square and first flower were not significantly different, and Normalized Difference Vegetation Index (NDVI) and the ratio of visible and near infrared reflectance (VIS/NIR) worked equally well. Although each of the three sensors performed well, we recommend using an adjustment equation with Greenseeker to compensate for deviations in time of day. Cotton yields in 2008 were lower when first N application was delayed to early flower. In the on-farm test in 2008, strips with N applied based on Crop Circle readings averaged 46 lb N acre-1 less fertilizer compared to the grower rate. Readings from a picker yield monitor indicated average lint yields were 1138 lb lint acre-1 in strips with variable rate N applied and 1209 lb lint acre-1 with the grower N rate.

All three sensor models gave good predictions of N need in the analyses at a height of 20 inches above the canopy. N rate recommendations based on sensors were more reliable at the mid-square and early flower growth stage than at the early square growth stage. Funding for this research was provided by Cotton Incorporated and the Missouri State Support Committee.

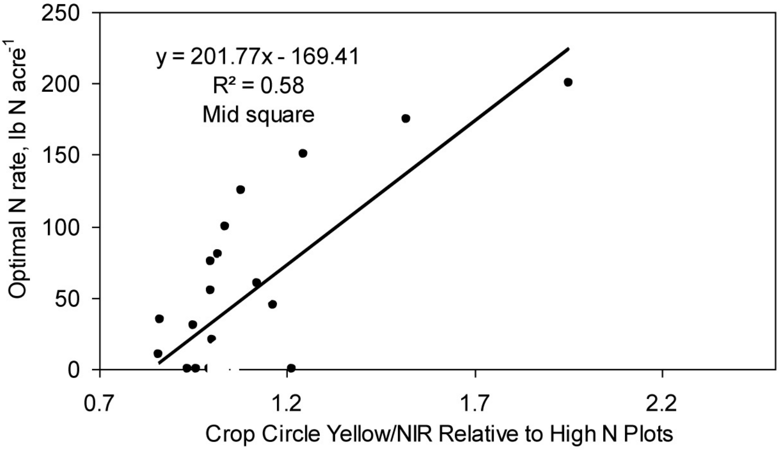

Figure 1. Example algorithm developed for Crop Circle relating Yellow/NIR relative to high nitrogen reference plots.

13th Annual National Conservation Systems Cotton & Rice Conference

RICE PRESENTATIONS

Tillage, Seeding And N Rate Effects On Rice Emergence, Yield And Yield Components

Presented by Dr. Dustin Harrell
Assistant Professor, LSU AgCenter

Rice (Oryza sativa L.) is an important agricultural commodity in Louisiana with an average of 471,000 acres grown in 2008 and 2009. A variety of tillage regimes are practiced by producers to prepare seedbeds prior to planting in drill-seeded delayed flood rice production. Conventional tillage is currently the most common tillage system used in drill-seeded Louisiana rice however; reduced tillage systems have become more common over the last decade. In fact, estimates from the 2008 season suggest that over 142,000 acres of rice planted in Louisiana used some form of conservation tillage practice, with a fall-stale seedbed being the predominant form. Conventional tillage has the advantage of destroying weedy vegetation and improved soil-to-seed contact. However, fall-stale seedbed advantages include reducing seedbed preparation time thus speeding planting of drill seeding during the spring, increased soil moisture at planting and reduced nutrient losses associated with draining rice fields. In both instances, a weed free and uniform seedbed is paramount for rice seedling survival. The fall-stale seedbed tillage system requires seedbeds to be prepared initially in the fall followed by burning down winter vegetation using herbicides in the spring. However, a potential disadvantage of the fall-stale seedbed would include reduced soil temperatures in early spring which could potentially reduce rice seed germination and seedling survival. Numerous studies have been conducted to individually analyze various tillage methods, seeding, or N rates; however, few have evaluated the three-way interactions between these factors as they affect rice density, grain yield and yield components. A clear understanding of the interrelationships between tillage, seeding, and N rate can aid producers in making sound decisions if less than optimum conditions are experienced at seeding that result in low stand densities. The objective of this research was to evaluate the main effects of tillage, seeding and N rate and their interactions on rice density, rough rice grain yield and yield components.

Experiments were conducted in 2007 and 2008 at the Louisiana State University Agricultural Center's Rice Research Station near Crowley, LA to evaluate agronomic responses 'Jupiter' and 'Cheniere' to variable tillage, seeding and N rates. Experiments were conducted on a Crowley silt loam (fine, smectitic, thermic Typic Albaqualfs) with an initial pH of 7.4. The experimental design for both experiments was a randomized complete block with four replications. Two tillage systems (conventional and fall-stale seedbed), four targeted seeding rates (15, 30, 45 and 60 seed ft-2) and four N rates (90, 120, 150 and 180 lb A-1) were used in the experiments. Winter vegetation of all plots was controlled using glyphosate plus 2,4-D approximately 4 weeks prior to seeding. Seeding was done immediately following conventional tillage treatment. An additional gylphosate application was made to all plots 1 d post seeding.

When data was evaluated across all seeding and N rates, the conventional tillage system reduced rice density of Jupiter by 25% and Cheniere by 16%. The reduction in stand achieved in the conventional tillage system can be explained by crusting of silt loam rice soils which can often occur after a heavy rainfall or flush irrigation event. When evaluated across all seeding and N rates, stale seedbed tillage increased grain yields over conventional tillage by 6 and 10% for Jupiter and Cheniere cultivars, respectively.

Jupiter rough rice yields increased with each increasing rate of N, with a maximum yield (9804 lb A-1) occurring at the 180 lb A-1 rate. Cheniere rough rice grain yield was increased by 4% when N rate was increased from 90 to 120 lb A-1, and increased another 4% when increasing N from 120 to 150 lb A-1. However, there was no additional increase in yield with further additions of N. The lack of a significant interaction between N rate and tillage in this study suggests that in a rice-fallow rotation, the optimum rate of N fertilization is similar between the fall stale seedbed and conventional tillage in drill-seeded delayed flood rice. The lack of a seeding rate by N rate interaction in this study suggests that poor rice densities as a function of low seeding rates cannot be compensated for by increasing N fertilization

The stale seedbed tillage practice had 16 and 18% more panicles as compared to the conventional tillage practice in Jupiter and Cheniere, respectively. Conversely, the stale seedbed tillage practice produced 7 and 13% less filled grain panicle-1 as compared with the conventional tillage system in Jupiter and Cheniere, respectively. Grain weight was slightly heavier in the stale seedbed as compared with the conventional tillage system for Jupiter rice however this was not observed for Cheniere. Jupiter and Cheniere panicle density increased numerically with increasing seeding rates. However, the 45 seed ft-2 seeding rate produced a statistically equivalent number of panicle as compared with the 60 seed ft-2 seeding rate in both cultivars. Filled grain panicle-1 tended to decline with increasing seeding rates and was maximized for both cultivars at the lowest seeding rate of 15 seed ft-2. Grain weights were lower at the higher seeding rates (45 and 60 seed ft-2) as compared to the lower seeding rates (15 and 30 seed ft-2) for Cheniere. Similarly, grain weight was numerically lower at the 15 seed ft-2 seeding rate as compared with all higher seeding rates. While all yield components tentatively influence rough rice grain yield, single linear regression analysis identified panicle density as the single most influential yield component. Panicle density could explain 49 and 51% of the variation in yield for Jupiter and Cheniere, respectively.

New Tools For IPM In Rice

Presented by Dr. M.O. Way

Professor of Entomology, Texas A&M University

Presented by Mark Nunez

Presented by Becky Pearson

Seed Treatments

The rice water weevil (RWW) is a key pest of rice in the South, but other insects, such as chinch bug, aphids, thrips, leafhoppers and black bugs, can be serious pests of seedling rice. With the cost of seed increasing and seeding rates decreasing, protecting seed from RWW as well as the above seedling pests is an excellent strategy to help insure a vigorous, uniform stand which is critical in a conservation tillage system. In 2008 and 2009, the seed treatment Dermacor X-100 was granted a Section 18 in Texas and other southern rice-producing states. The active ingredient in Dermacor X-100 is chlorantraniliprole. This seed treatment is effective against RWW, fall armyworm, South American rice miner and stalk borers, but does not control insects with piercing-sucking mouthparts, such as chinch bug. We hope to gain another Section 18 for Dermacor X-100 for the 2010 growing season.

For the past several years, we have evaluated other seed treatments with activity against RWW and insects with piercing-sucking mouthparts. Belay 2.13EC (active ingredient = clothianidin) and CruiserMaxx (active ingredient = thiamethoxam) provide excellent control of the above pests. The CruiserMaxx seed treatment also contains 3 fungicides to control an array of seedling rice diseases. CruiserMaxx recently was granted a Section 3 label, so this seed treatment will be available to southern rice farmers in 2010. CruiserMaxx also provides control of grape colaspis which is a serious pest of rice in Arkansas.

Foliar Treatment

In recent years, rice stink bug (RSB) has become more problematic in Texas. The average number of annual insecticide applications for RSB in Texas rice is 3 with some farmers spraying as many as 6 times. The vast majority of these applications involve pyrethroids and methyl parathion. Very high populations of RSB can develop quickly in Texas rice fields---especially in counties west of Houston. Frequently, sorghum fields near rice are harvested when rice is heading or in grain maturation stages of growth. Thus, high populations of adult RSB move from sorghum to rice. This can occur multiple times during the season, so rice farmers are forced to spray often. In addition, some scientists speculate the boll weevil eradication program has killed beneficial arthropods which suppress RSB populations. Also, adoption and widespread planting of Bt cotton may have increased populations of an array of stink bug species on a regional level. Finally, our data indicate populations of Texas RSB are harder to control with a pyrethroid than populations in other southern rice-producing states. In response to this added demand for more effective tools to control RSB, we recently evaluated Tenchu 20SG (active ingredient = dinotefuran) and other novel insecticides. Our data indicate Tenchu 20SG can provide up to 11 days residual activity against RSB. Thus, in 2008, a Crisis Exemption was granted for this product for Texas rice farmers. Again, in 2009, a Section 18 was granted for our farmers. Reports from the field confirm our results. We are in the process of applying for another Section 18 for Texas for Tenchu 20SG for the 2010 growing season. Other promising new RSB tools---not yet labeled on rice--- include Endigo