LSU AgCenter Research & Extension
Southwest Region

Rice Research Station News

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Louisiana Rice Research Board Supports Industry Improvements

The Louisiana Rice Research Board will meet on November 6 to review funded projects, evaluate new proposed projects and make decisions on funding for 2009. The Board is a 13-member group that administers funds collected at a rate of $.05/cwt on all rice produced in Louisiana. These funds can be used only for rice-related research purposes. This program was established as a result of state legislation and then approved by rice producers, who voted to initiate the check-off in 1972.

Board members are selected by the governor from a list of nominees submitted by major rice producer organizations in the state. These members serve with no remuneration, and all of their services are totally voluntary. Current members include Clarence Berken (Vice-Chairman), Donald Berken, John Boudreaux, Richard Fontenot (Secretary-Treasurer), Dane Hebert, Johnny Hensgens Jr., Paul "Jackie" Loewer Jr. (Chairman), Robert Miller, Samuel Noel, Brian Wild, Wayne Wild, Frederick Zaunbrecher and Linda Zaunbrecher.

The Board provides funds to a number of LSU AgCenter scientists conducting research that will provide new technologies to improve rice production and utilization. Funded projects cover a broad range of research areas such as variety development, genetics, weed control, disease control, insect control, physiology, agronomic practices, ratoon (second) crop production and economics.

Board-funded research has led to dramatic improvements in rice production technology. Average per acre yields have increased more than 45 percent since the Board began funding research. Much of this increase in yield is due to improved varieties that have greater yield potential under Louisiana climatic conditions. Other improvements have come from better weed, insect and disease control technology, much of which is the result of research conducted in Louisiana under Board-funded projects.

Louisiana's rice acreage increased from 378,000 in 2007 to 468,000 in 2008. This increase was in spite of the fact that rice production input costs are at an all-time high. The increase was primarily due to a substantial increase in the projected price producers will receive for this year's crop.

Since the amount of money available to the Board is directly related to acreage and yield, it is highly probable that the amount available for funding in 2009 will be higher than that available for funding in 2008. These funds are crucial to the projects that receive them. Research is expensive, and the availability, as well as stability, of funding plays an important role in the long-term productivity of any research endeavor.

Rice Research Board funds have been a stable source of money through the years and thus have helped many rice research projects deliver improved technology to the industry. This, in turn, helps keep our industry as competitive as possible, which is especially critical under economic conditions such as those faced by producers today.

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Special Dates of Interest:

Dec. 7-9, 2008 Little Rock, AR
Rice Outlook Conference

Jan. 6, 2009 Welsh, LA
Southwest LA Rice Forum

Jan. 7, 2009 Ville Platte, LA
Evangeline/St. Landry Rice and Soybean Mtg

Jan. 8, 2009 Crowley, LA
Acadia Rice Grower Mtg

Jan. 9, 2009 Kaplan, LA
Vermilion Rice Grower Mtg

July 1, 2009 Crowley, LA
RRS Field Day

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Date of Planting Studies Help Identify Optimum Planting Dates and Varieties

March
April

In the early spring in southwest Louisiana, one of the topics most heavily discussed is when to start planting rice. This is the time of year when five- and 10-day forecasts are watched closely – and rightfully so – to evaluate potential planting conditions. The ultimate measuring stick to evaluate planting date decisions, however, comes at the end of the season – from the combine. How does planting date play a role beyond emergence, seedling vigor and early season growth? The yield potential of a rice crop is an accumulation of how that crop interacts with all of the environmental variables during the course of a growing season, not just with the conditions at germination and emergence.

This can be explained by using the following hypothetical example. Assume that rice planted in mid-March (early planting) experienced abnormally cool conditions and that rice planted during mid-April experienced ideal conditions for germination and emergence. Also assume that temperatures are normal in June (coinciding with heading in the early-planted rice), but are extremely high in July (heading in April-planted rice). There may have been a stand loss associated with cool conditions in the early-planted rice, but subsequent environmental conditions were favorable, resulting in optimal tillering and heading stages. However, rice planted during the mid-April timeframe would have come up to a good stand, but might experience yield loss due to extremely high temperatures and/or disease during the pollination and heading stage of growth. Any number of factors during the course of the growing season can influence rice at different stages (and thus different planting dates).

As it turns out, the optimal planting date is difficult to predict given the variation between planting dates and years. We are all aware that environmental conditions (air and soil temperature, soil moisture, etc.) on March 15 of one year will probably be different from March 15 of the following year. So how do we manage the issue of unpredictable environments and planting dates in different years?

One way that researchers at the Rice Research Station approach this problem is to conduct the annual date-of-planting study. Multiple years of data are analyzed to identify, not the optimal date, but the optimal range of dates for planting rice, i.e. the recommended planting window. These trials are replicated and usually include 12 to 15 commercial varieties and experimental lines and are updated as newly released varieties become available. Planting dates usually range from late-February (too early) to early July (too late). Data collected from these studies include seedling vigor, maturity, plant height, grain yield and milling yield. The purpose of the study is to gain a long-term perspective on planting dates and varieties and how the two interact with each other to get useful information despite the year-to-year variation.

The results of these studies can be used to answer questions like:

- What is the optimum range of planting dates for southwest Louisiana? March 15 to April 20.
- Are some varieties better for early planting than others? Cypress has stable milling over a wide range of planting dates.
- Does the ideal planting date in one year differ from the next year? Yes, so we average the years to identify the optimal range.
- Can grain and milling yield, plant height and maturity be affected by different planting dates? Even for a single variety, all of these traits are affected by planting date.

These date-of-planting studies provide a wealth of useful information. These trials are summarized each year, and any new information specific to planting dates or new varieties will be incorporated into the annual Rice Varieties and Management Tips publication.

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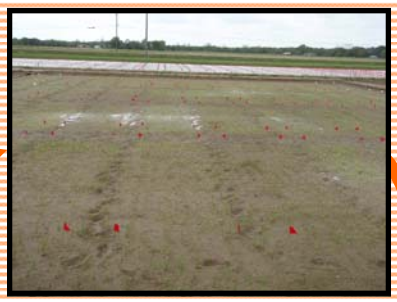
Eight tests are water-seeded by hand every two weeks starting in late February



Tests are planted having 3 replications and either 12 or 15 entries

Progression of Date of Planting Studies

Laboratory and Field Evaluation of High-Protein Rice Lines

Rice is one of Louisiana's major crops and has contributed significantly to the state's economy. To remain competitive in the marketplace, new varieties with higher yielding potential, better resistance to diseases and pests, and better grain quality need to continually be developed. In addition to these requirements, specific grain characteristics that add value to the existing standard quality will further improve the competitive level of the products released to the market. Rice added value has been a subject of increasing interest in the rice industry looking for more ways to market this crop beyond its current status as a source of carbohydrates and calories. Rice's natural content of dietary fiber, vitamins, minerals, specific oils (γ-oryzanol) and disease-fighting phyto-nutrients provide basic appeal to a growing number of consumers looking for the potential health benefits of food products. Improved grain protein content will help strengthen this product line.

Currently, we have tested a number of elite high-protein lines for their yield potential, milling quality and other important plant vigor characteristics. In general, the yield and milling quality among the tested elite lines are comparable with the original varieties from which they were developed. Some of the lines yielded slightly better than variety checks.

To further test their yield potential across growing regions, multi-location trials will be conducted. Four of these high-protein lines are CCDR4212, CCDR427, CY2967 and CY0153. Both CCDR4212 and CCDR427 have comparable yield and milling quality to Cocodrie. They are shorter, have better vigor and are one to two days later in maturity than Cocodrie.

High protein rice lines, Cocodrie (left) - and Cypress (right) – derived, in the 2008 preliminary yield trials.

The other two lines, CY2967 and CY0153, have similar yield and vigor with slightly better milling quality than Cypress. CY2967 has similar maturity as Cypress but is slightly taller.

These four lines will be entered in the multi-location tests in 2009. These performance trials are necessary to determine the stability of both yield potential and protein content in these lines. In addition to providing information on the stability of protein content and composition of certain essential amino acids – isoleucine, leucine, lysine, threonine, tryptophan, methionine, histidine, valine and phenylalanine – these tests provide data for grain yield, disease resistance, milling quality and other important plant parameters.

New entries of high-protein lines are continually being developed in the laboratory using different genetic backgrounds, including Cheniere, Trenasse and CL151. Based on a total protein content using a combustion method, two lines have a total protein content of 14%, eight lines 13%, seven lines 12% and two lines 11%, from a total of 575 new lines analyzed. The Rice Research Station is currently acquiring analyzing equipment to serve the need of two projects – the biotechnology project for protein analyses and agronomy project for plant/soil analyses. The availability of this equipment will greatly enhance grain protein research by allowing in-house analyses.

The whole-grain concept for rice would provide a specific vehicle to diversified rice markets. Increased protein content in rice grain will make a significant contribution to this effort. Data from previous studies along with multi-location trials will help establish the overall grain quality package of high-protein rice lines for both milled and brown rice. This may open additional markets for the rice industry and growers.

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"To remain competitive in the marketplace, new varieties with higher yielding potential, better resistance to diseases and pests, and better grain quality need to continually be developed."

Importance of Soil Testing in Rice Production

As we begin to close the books on the 2008 rice cropping season and think about next year's cropping plans, the increased costs of rice production, namely diesel fuel and fertilizer costs, weigh heavily on our minds. In fact, just this morning I was quoted a price of $870 per ton of urea. That's approximately $345 more than it was in March 2008. Currently, triple super phosphate will cost you about $1,090 per ton while potash will cost you $820 per ton. Both have jumped in price since March when they were approximately $748 and $541 per ton, respectively. By the time this article is published, these values most likely will have changed again. The one thing that does not change on a year-to-year basis, however, is the fact that a 7,000-pound per acre rice crop takes up approximately 112 pounds N, 60 pounds P_2O_5, and 168 pounds K_2O. Fortunately, the soil provides some, if not all, of the P and K nutrients during the cropping season. However, all soils are not created equal. Some have a higher innate nutrient content and require less fertilizer inputs. Other soils may be naturally less fertile and may require higher fertilizer inputs. So the question is: how much N, P and K fertilizer do you need on your soils?

Fortunately, P and K needs of next year's rice crop can be determined easily with a basic soil test. The test will cost around $7-$15, depending on what lab you choose to run the analysis and if you take the samples yourself or if you have someone else take the sample for you. Either way, the resulting analysis will provide a P and K recommendation for next year's crop.

In some cases, you may not need to apply P and K fertilizer at all and a simple $8 soil test may save you a considerable amount of money. Because fertilizer prices have increased so much, we need to move from the mindset of just applying P and K on every field at the same rate just because we have done it that way for years. It is much better to know how much P and K you need and apply based on those needs.

James Leonards, Research Associate at the RRS, performs a soil test.

Because all soil test recommendations are not made the same, you must be aware of the differences in the recommendations. For example, the LSU AgCenter's Soil Test and Plant Analysis Laboratory provides P and K recommendations based on a crop maintenance philosophy. That is, the fertilizer recommendations are based only on what is required for next year's crop and how much of that need your soil can supply. Other laboratories, however, may provide fertilizer recommendations based on a build-up philosophy. This means the recommendation includes the P and K needed for next year's crop plus additional fertilizer in excess of the crop's need to build up soil test levels. Depending on your situation, one philosophy may be better than another. For example, if you own the land, you may want to use the build-up philosophy. If, on the other hand, you are in the last year of a lease, do you really want to apply fertilizer beyond the crop's needs? The bottom line is to know what philosophy your fertilizer recommendations are based on and, if needed, modify those recommendations based on your needs and fertility goals.

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Pest of the Quarter

Rice Grain Smuts

False smut

Kernal smut

The false smut fungus, *Ustilaginoidea virens*, infects rice at flowering. The disease is characterized by large orange to olive green spore balls that replace one or more grains on a head (See figure). In the middle of the spore masses are sclerotia that act as survival structures. These sclerotia can be spread with the seed and infect the next crop. Removal of the sclerotia in seed cleaning reduces spread. Seed treatment with a fungicide also reduces inoculum potential. False smut spores cause discoloration of milled rice, but no significant yield loss is associated with the disease. Presence of the smut sclerotia in grain for export has caused problems.

Kernel smut symptoms appear just before maturity. A black mass of smut spores replaces all or some of the endosperm of the seed. Often the spores ooze out of the grain, leaving a black mass along the seam of the hulls (See figure). The fungus, *Tilletia barclayana*, overwinters as spores in soil of affected fields and in seed. The fungus infects immature, developing grain. Significant quality and yield reductions are possible.

Disease control is similar for both diseases. As with most rice diseases, development is favored by high nitrogen levels and late planting dates. Some varieties are more resistant than others. It has been reported that boot applications of propiconazole-containing fungicides reduce damage significantly. A rate of 6 oz/A of Tilt or equivalent has been shown to be effective in reducing the number of infected grains.

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Focus on Research Associates

Dr. Gretchen Zaunbrecher of Roberts Cove has worked at the LSU AgCenter Rice Research Station since July 7 as a research associate with Dr. Herry Utomo.

Gretchen received her doctorate in transgenics at Texas A&M in 2004. One of her projects in her doctoral work involved cloning pigs to develop organs that could be used for patients needing transplants.

She received a master's degree at Texas Tech University in reproductive physiology, and her bachelor's degree from the University of Louisiana at Lafayette in animal science.

At the Rice Station, she works with DNA to identify genetic markers for desired traits in rice plants and coastal marsh plants.

Gretchen said her work requires taking samples of leaf tissue and isolating DNA to find the intended markers, particularly for blast resistance.

Utomo said Gretchen has a positive attitude toward lab work.

"I am grateful to have her as my research associate," he said. "Her lab assistance will certainly be important for accomplishing more research objectives, both in marker-assisted selection in rice and molecular characterization of coastal plants."

Before working at the Rice Station, she taught at LSU-Eunice and the University of Louisiana at Lafayette.

Much of her work appears tedious and labor intensive, but Gretchen said she enjoys it.

"It's repetition, but each time it's a little different. If there is a problem, I like figuring out the solution."

She said she's a fan of the TV show "CSI" because of its frequent references to DNA technology, but she has to endure the exaggerations and inaccuracies in the show's lab work scenes.

She grew up surrounded by agriculture and showed sheep in the 4-H program. Her father, Steve Zaunbrecher, worked for G&H Seed as an agronomist before taking a job with BASF. Her brother, Quentin Zaunbrecher, previously worked at the station.

In her spare time, she reads, knits and enjoys time with her family.

"I spent 12 years in Texas, so it's nice to be back."

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