on the field setup of the first field to address their doubt and to help him determine if this was really worth the effort he was making. When the rows in the field watered out more uniformly and quicker than they ever had before Steve was pretty much convinced. However, his crew was still skeptical about it working on many of the other fields. Well they got the chance to see if it did work because Steve proceeded to run the program on 155 different fields this past season that ranged in size from 11 acres to 108 acres. The total for all the fields was about 4400 acres and included furrow irrigated cotton, corn and soybeans on soils ranging from sandy to clay. The fields varied from fairly square or rectangle shapes to triangle shapes with furrow lengths ranging from 100 feet to 1600 feet.

The irrigation crew started realizing that knowing the lay out for the field before they got there helped them get the fields going quicker because of the reduced guess work. They also realized that since the fields watered more uniformly and quicker they didn't have to spend as much time checking the fields while they were being irrigated. Steve has the field data stored on an external hard drive and print outs for each field so that he and his crew, as well as any future employees, can easily recall how to set up the fields in seasons to come.

Steve and his crew invested a lot of effort into using the program this year. In addition to the time involved with gathering the field data, Steve averaged about 30 minutes of computer time for each field and this ranged from 10 minutes to up to 1.5 hours for a couple of complicated field setups. Steve knows it was well worth the effort because the 25% less pumping time that he averaged on the fields reduced his $4 per gallon diesel fuel cost by approximately $100,000. The reduced pumping also conserved about 670 million gallons (2055 acre-feet) of the areas ground water that is a very precious and limited resource. This is the equivalent of 5.6 inches of water covering all of Steve's 4400 acres and the savings would have been even greater if the August rainfall hadn't been well above average this past season.

Conservation Systems Cotton & Rice Conference

RICE PRESENTATIONS

Herbicide Performance In Stale Seedbed Rice Production

Presented by Dr. Jason A. Bond
Weed Scientist, Mississippi State University, Delta Research and Extension Center

Presented by John-Kirk Manning
Mississippi State University, Delta Research and Extension Center

Presented by L. Chris Vaughn
Mississippi State University, Delta Research and Extension Center

Most rice in the midsouthern United States is grown using conventional tillage; however, conservation tillage has gained acceptance in many rice-growing areas. Conservation tillage includes both no-tillage and stale seedbed systems. Rice is planted into the residue of a previous crop in a no-till system, whereas in the stale seedbed system, previous crop residue is destroyed by tillage in the fall, and seedbeds remain fallow during the winter. The adoption of conservation tillage in rice has been encouraged because of its economical and environmental benefits. Preplant weed management, difficulties in establishing stand, and varieties that have performed poorly in no-till systems are factors that have limited the commercial use of conservation tillage techniques for rice.

Conservation tillage systems rely on herbicides to remove winter weeds prior to planting. Burndown herbicide programs in Mississippi usually consist of glyphosate or glyphosate plus 2,4-D applied 3 to 4 weeks prior to planting. However, control from burndown herbicide applications is often incomplete and weeds regrow prior to planting. Furthermore, residue left on the soil surface could interfere with placement of preemergence (PRE) herbicides, possibly reducing control from these applications.

Barnyardgrass and sprangletop species are capable of decreasing rice yields by 70 and 36%, respectively. Command (clomazone), Prowl (pendimethalin), Facet (quinclorac), and Bolero (thiobencarb) are the only herbicides with labeling for application to rice that are effective against annual grasses when applied preemergence (PRE). Although Facet may be applied PRE to rice, it has little activity against sprangletop species. Prowl and Bolero are effective in controlling sprangletop species, but labeling requires that rice seed must have imbibed water prior to application. Command controls sprangletop species and may be applied at planting. However, at current prices, Prowl costs approximately 58% less than Command and Bolero.

Research was conducted at the Mississippi State University Delta Research and Extension Center in Stoneville to address herbicide performance in a stale seedbed rice production system. The objectives of this research were to (1) evaluate the impact of tillage system on the efficacy of preemergence herbicides in rice, (2) compare the response of a rice variety and a rice hybrid to applications of Command and ammonium sulfate in a stale seedbed system, and (3) determine the response of three rice varieties to three application timings and two formulations of pendimethalin in a stale seedbed system.

The study to evaluate the impact of tillage system on the efficacy of preemergence rice herbicides was conducted in 2008. Tillage systems included fall stale seedbed and conventional tillage. Herbicide treatments consisted of Command (1.6 pt/A), Prowl H2O (2.1 pt/A), and Facet (0.67 pt/A) applied PRE immediately after planting. Herbicide rates were the maximum for a single application to a clay soil. Rice injury and control of barnyardgrass and browntop millet was visually estimated at 15, 30, and 45 days after application (DAT). Tillage system did not influence control of barnyardgrass or browntop millet at any evaluation. Barnyardgrass control from Command, Prowl H2O, and Facet was equivalent 15 DAT; however; Command was more effective than Prowl H2O and Facet 30 DAT. By the final evaluation, Command and Prowl H2O controlled more barnyardgrass than Facet. Facet never controlled browntop millet >70%. Browntop millet control from Command and Prowl H2O was equivalent and at least 85% at all evaluations. The efficacy of preemergence herbicides was not negatively impacted by the stale seedbed rice production system.

A second study compared the response of a rice variety and hybrid to PRE applications of Command and early postemergence applications of ammonium sulfate fertilizer in a stale seedbed rice production system. The rice variety, Cocodrie, and the rice hybrid, XL723, were seeded into a stale seedbed at an early planting date, March 24. Command at 1 and 1.6 pt/A was applied PRE. Ammonium sulfate (0 and 100 lb/A) was applied when rice reached the two- to three-leaf stage. Rice stand density was determined 14 days after rice emergence (DAE). Visual herbicide injury and rice height were recorded at weekly intervals from emergence until flood. Rice yield was measured at season's end. Ammonium sulfate application had no effect on visual estimates of rice injury or rice height. Injury was greater for XL723 than Cocodrie at all evaluations. Command at 1.6 pt/A injured Cocodrie and XL723 more than Command at 1 pt/A. Averaged across herbicide and fertilizer treatments, XL723 produced higher rice yield than Cocodrie. Regardless of cultivar, rice yield was reduced by Command at 1.6 pt/A when no ammonium sulfate was applied; however, no yield reductions due to Command application were detected where ammonium sulfate at 100 lb/A was applied. Although visual injury was greater for the rice hybrid, this injury did not translate into a yield reduction.

The third study was conducted from 2005 through 2007 and determined the response of three rice varieties to three application timings and two formulations of pendimethalin in a stale seedbed rice production system. The rice varieties Cocodrie, Lemont, and Wells were planted in a stale seedbed rice production system. Two formulations of pendimethalin, an emulsifiable concentrate (Prowl EC) and a capsule suspension (Prowl H2O) were applied at 1 lb ai/A. These rates corresponded to 2.4 pt/A for Prowl EC and 2.1 pt/A for Prowl H2O. Pendimethalin treatments were applied 0, 3, and 7 days after planting. No visual injury was detected for any variety. Seedling density, days to 50% heading, and rice yield were not impacted by pendimethalin formulation or application timing. The practice of planting varieties with excellent seedling vigor into non-disturbed soils with greater available moisture may provide an opportunity to use pendimethalin as a preemergence herbicide for rice production.

Research with other areas of rice production have demonstrated that rice yields in a reduced tillage system are similar to those in a conventional tillage system when growing conditions are favorable, particularly during the early parts of the season. Based on results of the current research, herbicide performance is not diminished when rice is grown in a stale seedbed production system.

▸ Evaluation Of Conventional And Reduced Tillage Practices On Optimum Seeding Rate, Nitrogen Fertilization Rate, And Yield Components

Presented by Dr. Dustin L. Harrell
Assistant Professor, LSU AgCenter-Rice Research Center

Conventional tillage is currently the most common tillage system used in drill-seeded Louisiana rice. However, reduced tillage systems have become increasingly more common every year. Early estimates from the 2007 growing season in Louisiana indicate that approximately 42% of the planted acreage was planted using some form of reduced tillage. Reduced tillage systems, such as no-till, spring, and fall stale seedbeds, have several benefits over conventional tilled rice seedbeds, which make them more desirable. Most notably is the ability to reduce overall production costs, speed planting of drill-seeded rice by reducing seedbed preparation time, and minimizing soil and nutrient losses associated with draining rice fields. Nonetheless, only limited research is available that focuses on seeding and nitrogen (N) fertilization rate differences, which may exist between conventional and reduced tillage systems of currently used rice cultivars. The primary objectives of the study are threefold: 1) to evaluate the seeding rate differences that may occur between a fall stale and conventionally tilled seedbed for drill-seeded rice; 2) evaluate N fertilization requirement differences between the two tillage systems; and 3) to determine if a less than optimum stand or N fertilization rate can be compensated for by increasing the N rate or seeding rate, respectively.

Two studies were conducted in 2007 and 2008 at the LSU AgCenter's Rice Research Station South Farm located just south of Crowley, Louisiana. The first study evaluated 'Jupiter,' a high yielding semidwarf medium- grain cultivar, while the second evaluated 'Cheniere,' a high yielding semidwarf long-grain cultivar. Two tillage treatments (conventional and fall stale seedbed), four seeding rates (161, 323, 484, and 646 seed m-2), and four N rates (101, 134, 168, and 202 kg ha-1) were used in each study. Treatments were arranged in a randomized complete block with a factorial arrangement of treatments with four replications. Both trials were drill seeded into a Crowley silt loam soil (fine, smectitic, thermic Typic Albaqualfs). Data obtained from the studies included days to 50% heading, plant height, yield, total and whole milling percentage, stand density, and