AMS and DAP which is a very common source used in rice in the midsouthern U.S. *MS-15F*

Send address changes or inquiries to:
INTERNATIONAL PLANT NUTRITION INSTITUTE
655 Engineering Drive, Suite 110
Norcross, GA 30092-2837
Phone: 770-447-0335
Website: www.ipni.net
IPNI