that is largely used by RiceTec and is used to produce ca. 78% of all hybrid rice in China. Results from the initial year of the study shows that the canopy of hybrids tend to develop more quickly than that of inbreds, intercept light more efficiently, and have canopy-level photosynthetic rates that are on average higher than that of inbreds. The results were very similar in 2008 and 2009, except for light interception efficiency. Our results show that hybrids are not intrinsically better able to intercept light than inbreds. In fact, the 3-line hybrids that we created on average produce leaves that are more erect than found on the inbred parents that were used to create them, which means that with our hybrids the upper most leaves allow more light to penetrate deeper into the canopy before being intercepted. This result is consistent with what has been reported by Chinese hybrid rice breeders, but it is contrary to what we found for commercial RiceTec hybrids during the first year of our study.

This presentation provides an update on the status of our hybrid/inbred photosynthesis research whose main goal is to determine the basis for differences in the yield of inbreds and hybrids. So far, we have found that each of the first three factors that are listed above help to explain differences in the yield performance comparing inbreds and hybrids. If the differences turn out to be restricted to these factors, this will suggest that the growth characteristics of inbreds can be modified to produce yields that compete with what is achieved with hybrids. However, if the superior yield performance of hybrids is in part due to hybrids possessing greater variability in the metabolic pathways that control photosynthesis, this would suggest that hybrids on-average will continue to out yield inbreds. This is not to say that the yield performance of inbreds will stop improving. This also does not imply that hybrids are the most cost effective to grow. Ultimately the superiority of a variety is determined by the net profits that it produces and not only its yield.

14th Annual National Conservation Systems Cotton & Rice Conference

CORN PRESENTATIONS

Program 1CR-2

Bed Height And Bed Longevity Effect On Corn And Soybean Yield

Presented by Dr. Normie Buehring

Professor of Agronomy, MSU

Since drainage on flat bottomland soils is critical, a study was initiated on a Leeper silty clay loam soil in the fall of 2005 to evaluate bed height duration (5 to 6, 8 to 9 and 10 to 12-inch) effect on corn and soybean yield in a corn-soybean rotation. The study also evaluated under-row-deep tillage (Paratill, 10 to 12 inches depth) + bed (8 to 9-inch height) roller. The beds were formed with a bedder equipped with 12-inch busters and a roller. **Corn:** After initial bed formation in the fall of 2005, all bed heights, including under-row-deep tillage (Paratill), produced a 4-year (2006-2009) average of 9 to 18 bushels more per acre than continuous no-till (no raised bed). Under-row-deep tillage (Paratill) + bed-roller showed no consistent yield advantage over the bed-roller alone. In both 2008 and 2009, the yields for beds formed in 2005 were lower for 5 to 6-inch beds than 8 to 9-inch beds. These 8 to 9-inch beds had a 4-year average yield of 134 bu/acre, which was 15 bu/acre more than the continuous no-till system. The yield also was equal to the annual fall Paratill + bed-roller application, and the 10 to 11-inch beds formed in the fall of 2005. **Soybean:** Soybean showed less yield response to raised beds than corn. In 2009, the yields for no-till and the 5 to 6-inch beds formed in 2005 were equal but lower than all other bed heights treatments. Only one (2008) of 4 years Paratill + bed-roller showed higher yield than no-till and all bed heights (5 to 6-inch, 8 to 9-

inch and 10 to 12-inch) formed in 2005. The 4-year (2006-2009) average plant height at maturity indicated no-till and the 5 to 6-inch beds formed in 2005 were equal but both were shorter in height than all other bed height treatments. The 8 to 9-inch beds formed in 2005 were 4-inches tall in 2009, and the yield was higher than both no-till and 5 to 6-inch beds formed in 2005. Bed heights in 2009 for no-till and the 5 to 6-inch bed height formed in 2005 was 2.9 inches. In summary, these results indicate that a minimum bed height of about 4 inches is necessary to maintain high yields for both corn and soybeans. Therefore, the no-till cropping system can be used on bottomland silty clay loam soils for about 4 years on 8 to 9-inch initial bed heights without yield losses.

Program 3CR-2

▸ On-Farm Nitrogen Calibration In Irrigated Corn

Presented by Dr. John S. Kruse

Assistant Professor, Cotton and Feedgrain Specialist, LSU AgCenter

Nitrogen (N) is a critical component of corn production and represents a substantial portion of a corn producer's fertility budget. Nitrogen costs have remained stable in the recent past but many recall two and three years ago when N prices were well above historical averages. Corn producers strive to maximize farm profits by optimizing yields with judicious use of fertilizer inputs, including nitrogen. Growers face a dilemma about how much nitrogen to apply each year due to the lack of a reliable N test that can accurately predict crop N needs for a particular growing season. As a result, many producers will apply an amount of N that will ensure optimum yields regardless of weather and growing conditions. Many producers follow Extension recommendations for corn nitrogen inputs, yet some are concerned that these scientific recommendations are based on trials that may not represent their particular farm conditions or practices. On-farm nitrogen calibration is one method producers can use to more accurately quantify the optimal nitrogen needs of their particular crop and location.
A calibration trial was established on a farm located in Tensas Parish in the Louisiana Delta on center pivot-irrigated land with a predominantly silty clay loam texture. The corn hybrid Pioneer 31D59 with a population of approximately 30,000 live plants per acre was planted on March 5 and harvested on August 12, 2010. Soil tests prior to nitrogen fertilizer application indicated that all phosphorus, potassium, minor and micronutrients were adequate for optimal potential yields. Treatments were established as 12-row, field-length strips in a repeating order of 190, 220 and 250 pounds of nitrogen per acre and replicated three times. The field was examined in three zones – east, central and west – for purposes of evaluating potential soil differences within the trial. Nitrogen was sidedress-applied as a liquid urea-ammonium nitrate solution, knifed-in at crop stage V4. Parameters measured were pre-plant soil total nitrogen, crop yield, post harvest corn stalk nitrate content, and post harvest soil residual nitrate-nitrogen. Potential differences in crop yield between treatments and location within the field were examined by comparing the standard deviation of the means.
Soil total nitrogen prior to the N sidedress-application was consistent across zones at 0.12%. Crop yields differed numerically by N rate, but differences within treatments were greater than differences between treatments (Figure 1). The mean corn grain yield on the 190 lbs. N/acre treatment was 170.2 bushels per acre. The yield on the treatment with 220 lbs. N/acre was almost identical at 172.3 bushels per acre. The mean yield for the 250 lbs. N/acre treatment was numerically the lowest at 168.6 bushels per acre. Stalk nitrate samples did not differentiate greatly between N rates* although the high N rate treatment had the fewest number of samples below 250 ppm (Table 1). Post-harvest soil residual nitrate-nitrogen levels did not differ greatly between N rates at 41.3, 41.8 and 44.7 lbs of nitrate-N per acre for the 190, 220, and 250 pounds of N applied, respectively. These levels demonstrated that a substantial portion of nitrogen was available in the nitrate form at the end of the season, and yet had not been utilized by the crop. These data indicate in aggregate that for this growing season, the optimal nitrogen rate appeared to be 220 pounds of N per acre, although the lower rate of 190