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Rice Research Station News

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Louisiana Rice Research Checkoff Program

More than 40 years ago Louisiana rice industry leaders understood the importance of research to improve rice production technology. Through legislative action, the rice research checkoff program was established. While this program has been tweaked through the years, its function is the same as when it was first established – to provide funds to conduct research on rice to provide improved production technology for the Louisiana rice industry. The research checkoff program collects $.05/cwt. on all rice produced in Louisiana. This program is administered by a board made up of 13 Louisiana rice producers. The board is appointed by the governor from nominations submitted by statewide rice producer organizations. These members serve with no remuneration, and all of their services are totally voluntary.

PHYSIOLOGY
VARIETY DEVELOPMENT
RATOON CROP PRODUCTION
WEED CONTROL
ECONOMICS

INSECT CONTROL
AGRONOMIC PRACTICES
GENETICS
DISEASE CONTROL
HYBRID RICE

The research board can fund any worthy research endeavor. However, a substantial amount of the research checkoff funds are provided to LSU AgCenter rice scientists because much of the research conducted by these individuals has immediate application to improvement in Louisiana production technology. 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, economics, and several areas of post-harvest technology.

Research funded by this board has led to dramatic improvements in rice production technology. Average per acre yields have increased more than 50 percent since this board has been 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 has come from research conducted in Louisiana under board-funded projects. These research scientists must continually adapt to new challenges. An example of this is the rice blast disease outbreak in southwest Louisiana in 2012. This was the most severe problem with this disease in many years and will necessitate improvement in resistance to this disease in some of our most popular varieties. Research such as this is expensive, and the availability as well as stability of funding plays a key role in the long-term productivity of this or any research endeavor. The Rice Research Board funds have been a stable source of money through the years and thus have helped many rice research programs deliver improved technology to the industry. This, in turn, helps keep our industry as competitive as possible.

These research efforts are essential for the long-term viability of the Louisiana rice industry. These checkoff funds are definitely money well spent.

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Special Dates of Interest:

2012 USA Rice Outlook Conference
December 9-11, 2012
Coronada, CA

National Conservation Systems Cotton and Rice Conference
January 31-February 1, 2013
Baton Rouge, LA

Don't Guess, Soil Test

The slogan “don’t guess, soil test” was coined many years ago in an effort to remind and encourage farmers and consultants to use soil testing services to determine the fertilizer needs for their crops. This slogan still rings true today because fertilizers are still the highest input cost in a commercial rice crop. I recently priced some of the most common nitrogen (N), phosphate (P), and potassium (K) fertilizers used in a rice crop from a local dealer. The P fertilizers – triple super-phosphate (TSP, 0-46-0) and diammonium phosphate (DAP, 12-46) – were currently $582 and $628 per ton, respectively. The most commonly used N fertilizers – urea (46-0-0) and ammonium sulfate (21-0-0) – were priced at $553 and $385 per ton, respectively. The most common K fertilizer – muriate of potash (KCl, 0-0-60 or 0-0-62) – was priced at $572 per ton for the 0-0-62 analysis fertilizer.

Most of you are probably familiar with the 0-0-60 analysis potash fertilizer, which is red in color. Well, the 0-0-62 analysis fertilizer is just a bit more pure, is white in color and is typically a little more uniform. In general, I found that all of our commonly used N, P and K fertilizers are slightly below the October 2011 prices from that same local dealer. Even though the prices are currently slightly more favorable today than this time last year, you never know what may happen in the coming months. Remember 2008 when P and K fertilizers doubled in price from January to July and urea increased by $300?

Truthfully, by the time this article is published, most likely these values will have changed again. However, the one thing that does not change on a year-to-year basis is the fact that a 7000 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, we must remember that all soils are not created equal. Some soils have a higher native nutrient content than others, which in turn would require less fertilizer inputs, while others may be naturally less fertile and may require higher fertilizer inputs. So, the real question is: How much N, P and K fertilizer do you need on *your* soils?

Like soils, all soil test recommendations are not made the same, and you must be aware of the differences in the recommendations you receive. 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 you receive are based only on what is required for next year’s crop and how much of that need your soil can supply. However, other laboratories may provide fertilizer recommendations based on a build-up philosophy. Basically, a build-up fertilizer recommendation includes the P and K needed for next year’s crop plus additional fertilizer in excess of the crop’s need in order 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. On the other hand, if 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.

Removing soil from a soil test probe.

Traditionally, there has not been a good soil test for N that was accurately calibrated to estimate the fertilizer needs for rice production. However, the University of Arkansas has recently calibrated a nitrogen soil test for rice, coined N-STaR. This soil test is currently calibrated only for silt loam soils. This test is presently a recommended best management practice in Arkansas but is not currently recommended in Louisiana. On-farm validation trials in Louisiana on soils that have a very high native N concentration, which results in a low N fertilizer recommendation, have been evaluated for the past two years with mixed results. While N-STaR recommendations have not been on the money on all occasions, the test has shown that it can accurately separate soils requiring normal N fertilizer rates from those requiring less than normal N fertilizer rates. This is an excellent tool, especially if you are farming a field for the first time and you are unsure of the native N fertility levels of the soil. If you are interested in the N-STaR test, you can contact Dr. Roberts at the N-STaR lab (479-575-6752; nstarlab@uark.edu).

Remember, when determining your fertilizer needs for next season – don’t guess, soil test.

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What Are Rice Hybrids and How Do They Differ From Pure Lines?

Over the years Louisiana rice producers have benefited from planting elite commercial pure line (inbred) rice varieties produced by crossing two dissimilar parents to generate the first generation (F_1) of seeds. Because rice is primarily a self-pollinated crop, the F_1 plants will produce the next generation where breeders select the best individuals to advance in succeeding generations that in five to 10 years give rise to a new pure line variety. The most popular Louisiana variety grown in 2011 was the inbred CL151 at nearly one-third of the total acreage.

Hybrid rice, produced from the first generation (F_1) of seeds between a cross of two genetically dissimilar pure line (inbred) parents, represents a relatively new option for Louisiana farmers. Commercial hybrids typically yield 10 percent to 20 percent more than the best inbreds grown under similar conditions believed to be the result of “hybrid vigor” or “heterosis” from crossing the two parents. To exploit the benefits of hybrid rice, farmers must purchase hybrid seed from commercial companies for each cropping season. Use of a “male sterile” line with nonviable pollen is a crucial component for hybrid seed production. The male sterile is used as a female and planted alongside a pollen-fertile male that pollinate the female in an isolated plot to produce bulk quantities of hybrid seed. In 2011, two RiceTec company hybrid varieties, CLXL729 and CLXL745, occupied about 22 percent of the total Louisiana acreage The potential for hybrid rice in Louisiana is good, but there are several challenges, including but not limited to, lodging, maturity, whole-grain milling yields, grain appearance, shattering (grain retention) and seed dormancy. The Rice Research Station is currently engaged in breeding research to address these challenges.

Hybrid field at the Rice Station

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Lodged Rice Impacts Milling Yield and Price

Lodged rice at harvest time can disrupt harvest operations and significantly affect the income and expenses associated with rice production. Although several different factors can cause a rice plant to lodge, the most common is adverse weather conditions prior to harvest. Anytime from just prior to field drainage all the way until harvest time, adverse weather can cause rice to lodge with widely varying effects across a field in terms of size and number of affected areas. Lodged rice conditions at harvest can cause increased harvest time as well as reduced yield. The economic consequences of these two factors can be estimated fairly accurately. What has not been as well understood or documented is the impact on milling yield and market price of rice harvested under lodged conditions. The length of time and conditions under which a rice crop is lodged prior to harvest affects milling yield and the related rough rice market price received.

Artificially lodging plots in study.

For the past two years, tests have been conducted at the LSU AgCenter Rice Research Station in Crowley to evaluate the effect of lodged rice conditions on rough rice milling yield and the resulting rough rice market price received. Rice varieties evaluated in the lodging studies have included CL151, Jupiter, Wells, Cocodrie, Cheniere, Presidio and LAH10. Research results indicate that although lodged crop conditions at harvest may not result in significantly reduced total milling yields, there is a rather significant shift in head rice and broken yields. Results from tests conducted in 2012 – over all rice varieties evaluated, planting dates and lodging dates – showed average loss in head rice milling yield of 5.2 pounds, average increase in broken milling yield of 3.4 pounds, and average loss in total milling yield of 1.8 pounds. Reductions in estimated rough rice market price received associated with these milling yield losses ranged as high at $3.00 per cwt.

With increased harvest costs and reduced yield coupled with reduced milling yield and rough rice market price, lodged rice crop conditions at harvest can result in significant reductions in net economic returns.

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Pest of the Quarter

Knotgrass

Knotgrass (*Paspalum distichum* L.) is considered to be native to the South America. It grows best in wet areas in tropical and subtropical regions around the world. The plant is a C_4 plant, which means it has an efficient mechanism of fixing carbon into sugars. C_4 plants tend to be more adaptable in tropical environments. Many of our grass weeds in Louisiana are classified as C_4 plants.

Knotgrass is a spreading perennial with rhizomes and stolons with the ability to root at each node. It can grow up to 2 feet tall with short internodes and hairy nodes. Knotgrass leaf blades can be 0.5 to 1 inch wide and 1 to 4 inches long with a membranous ligule. Knotgrass leaves are hairy along the margins and often hairy at the base. The seedheads consist of two spike-like racemes 1 to 3 inches long. On occasion, the seed head can have three to four racemes. The plant can flower from 30 to 52 days and produce viable seed 20 to 30 days after flowering.

Knotgrass is found in the lower half of the United States from North Carolina to the Pacific Coast to Washington state. Various samples from collections in the United States are similar in appearance; however, the pubescence (hairs) increases from the east to the west coast. It is considered a serious weed in Asia and Latin America and is found in more than 60 countries from Australia, Africa, Asia and the Americas. This weed is an excellent example of why scientific names are used instead of common names around the world. It has more than 45 common names including: knotgrass, water couch, shalhaw, mercer grass, grama colorado, naru, bakbaka, grama, kweek paspalums, water Bermuda and aladillo; however, if one refers to it as *Paspalum disticum,* it can be recognized all over the world.

Knotgrass has a tremendous ability to survive across a wide range of environments. It has been shown to survive the winter in Japan under ice formed on the water surface. Much of the above-ground tissue died, but the buds at the nodes were able to survive and sprout when favorable conditions occurred. Knotgrass is adaptable to pH values from 4.5 to 8.3, and it has a tremendous ability to adapt to high heavy metal areas, such as mine tailings. In China, knotgrass has become twice as tolerant to copper, manganese and iron in 80 years of evaluation.

Knotgrass has the tremendous ability to produce plants from rhizomes and stolons. A section of stolon containing a node can produce a new plant within 36 hours. At a temperature of 86 degrees F, stems can elongate at a rate of 1.5 inches per day. Research has shown this to be faster than rice growth, and this illustrates how competitive this weed can be with rice. The optimum germination temperature for stolons and rhizomes is 86 degrees F to 104 degrees F. These temperatures are well within our optimum range for rice production in Louisiana. It also shows how this plant can continue to reproduce under high temperatures when rice growth slows. Knotgrass produces stolons at a much higher rate than rhizomes, indicating the potential for reproduction is greater from stolons than rhizomes. It has the ability to reproduce from seed, but in south Louisiana, because of the warm winters, this weed can reproduce and infest production fields mainly from stolons and rhizomes. The ability for knotgrass to survive in 20 inches of water also indicates that the weed can reproduce under water-seeded production systems in Louisiana.

In rice production, this weed is easy to manage compared with other perennial grasses that infest rice. In conventional rice, a preemergence application of Command followed by Clincher is very effective on this weed. In Clearfield rice production, Command plus Newpath and/or Beyond can also be effective in managing this weed, and one still has the Clincher option for escapes. A well-prepared seedbed will help ensure rice gets a competitive advantage over knotgrass.

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Arsenic in Rice

A recently published Consumer Reports article has stated that U.S.-produced rice has excessively high levels of arsenic that should be of concern to rice consumers. Because rice is grown under flooded conditions, there is a greater potential for accumulation of arsenic in the grain. However, most experts in the field agree that U.S. rice levels of arsenic are not a cause for alarm. The U.S. Food and Drug Administration does not recommend changes by consumers, including children, regarding their consumption of rice and rice products. On Sept. 19, FDA released the following statement: "Based on the currently available data and scientific literature, the FDA does not have an adequate scientific basis to recommend changes by consumers regarding their consumption of rice and rice products."

Published research (http://www.epa.gov/nerl/download_files/documents/Xue-Zartarian-Arsenic-in-Food-Model-Eval.5.18.10.ES.LB-Web.doc.pdf) from EPA found estimated arsenic exposures from the diet to be low – approximately one-fifth the level set to protect consumers from the effects of long-term, chronic exposure to inorganic arsenic in drinking and cooking water alone. EPA's published results also indicate that fruit and vegetables as a group contribute a greater amount of inorganic arsenic than rice and other grains. Also, according to food safety toxicologists, the issue of arsenic levels in food is not the usual type of food safety issue because there are no known instances of illness or scientific studies that directly connect arsenic in food in general, or in rice specifically, to any adverse health effects in the United States. Thus, scientists who specialize in this area do not perceive any imminent hazard. They also point out that because arsenic is a naturally occurring element that has been in air, soil, rocks and water for thousands of years, it is not new, and the human body has historically been exposed to it.

Respected food safety toxicologists and medical experts say that the Consumer Reports story (http://www.consumerreports.org/cro/magazine/2012/11/arsenic-in-your-food/index.htm) does not add meaningful information to the public discourse of an important issue and unnecessarily alarms consumers who are not aware of the facts about arsenic in all foods. Furthermore, the limited number of tests conducted by Consumer Reports is not a sound basis on which to provide dietary guidance.

The Consumer Reports article further implied that U.S.-produced rice is excessively high in arsenic content when compared to rice produced in other countries. In fact, CODEX, an international food safety standards group that is part of the World Health Organization, issued a report (http://www.usarice.com/doclib/188/6255.pdf) that shows U.S. rice has the lowest inorganic arsenic level of all rice surveyed.

The bottom line is that rice is a nutritious food and an important part of a healthy diet.

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o **Eliminating rice from the diet does not eliminate exposure to arsenic in the diet. In fact, 42 percent of the inorganic arsenic exposure for consumers comes through vegetables and fruits/fruit juices.**

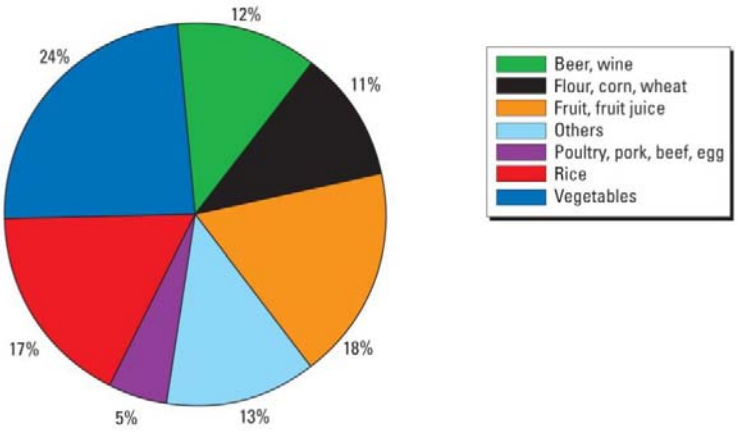

Figure 5. Contributions of iAs intake by foods.

Source: *Probabilistic Modeling of Dietary Arsenic Exposure and Dose and Evaluation with 2003-2004 NHANES Data*, U.S. Environmental Protection Agency (EPA), March 2010, Xue et al.

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RICE RESEARCH STATION 1909-2009

Focus

Jennifer Dartez

Jennifer Dartez, research farm assistant, has been working at the Rice Research Station for more than 10 years.

“I started in June 2002 right after I graduated from Crowley High School,” she said.

She had worked at the station during summers, helping in the entomology lab with rice water weevil research.

Dartez said she enjoys her job in the tissue culture lab because of its varied job responsibilities.

“I’m always doing something different,” she said while cleaning young rice plants to be used in anther culture propagation. “I’m not stuck behind a desk every day.”

She and her husband Chase, a crane operator, have two sons, Kaden, age 10, and Bennett, age 4.

Her father, Mike Dronet, worked at the station until his retirement a few years ago.

When she’s not at work, Dartez seeks out fast-paced entertainment, especially motorsports. She enjoys 4-wheeling and drag racing. She and her husband have a 2000 Camaro that they race at drag strips.

Her boss, Mona Meche, said Dartez is a model employee. “She’s very efficient and conscientious. She’s a real asset to the lab.”

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