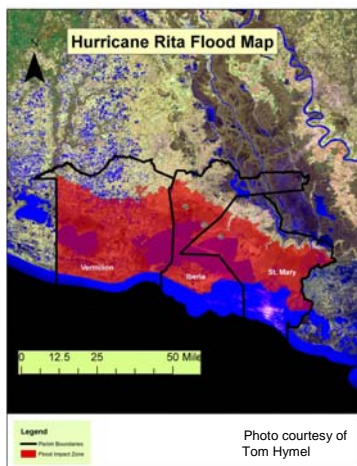


Salt Contamination of Rice Soils Following Hurricane Rita



On Sept. 23-24, 2005, Hurricane Rita struck the coast of southwestern Louisiana and southeastern Texas. Following Rita's landfall, an unprecedented storm surge inundated the coastal parishes of southwestern Louisiana, including parts of Calcasieu, Cameron, Jefferson Davis, Vermilion and Iberia parishes. Some flooded areas were covered with freshwater from lakes and bayous pushed out of these bodies by the force of brackish and saltwater from coastal marshes and the Gulf of Mexico. Other areas were covered by concentrated saltwater from the Gulf of Mexico.

The flood persisted as long as three weeks in some areas. The storm surge affected agricultural lands, including the rice-growing region of southwestern Louisiana. The levels of soluble salts remaining after the floodwater receded are cause for major concern and has left the productivity of large tracts of rice soils in serious question for the 2006 crop year.



Efforts are underway to define the extent and severity of salt contamination, to interpret results of soil tests revealing levels of salt contamination, and to offer recommendations for remediation of the contaminated soils. Greenhouse research is ongoing at the Rice Research Station to address rice production issues associated with the storm surge. Soil from seven sites in the impacted areas was collected, and laboratory analyses determined that soluble salt levels in these soils were 590 ppm to 8,270 ppm.

A greenhouse bioassay showed that seedling emergence and plant dry weight 21 days after rice planting were not affected in soils with soluble salt levels <980 ppm, whereas seedling emergence was reduced at least 76% in soils with >6,430 ppm soluble salts. Unfortunately, the impact on rice development of season-long exposure to these soluble salt levels is not clear. Furthermore, the negative effects of salt contamination were more pronounced when rice was water-seeded than when it was dry-seeded. Soil test results have shown, however, that soluble salt levels at the seven sites tested in greenhouse research decreased 40% to 60% from Oct. 25 to Dec. 12, 2005. However, more rainfall through the remainder of the winter months will be required for severely impacted fields to be productive in 2006.



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Special Dates of Interest:

Rice Technical Working Group
(RTWG)

February 26 — March 1, 2006

The Woodlands, Texas

<http://beaumont.tamu.edu/RTWG2006/>

Rice Research Station Field Day

Thursday, June 29, 2006

2006 Rice Cash Flow Model

The dramatic rise in fuel and fertilizer prices, which occurred last fall, has caused projected rice production costs for the 2006 crop year to rise substantially and has adversely affected many farms ability to cash flow. Rice growers are currently looking at what can be changed in the operation to improve their projected cash flow in the face of these high input prices. One option is to renegotiate rental arrangements. Another option would be to alter the percent of rice base acreage planted. The Projected 2006 Rice Farm Cash Flow Model was developed to assist rice producers in planning for the 2006 crop year. The model is an Excel spreadsheet which allows rice producers to enter projected acreage, yield, market price and production cost data for 2006 to estimate net returns above variable production costs and to easily evaluate the impact of changing percent of base planted on net returns. The primary

purpose of the model is to evaluate the impact on net returns above variable production costs for alternative rice rental arrangements and percent of base acreage planted. The model also includes entry cells for whole farm fixed expenses to estimate projected returns from rice production over all costs.

The Projected 2006 Rice Farm Cash Flow Model calculates projected net returns above variable production costs for a rice farm or specific tract of land of a specified acreage. For each farm or tract, data to be entered into the model includes estimates for the 2006 crop season including rice acreage, base acres, percent of base planted, projected first crop and ratoon crop yields, program yields, projected prices and production costs. Gross returns, variable costs and net returns are calculated for the farm or tract based upon the data entered.

If you would like to obtain a copy of the cash flow model, contact Dr. Mike Salassi, msalassi@agcenter.lsu.edu.



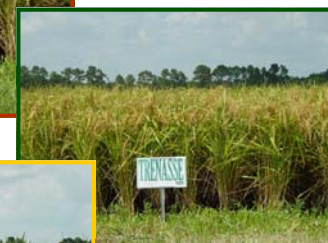
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Rice Variety Update

Three new varieties released from the Rice Research Station for seed production in 2005 will be available for commercial production in 2006. 'Trenasse' is a very early maturing, short stature long-grain with excellent yield potential. It is 4-5 days earlier in maturity than 'Cocodrie' and has comparable yield potential. Trenasse is 3 inches taller than Cocodrie and somewhat more susceptible to lodging. It is rated as moderately susceptible to blast and very susceptible to sheath blight. It has displayed good milling characteristics.

'Jupiter' is an early, semidwarf medium-grain variety that has displayed excellent yield potential and good disease resistance characteristics. It has consistently shown a 600-700 lb per acre yield advantage over 'Bengal', the predominant southern U.S. medium-grain variety in recent years. Jupiter has displayed very good whole grain milling yields and good grain appearance characteristics. Jupiter is rated as resistant to blast and bacterial panicle blight, as well as moderately resistant to straighthead disorder, all of which can cause problems in Bengal. The new variety is comparable to Bengal in maturity and plant height.

'CL131' is a new semidwarf long-grain variety developed for use with the Clearfield production system. It is 1-2 days earlier in maturity and 5 inches shorter than 'CL161', the current most popular Clearfield variety. CL131 is moderately susceptible to blast and very susceptible to sheath blight which makes it similar to CL161 in reaction to these diseases.



Additional information on these and other rice varieties and hybrids can be found in the LSU AgCenter Publication "Rice Varieties and Management Tips-2006" at

http://www.lsuagcenter.com/en/crops_livestock/crops/rice/Publications/Rice+Varieties+and+Management+Tips.htm .

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Section 18 Exemptions and the Rice Water Weevil

Section 18 Emergency Exemptions are issued by the EPA “to allow States to use a pesticide for an unregistered use for a limited time if EPA determines that emergency conditions exist” (<http://www.epa.gov/opprd001/section18>). Recently, LSU AgCenter personnel, in cooperation with the Louisiana Department of Agriculture and Forestry, submitted applications for Section 18 Emergency Exemptions for the use of the insecticides etofenprox and carbofuran against the rice water weevil in rice. The Section 18 applications were both submitted to the EPA in early December, and the EPA has not yet issued a decision on either request. In the Section 18 applications, the following circumstances and factors were used to argue for the existence of an “emergency condition” in rice with respect to weevil control: the serious nature of the weevil threat, particularly in pinpoint-flooded rice;

the recent removal of Icon from the market, leaving the pyrethroids as the only widely-used insecticides for weevil control; the proximity of rice fields to crawfish ponds throughout southwest Louisiana, a condition that increases the likelihood of pyrethroid drift into crawfish ponds; and various other problems associated with the effective use of pyrethroids.

The granular formulation of carbofuran, Furadan, was used successfully for weevil management for more than 30 years in southern Louisiana. Its use was disallowed in rice by the EPA in the mid-1990s, primarily because of its toxicity to birds. The EPA has been reluctant to issue Emergency Exemptions for the use of carbofuran in rice in the past because of the real and perceived environmental risks associated with the use of carbofuran. Rice

producers in southern Louisiana are already trained in the proper use of this insecticide and, because it is a granular formulation, there is less potential for drift with Furadan than there is with the liquid formulations of pyrethroids. Furadan is approximately 500 times less toxic to crawfish than the pyrethroids.

Etofenprox is a pyrethroid-like insecticide used in a manner similar to the other pyrethroid insecticides; that is, the product works best when applied shortly after flooding. This insecticide has been used for almost 20 years to control rice water weevils in Japan. Etofenprox has given only moderate control of weevils in tests conducted at the Rice Research Station, but its mediocre performance in these tests was probably related to extremely high weevil pressures in the tests in which it

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Pest of the Quarter– Sheath Blight

Sheath blight is the most important disease of rice in the southern United States. The causal fungus is *Rhizoctonia solani*. Losses range from 1% to 25%, depending on inoculum pressure, environmental conditions, host resistance and cultural management. High humidity and moderate temperatures favor the disease. High seeding rates and high doses of nitrogen increase canopy thickness and increase humidity, resulting in increased disease.

The pathogen survives in the soil as sclerotia, in infected straw or on alternate hosts. It is present in most rice fields. Severity is proportional to number of sclerotia and infected debris in the soil. Infection occurs at the point of contact, usually around the water line, and mycelium penetrates the plant, normally starting at the tillering or internode elongation growth stages.

Lesions, 1 cm to 3 cm, initially appear on the sheath, are oval or ellipsoidal, dark green to gray in color, and appear water soaked. Lesions usually have a brown border around them, with resistant plants having a wider and darker border than susceptible cultivars. When the plant produces this resistant response, the mycelium grows out of the tissue and over the resistance reaction and causes a new secondary infection.

This process gives the disease its characteristic appearance of a snakeskin-banding pattern. Lesions on the leaves are more irregular and have a banded coloration with dark green, brown, and yellow-orange coloration. Large oval



Sclerotia

Cont. pg. 4

Section 18 Exemptions and the Rice Water

Cont.

was applied (applications of foliar pyrethroids included as standards in these tests also failed to adequately control weevils). The successful use of etofenprox in Japan, and positive results with etofenprox in tests in other rice-growing regions of the U.S., suggest that etofenprox should adequately control weevils under normal circumstances. Etofenprox is toxic to crawfish but, as a granular, is less likely to drift into crawfish ponds when applied to rice fields than are the liquid pyrethroids.

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Pest of the Quarter - Sheath Blight

Cont.

spots on the sheath and irregular spots on the leaf blades characterize the disease. Leaves that become infected usually die and turn tan.

Sclerotia are the survival structures of the fungus, irregular bean shaped 4 mm to 5 mm in size, and formed on the surface of the leaves and sheaths. When initially formed, they are white but turn dark brown to black and fall off easily. The sclerotia can survive several years in the soil. Sheath blight, although a soil-borne pathogen without a secondary wind spread spore stage, can develop rapidly under the favorable environmental conditions.

Sheath blight can be controlled by a combination of practices. Some commercial cultivars have partial resistance. Avoiding excessive stands and nitrogen fertilizer, without sacrificing yield potential, will reduce incidence of this disease. Applying fungicides is often necessary when economically advisable.

Rice must be scouted to determine if a treatment threshold has been exceeded. Specific fungicide treatment recommendations are based on either percent positive tillers infected or percent positive stops. This threshold is adjusted for the susceptibility of the cultivar. With very susceptible and susceptible cultivars, 5% to 10% of the tillers infected or 35% positive stops indicate that a fungicide is necessary. A moderately susceptible cultivar requires 10% to 15% infected tillers or 50% positive stops to justify a fungicide treatment.

In the past, two fungicide treatments were necessary to reduce sheath blight. But with the advent of more effective fungicides and economic constraints that limit the number of applications, a single application approach is usually used. See your LSU AgCenter county agent for current fungicide recommendations.

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Rice CAP Project Update

The Rice CAP Project is a USDA-funded research effort from 2004-2008 that aims to develop and transfer DNA marker technology to enhance rice breeding programs and the U.S. rice industry. Dr. Ernest Girouard serves as the chairman of the Stakeholder Advisory Board. The Rice Station is a major contributor to the project involving Don Groth, Steve Linscombe, Jim Oard, Xueyan Sha and Herry Utomo.

Four research objectives of this project are to:

- (1) Identify and use candidate genes and other molecular markers that control milling quality and resistance to sheath blight disease.
- (2) Validate the function of candidate genes associated with milling quality and sheath blight resistance.
- (3) Develop technical training programs and resources to ensure implementation of molecular marker and gene validation technologies to solve rice problems.
- (4) Provide educational opportunities for consumers emphasizing the potential of genomic research for improving the abundance and quality of rice.

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Rice CAP Project Update Cont.

Research progress during 2005 involved field evaluation of 156 lines from the population Cypress/RT0034 (MY1) for milling quality. Data for whole milling yield (head rice) and grain dimension were collected along with DNA marker information from each line. This experiment will be repeated by the Rice Station and the other cooperators in 2006 with the goal of identifying DNA markers that will assist in the breeding and release of new Louisiana varieties with improved milling quality.

Other research in 2005 focused on the evaluation of a cross involving Cocodrie and a sheath blight-resistant line developed by Dr. Chuck Rush. A total of 325 doubled-haploid lines from this population were evaluated in replicated plots for sheath blight resistance, plant height and maturity. A few lines with acceptable height and maturity were identified with good levels of sheath blight resistance. This population (SB2) will be evaluated again in 2006 in Louisiana, Texas and Arkansas. Seed for two other populations were also increased in 2005 for milling (MY2) and sheath blight (SB3) for distribution to Louisiana, Texas and Arkansas in the spring of 2006.

To speed up development of sheath blight-resistant rice, three screening methods for resistance were evaluated in the greenhouse in 2005. Five separate microchamber, 1 detached leaf, and 1 high-humidity greenhouse experiments were completed. Data for level of sheath blight resistance and lesion height were recorded using the microchamber method for 35 lines varying in response to infection by the sheath blight fungus, *Rhizoctonia solani*. The results suggest that the microchamber method may be useful to evaluate rice for sheath blight resistance in conjunction with standard field inoculation results. All methods will be compared in 2006.

In summary, successful research was completed in 2005 involving two populations for enhanced milling and sheath blight resistance. A greenhouse method was also identified to complement field trials for development of sheath blight resistance. Research in 2006 will evaluate the four populations described above to select DNA markers that will complement the breeding efforts at the Rice Station. Please visit the Web site <http://www.uark.edu/ua/ricecap/> for additional information on the Rice CAP Project.

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Medium-grain Variety Development

Before I start talking about medium-grain breeding, I want to introduce myself, since I am a new member of the rice research team. I was born and raised in St. Joseph, La. I received an MS degree in weed science from Mississippi State University and a Ph.D. degree in cotton breeding and genetics from LSU. Immediately after finishing at LSU, I came on board as the medium-grain rice breeder here at the Rice Station in August 2005.

The LSU AgCenter's Rice Research Station has a long history of variety development. Many of the benchmark varieties planted in the past, which contributed to the viability of the Louisiana rice industry, were developed here at the Rice Station. The long-term commitment by Louisiana rice producers to support the research and variety development efforts at the Rice Station will continue to generate yield improvements and technological advancements.

We continue to use the conventional, time-tested breeding methods, which have been successful in the past, as well as the evolving new technologies such as marker-assisted selection. The winter nursery facility at Lajas, Puerto Rico, is an important resource for breeders to expedite variety development. We make about 70 medium-grain crosses and maintain 10,000 progeny rows each year to combine desired characteristics to meet the objectives of the breeding program. Segregating generations are advanced at the Rice Research Station and at the winter nursery.

Many traits are considered during the selection process. Yield potential and grain quality are always the most impor-

tant traits followed by short stature, lodging resistance, disease (blast, sheath blight, and bacterial panicle blight) resistance, earliness, seedling vigor, ratoon yield and others. Grain shape and size and cooking quality are evaluated to ensure that they conform to quality standards for the U.S. medium-grain market.

Selection of promising lines having a good combination of these characteristics is conducted in the field, laboratory, greenhouse and disease nurseries. Molecular screening is used to identify blast-resistant material early in the selection process. Promising experimental lines are advanced to various yield trials and evaluated for yield, stability, disease resistance, and other agronomic characters such as maturity and height. Those lines that perform well in the state and multi-state yield trials are considered for variety releases.

I also want to mention that most of the activities associated with the medium-grain breeding program benefit from a high level of cooperation among the Rice Station faculty and a motivated staff of research associates. Such cooperation and work ethic increase the accuracy at each level of the breeding process, resulting in superior medium-grain varieties available sooner to rice producers.

In the future, we plan to conduct research on the yield and milling stability (consistency) of current medium-grain varieties and how we can improve these characteristics in future medium-grain releases

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[www.lsuagcenter.com/en/
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Focus on Research Associates

Growing plants at the Rice Research Station has been Mona Meche's job for 29 years.

She worked part-time for 4 years before graduating from the University of Southwestern Louisiana in horticulture, and she has been full-time for 25 years.

"I think I've worked in just about every slot out here," she said.

As a research associate coordinator, she now works closely with Drs. Herry Utomo and Ida Wenefrida. One of the projects includes using anther culture to develop a variety of rice with a high lysine content.

"Mona cooperates well with our project and she is an easy person to work with," Utomo said.

"Her assistance in this area of research is important," Wenefrida said. "Mona is thorough with her work."

Mona and her husband, Greg, have 3 sons, ages 8, 14 and 16.

"I like being around people," she said. "I enjoy meeting people from all over the country who come here and I enjoy working with the kids."

Her oldest son, Tyler, worked at the station last summer as a student worker.

Even before graduating from high school, Meche said she knew she would find a career in agriculture.

At home, she works in her yard either on landscaping projects or in the vegetable garden. But she wouldn't want to choose one over the other.

"I love my garden, but I love my roses and the landscaping," she said.



Comings and Goings

You might see Jeremy Hebert in rice fields anywhere across the state. He begins his second year this spring as an extension associate working with Dr. Johnny Saichuk, LSU AgCenter rice specialist, in the verification program. Hebert is a native of Iowa and a graduate of McNeese State University.

Ted Fontenot of Eunice left his job as research associate at the Rice Station in December to pursue further education.

Research partially funded by the Louisiana Rice Research Board

The LSU Agricultural Center is a statewide campus of the LSU System and provides equal opportunities in programs and employment.