these instances potassium may be applied at or just prior to planting.

Where red rice is not a problem and crawfish culture is not involved the simple technique of drilling was changed to permit seeding into undisturbed soil. Equipment developed for other crops was modified as necessary especially in the heavy clay soils of northeast Louisiana.

By far the single most influential change facilitating the adoption of reduced tillage was the development of Clearfield rice varieties. These varieties are tolerant of the herbicides Newpath (imazethapyr) and Beyond (imazamox) which will control red rice in conventional rice. This opened the door to drill seeding into red rice problem areas solving the problems associated with water seeding of rice increasing the acreage eligible for reduced tillage.

Trends In Texas Rice

Presented by Dr. Jim Stansel

Resident Director, Professor Emeritus, Texas A&M University

Dramatic changes in most phases of Texas rice production occurred in 2006. The 147,549 rice acres in Texas were the lowest since 1934. Average yields in 1934 were 2,241 lbs/ac (14 barrels), illustrating how far production has advanced. The 2006 acreage was a 26 percent reduction from 2005. Texas yields were the highest ever recorded and there were significant changes in the varieties grown.

Cocodrie remained the leading variety comprising 42 percent of the Texas acreage followed by Cheniere at 14 percent. Clearfield varieties made up 16 percent of the acreage with CL131 the most popular. The Rice Tec hybrids were grown on 14 percent of the acres with XL 723 having the largest acreage.

Main crop yields were over 8,000lbs/ac (50 barrels) dry weight, the highest average ever recorded in Texas. Over 40 percent of the hybrid fields yielded (main crop, dry wt.) over 10,000 lbs/ac (62 barrels). Hybrid milling yields averaged 60.7/72.8 number 2. Main crop yields across all varieties were above normal in the western regions with yields about normal in the east.

The first 50 percent of the crop was planted 2 weeks earlier than normal due to dry field conditions during the winter and early spring. The crop survived near record cold in late March and early April and was harvested a week earlier than normal. The second half of the crop in the east was later than normal due largely to a wet and cold April. Statewide, the reduced acreage, early planting and early harvest contributed to the record yields.

Rice Nutrition Studies For Mississippi River Alluvial Soils

Presented by Dr. Timothy W. Walker

Asst. Agronomist, MSU

A large percentage of southern USA rice production is located in the Mississippi River Alluvial Valley. This area is known for its highly fertile soils and abundant water supply. Research is conducted so that information regarding nutrient recommendations keeps pace with an agricultural climate where change is rapid and certain. Much effort is placed in defining nitrogen (N) recommendations because it is applied in greater quantity and incidence compared to other plant nutrients. Furthermore, because there currently are no soil tests suitable for determining the amount of N that should be applied compared to the amount that is or will become available in the soil. In addition to N, grain yield responses to other nutrients such as P, K, S and Zn are evaluated so that general recommendations can be made based on where nutrients should be supplied, at what rate they should be applied, and the proper timing of the application so that optimum efficiency can be achieved. A summary of N-, P-, and K-nutrition studies conducted in Mississippi in 2006 are presented in this report.

In Mississippi, rice receives N-fertilizer typically three to five times throughout the grow-

ing season. Research has indicated that rice can yield equal to or greater with less than or equal amounts of N being applied once; however, water management and environmental conditions conducive for maximum N efficiency are critical. As N costs have more than doubled within the past few years, questions about N-fertilizer management have resurfaced. Studies have been conducted to evaluate N fertilizer management as a whole which include early season N (1- to 3-leaf), preflood N (4- to 6-leaf), midseason N (internode elongation), and late season N (heading).

Early Season N

Studies were conducted in Arkansas, Mississippi and Missouri in 2005 and 2006 on Sharkey clay to determine the value of applying early season N to 'Cocodrie' rice. All possible combinations of early season N source (ammonium sulfate, diammonium phosphate, urea and a non-treated control) and preflood N rate (90, 120 and 150 lb N $^{a-1}$) were evaluated. Early season N sources were applied at 20 lb N $^{a-1}$ when rice reached the 1- to 3-leaf growth stage. Preflood N was applied when the rice reached the 5- to 6-leaf growth stage which immediately preceded permanent flood establishment. Plant height, biomass and N uptake measurements were conducted at the 5-leaf stage. Biomass and N-uptake measurements were conducted at panicle emergence. At maturity, plots were harvested and yields were adjusted to 12% moisture. Averaged across the three locations, plant height was increased approximately 2 in regardless of N source. Averaged across preflood N rates, rice grain yield was six bushels per acre greater when ammonium sulfate was used early season compared to when no early season N was applied.

Preflood N and Midseason N

Tillering is a major yield component in rice and it is largely affected by N-nutrition in the early vegetative growth stage. Nitrogen response studies were conducted at four locations in 2006. Sharkey clay was present at two locations and Forestdale silt loam was present at the other two locations. For clay soils, the newly released varieties 'CL171AR' and 'Sabine' were subjected to preflood N rates of 90, 120, 150, 180 and 210 lb $^{a-1}$ and midseason N rates of 0 or 46 lb $^{a-1}$ on clay soil. The preflood N rates were reduced by 30 lb $^{a-1}$ on the silt loam soils. A non-treated control was also included. For clay soils rice grain yields reached optimum economic yields when preflood N rates reached 150 lb N $^{a-1}$. Yields also increased when midseason N was applied. For silt loam soils, grain yields were impacted differently by N treatment combinations based on location. Response to N at one location (Satterfield) was essentially flat; however, at the second silt loam location (Circle H), grain yields increased with increasing N up to 120 lb N $^{a-1}$. Midseason N response also varied between the two locations. No response was detected at Satterfield; however, grain yields were increased with midseason N at Circle H.

Heading N

Substantial rough and head rice response has been obtained when N fertilizer has been applied at 5% heading on hybrid rice. In addition, heading applications have improved the stand ability of hybrids which are prone to lodging. Studies were conducted with Cocodrie and Wells from 2003 to 2005 to evaluate the effects of top-dress applications on weekly intervals from panicle differentiation until 5% heading. Whole milled rice for Cocodrie was slightly greater (1%) when 46 lb N $^{a-1}$ was applied at the 5% heading stage. However, milling for Wells was not affected by top-dress N timing. Grain yields were also not affected by top-dress timing; however, for Cocodrie, rice grain yields were greatest when 75% of the N was applied preflood when compared to 50% of the total N being applied preflood.

P and K Nutrition

Several P response studies have been conducted in recent years. Multiple factors determine whether rice grain yields respond to P fertilization; however, based on data collected at this time, the probability of obtaining a response increases in the: 1) cut areas of land-formed fields; 2) areas of low soil test-P and high soil pH. Phosphorus rates of 25 to 50 lb P2O5 $^{a-1}$ are usually sufficient to make optimum yields. Fertilizer timing studies indicate that a window of just prior to planting until 4-leaf rice provides the greatest yield response. In 2006, three K response studies were conducted with one location showing a significant yield response of approximately 7% over the untreated check. Potassium has not been a widespread problem in the Mississippi Delta because its native levels are relatively high on typical rice soils.

Summary

Detailed results of these and other nutrition studies including how to incorporate these data into production systems will be presented at the conference.