southern rice-producing states for the 2011 growing season. Our data show Nipsit INSIDE provides excellent control of RWW.

In 2010, all 3 seed treatments were evaluated for RWW control at the Texas AgriLife Research and Extension Center at Beaumont. All experiments were designed as a randomized complete block with 4 replications. Plot size was 18 ft X 7 rows, 7 inches between rows. Each plot was surrounded by a metal barrier. Seed was treated and plots drill-planted followed by flushing until 3 weeks after rice emergence when a flood was applied. At about 3 and 4 1/2 weeks after flood (this is when RWW populations are the highest during the season), 5, 4 inch diameter X 4 inch deep mud cores from each plot were removed and processed for RWW larvae and pupae. Each core contained at least 1 rice plant including roots. At maturity, plots were harvested to obtain yields.

In a planting rate study with Dermacor X-100 applied to Cocodrie seed at 1.75 fl oz/cwt, RWW control in plots planted at 60, 90 and 120 lb/A was excellent with yield increases of 888, 993 and 1100 lb/A, respectively. In another planting rate study, Cruiser 5FS, which is the insecticidal component of CruiserMaxx, was applied to Cocodrie seed at 3.3 fl oz/cwt followed by planting at 25, 50 and 75 lb/A. RWW control was 81, 91 and 95%, respectively. Yield increases were 616, 876 and 807 lb/A, respectively. In a third study, Nipsit INSIDE applied at 1.9 and 3.3 fl oz/cwt Cocodrie seed planted at 80 lb/A, provided 98% control of RWW with yield increases of 684 and 1048 lb/A, respectively.

These data show the importance of controlling RWW. Some farmers do not opt to control RWW because the above-ground damage is often difficult to observe. Insecticidal seed treatments are effective and farmer-friendly.

Program 10R-2

Unraveling The Basis For The Yield Performance Of Rice Hybrid And Inbred Varieties

Presented by Dr. L. Ted Wilson

Professor & Center Director, Texas A&M Univeristy

Experiments were initiated in 2007 to determine why hybrid rice varieties on-average produce higher yields than inbred varieties. These studies specifically focus on determining whether the yield advantage of commercial hybrids is due to hybrids having a greater ability to produce photosynthates or due to hybrids having a greater growth potential. A greater photosynthesis capacity can occur due to four factors: 1) the leaf canopy of hybrids develop more quickly and as a result intercepts a greater amount of light early in the season, 2) hybrids intercept light more efficiently due to subtle differences in the orientation of tillers and leaves within the canopy, 3) a greater photosynthesis rate is due to hybrids experiencing less photosynthesis feedback inhibition as a result of a greater demand for metabolites by developing tillers and associated organs, and 4) hybrids having an intrinsically greater photosynthesis rate per unit area of leaf surface. The first three factors can be explained by difference in rates of tiller and leaf production and growth. In contrast, the fourth factor would imply that hybrids possess greater variability in the metabolic pathways that control photosynthesis.

During the last four years of our study, we have measured for a number of inbred and hybrid varieties light capture, photosynthesis, seasonal growth, development, and yield, and the seasonal allocation of nitrogen and total non-structural carbohydrates (TNC) to each part of the plant. Measuring the amount of nitrogen, particularly in the leaf tissue, is important due to nitrogen playing a fundamental role in a photosynthesis. The greater the amount of nitrogen in a leaf, normally the higher the rate of photosynthesis. Measuring TNC levels is important due to TNCs fueling grow and development and providing a direct measure of a plant's health.

For 2007, our research focused on studying four commercial inbreds varieties and four commercial hybrids. For 2008 through 2010, we have studied a number of inbreds and hybrid offspring that we produced using the cytoplasmic 3-line breeding system, which is the system 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-