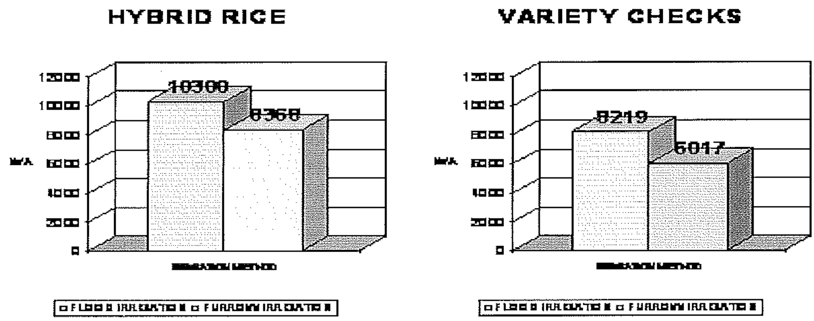
2 Year Mean grain yield of RiceTec Hybrid Rice (Left) and recommended cultivars (Right) when water was limited.

FLOOD IRRIGATION vs FURROW IRRIGATION



We have not achieved the same yields with furrow irrigated rice that we normally achieve with flooded rice culture. However we believe that we can recover most of the yield potential through research into refined management practices for furrow irrigated rice and sprinkler irrigated rice.

The advantage to adopting these conservation systems is not increased yield potential, but reduced input costs for water labor and fuel and water conservation. If input costs for diesel fuel, fertilizer and water continue to increase these systems can become cost effective.

▸ Managing Nitrogen In Rice With Precision: Is It Possible?

Presented by Dr. Timothy W. Walker

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Presented by Jason M. Satterfield

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Introduction

In recent years, nitrogen (N) fertilizer and its application has gained more attention due to exponential price increases in fertilizer and fuel. Means by which N can be applied more precisely would result in economical and environmental benefits. Currently, no soil- or plant-based test exists to predetermine N need, rather, recommendations are made based on results from N-fertilizer response studies that are conducted across a broad landscape of soils representative of the major rice growing area. Research has shown that one of the most effective means to manage N for optimum uptake and utilization efficiency is to apply a large percentage of the needed N immediately prior to flood establishment followed by the remaining N being applied near the onset of reproductive growth (panicle differentiation). Nitrogen uptake differences are likely to occur due to numerous factors including but not limited to soil type, native N availability, and N-loss mechanisms. The objective of this research was to evaluate crop canopy reflectance as a potential tool to determine N nutrition needs at panicle differentiation (PD). If successful, this technology could provide an opportunity to apply top-dress N with greater precision rather than predetermined blanket applications.

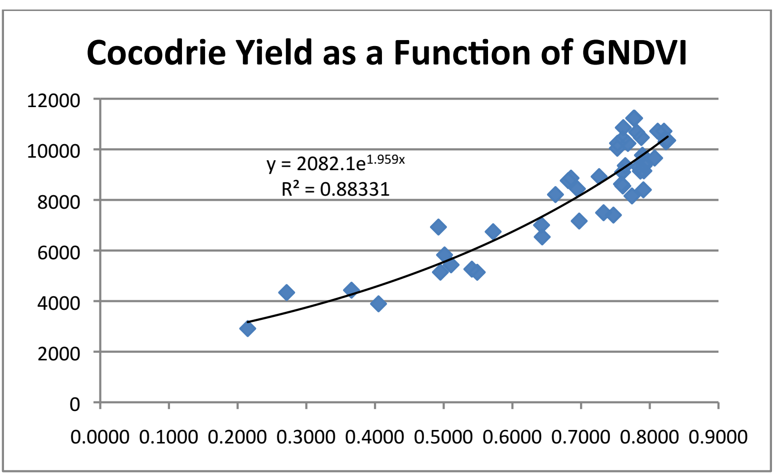
Materials and Methods

Field studies were conducted at the Delta Research and Extension Center in 2007 and 2008. Three rice cultivars (‘Cocodrie’, ‘Wells’, and ‘XL723’) chosen to represent the most common plant types grown in the southern USA rice growing region were drill-seeded in Sharkey clay soil. Six N treatments (0, 60, 90, 120, 150, and 180 lb N/acre) were broadcast applied to dry soil for each cultivar within two days prior to flood establishment which corresponded to the physiological growth stage of 5- to 6-leaf. At PD, spectral reflectance measurements were conducted using a GER 1500 spectrophotometer capable of measuring reflectance from 350 nm to 1050 nm in 2 nm increments. Reflectance measurements were collected on days of minimal cloud coverage and between the hours of 1000 and 1400 to minimize interference and the reflectance angle from the crop canopy. Total above ground plant samples were collected on the same day so that total dry matter (TDM) and N concentration could be determined. Total N uptake (TNU) was calculated from the product of TDM and N concentration. At harvest maturity, plots were harvested with a small plot combine and yields were standardized to 12% moisture content. Reflectance data were used to calculate Green Normalized Difference Vegetative Index (GNDVI) and Normalized Difference Vegetative Index (NDVI). Response variables including NDVI, GNDVI, TDM, N concentration, TNU, and yield were subjected to PROC CORR in SAS to determine what relationships existed. Where important relationships did exist, the data were subjected to regression analysis to quantify specific relationships.

Results and Discussion

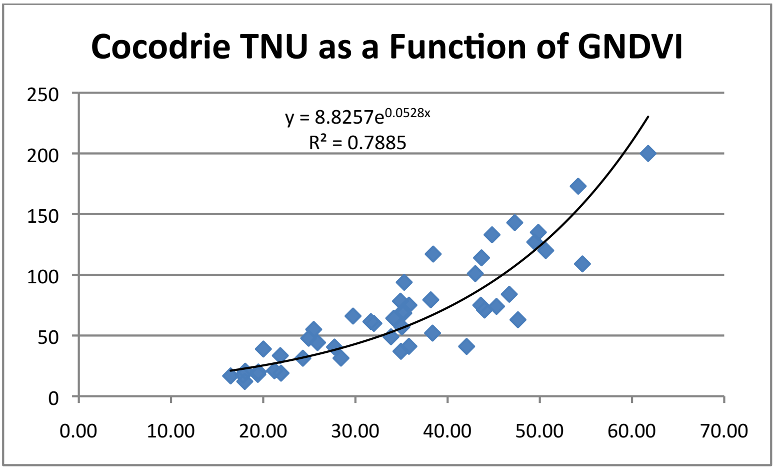
Correlation analyses indicated that a strong relationship existed between GNDVI and TNU for all cultivars. Regression analyses indicated that TNU and yield could be modeled by an exponential function. Greater than 80% of the variability associated with grain yield as a function of GNDVI could be explained. In addition, greater than 70% of the variability associated with TNU as a function of GNDVI could be explained. Since canopy reflectance is strongly related to major yield contributing factors in rice, this technology should be further investigated for its potential to determine the optimum N rate needed at PD for positive economic returns.

Figure 1. An example of the exponential relationship between yield and GNDVI for Cocodrie from studies conducted in 2007 and 2008.



Notes: ____

Figure 2. An example of the exponential relationship between total nitrogen uptake (TNU) and GNDVI for Cocodrie from studies conducted in 2007 and 2008.



▸ Insecticidal Seed Treatments And Conservation Tillage

Presented by Dr. M.O. Way

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Presented by M. S. Nunez

Presented by R. A. Pearson

Introduction

Conservation tillage is becoming more prevalent in Texas rice farming. This practice frequently results in earlier planting which is sometimes associated with poor emergence and stands. Furthermore, Texas rice farmers are planting at lower seeding rates than in the past which is due in part to increasing cost of seed (e.g. hybrid seed). Consequently, pesticidal seed treatments can be considered "good insurance" against the array of pests which threatens rice stands or vigor. Recently, we evaluated Dermacor X-100 seed treatment for control of rice water weevil (RWW), Lissorhoptrus oryzophilus, and stem borers including sugarcane borer (SCB), Diatraea saccharalis and Mexican rice borer (MRB), Eoreuma loftini. The active ingredient in Dermacor X-100 is rynaxypyr which has an excellent environmental profile---relatively low toxicity to birds, fish and mammals. Dermacor X-100 applied to seed greatly reduces the negative effects of drift associated with foliar insecticide applications.

Materials and Methods

Experiments were conducted in 2008. Dermacor X-100 treated seed was provided by DuPont. All rice was drill-seeded and flushed as needed until application of the flood-about 3 weeks after emergence. Plot size was 7-9 rows (7 inch spacing) by 16-18 ft long. Treatments were replicated 4 times. Weeds were controlled using recommended herbicides, rates and timings. Fertilizer was applied as recommended for Cocodrie and XL723---the 2 varieties used in the experiments. Plots were harvested and yields adjusted to 12% moisture. All data were analyzed by ANOVA and means separated by LSD.

Experiment 1. This experiment was conducted at the Beaumont Center. All plots were surrounded by metal barriers. The experiment was designed as a split plot with main plots