Volume 2 Issue 4 November 1, 2005

RICE RESEARCH STATION NEWS

Effects of Food Limitations on Crawfish Reproduction: A Preliminary Finding

Crawfish culture in the 130,000 acres of ponds in Louisiana utilizes no hatcheries and essentially no formulated feeds. Instead, producers rely on natural reproduction from introduced or indigenous adults, and the nutritional needs of crawfish are met from the natural food chain, fueled by rice plants or other types of vegetation. When crawfish populations are high, food resources can become prematurely depleted, resulting in crawfish broodstock entering summer burrows with low energy reserves. Low energy reserves in pre-reproductive females have been theorized to result in low reproduction, but this has not been clearly demonstrated.

A study was conducted at the Rice Research Station to investigate this potential cause and effect relationship. Mature female red swamp crawfish were collected in June from experimental ponds differing in food resources, and held in the lab in simulated burrows for spawning. Treatments at the time of collection consisted of ponds that were:

(1) depleted of nearly all forage substrates

(2) replete in forage (>1,000 lb/acre dry forage weight)

(3) depleted of forage, but fed with 25% crude protein formulated feed

(4) depleted of forage, but fed whole raw soybeans

Females with young

LSU AgCenter Research & Extension

Southwest Region

The supplemental feeds were offered at 35 lb/acre/day, 5 days/week for 3 weeks prior to collection of crawfish. Crawfish were monitored for reproduction over a 6-month period.

Results are presented in the accompanying table. Small differences in survival of crawfish during the burrow period were observed among the treatments, but there appeared to be a trend of higher survival with the supplemental offerings of feed. With regard to surviving animals, it was highly apparent that limited food resources near the end of the crawfish production season resulted in lower reproductive success (less spawns and fewer offspring). Moreover, short-term feeding with high

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Update on Outcrossing between Clearfield Rice and Red Rice

Recent research conducted by the Rice Research Station and the Department of Agronomy and Environmental Science has shown that hybridization between Clearfield rice and red rice could have a direct impact on the management and long-term success of imazethapyr (Newpath) technology for red rice control. Multiple field tests over the past four years, both in small research plots and commercial fields, have shown consistent results of outcrossing between commercial rice and red rice at rates that vary from less than 1% at some locations to 3% in others. While overlap in flowering time between commercial rice and red rice is an important factor, no other plant traits have shown a consistent relationship to the extent of outcrossing in any given location. Some varieties may outcross to a higher degree than others, but additional research is needed to confirm this result obtained from a single-year study.

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Special Dates of Interest:

Rice Technical Working Group (RTWG)

February 26 — March 1, 2006

The Woodlands, Texas

Rice Research Station Field Day

Thursday, June 29, 2006

Effects of Food Limitations on Crawfish Reproduction: A Preliminary Finding (cont.)

protein/high energy feeds in forage depleted ponds prior to crawfish burrowing seemed to mitigate the food shortages and even increased the spawning rate over those crawfish from ponds rich in forage. There were minimal differences due to feed type.

Although corroboration is needed to further document this apparent cause and effect, these findings suggest the importance of continued work in the area of crawfish nutrition and reproductive outcomes. For animals that will be used as stockers in new ponds, it is also equally important to ascertain whether feeds offer any benefit over an adequate post-stocking period where crawfish might be able to gain sufficient energy reserves in the relatively food-rich environment of a new pond.

Table: Averages for mature female crawfish collected from ponds with various food resources and held in simulated burrows for reproduction. The number of crawfish per treatment was 88.

Treatment	Wt.	Survival	Spawned	No. Offspring	No. Offspring
	(g)	(%)	(%)[1]	(per female)	(per g of female)
Forage Depleted	13.8	65.9	8.6	71	5.0
Forage Replete	26.8	67.0	28.8	225	9.5
Forage Depleted w/ Pellets	17.1	81.9	51.4	157	9.1
Forage Depleted w/Soybeans	18.7	76.1	58.2	160	8.3

[1] As a percentage of surviving crawfish

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Update on Outcrossing between Clearfield Rice and Red Rice (cont.)

Based on this and other research from the Rice Research Station, the following is recommended to reduce the risk of outcrossing and prolong effectiveness of the Clearfield technology:

(1) Apply two-sequential treatments of imazethapyr (Newpath) at recommended rates and timings on Clearfield cultivars to minimize escape of red rice and hybridization with the commercial crop.

(2) Monitor the potential for outcrossing early in the season and physically remove or rogue red rice plants that escaped herbicide treatments.

(3) Apply imazamox (Beyond) herbicide to control large (five-leaf stage or older) red rice plants that escaped prior Newpath applications.

(4) Never plant Clearfield rice in the same field in two consecutive years.

(5) A herbicide with a different mode of action should be applied to control red rice in the alternate year when Clearfield rice is not planted (an example would be Roundup-Ready soybeans).

(6) If no crop is planted following Clearfield rice, the field should be fallow plowed to prevent seed set on any red rice that emerges.

Clearfield rice is an excellent tool to control red rice in commercial rice production and these steps will be critical to prolong the effectiveness of this technology.

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"Multiple field tests over the past four years, both in small research plots and commercial fields, have shown consistent results of outcrossing between commercial rice and red rice at rates that vary from less than 1% at some locations to 3% in others. "

Fungicide Rates and Timings

Fungicide timing and rate trials have been conducted at the LSU AgCenter's Rice Research Station and in grower fields since the early 1970s by Drs. Chuck Rush and Don Lindberg and more recently by Dr. Don Groth. Typically, fungicides were applied to small plots using CO_2 pressurized sprayers, although several aerial trials have also been conducted. Fungicides were applied at various timings including 7 days after panicle differentiation (PD+7), 2-inch boot (B), 50% heading (H), or 5, 10 or 15 days after heading (H+5, H+10, H+15) alone or in combinations. Varieties selected were either susceptible to sheath blight, blast or other diseases and were managed to favor disease (i.e. inoculated, fertilized with high N rates, planted late, and or located where disease pressure was high.). Data collected include disease severity and incidence, lodging, yield and milling.

Several fungicides have been labeled due in part to the work conducted in this program. They include Mertec, Benlate, Beam, Tilt, Rovral, Quadris, Moncut, Gem, Stratego, Quilt, Propamax, and Bumper. Recommended rates, timings and disease control spectrums have been developed and economic returns calculated. Fungicide application technology has also been evaluated (including time of day effects, adjuvants, canopy penetration, and other aspects that affect fungicide performance) and recommendations have been changed to improve efficacy. Just as important, a number of compounds were shown not to have fungicidal activity and were of no benefits to rice growers. Most recently, the importance of applying a fungicide by heading to maximize sheath blight and blast control and yield has been demonstrated. Evaluating new, more effective fungicides and determining their best timing and rate against multiple diseases continues.

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Foundation Seed Availability in 2006

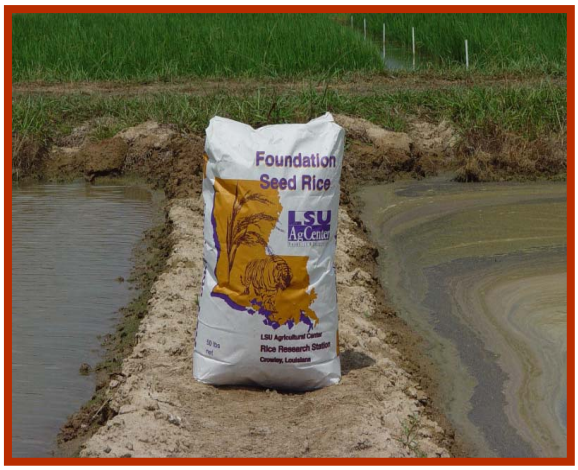
Each year the LSU AgCenter's Rice Research Station produces foundation seed of current rice varieties and makes this seed available to the rice seed industry. This seed is used to produce registered seed, which is then seeded to produce certified seed. Most rice seed planted for commercial production is of the certified class. Stringent field and laboratory standards must be met at each stage of production. This testing is conducted by the Louisiana Department of Agriculture and Forestry. Most of the foundation production is of varieties developed by the Rice Research Station; however, we do regularly produce seed of varieties developed by other state programs when demand exists for such seed.

The cleaning of the 2005 foundation seed crop is now underway. The Rice Research Station will have the estimated amounts of the following varieties available for sale in 2006: Trenasse (1300 cwt.); Cheniere (1200 cwt.); Cocodrie (700 cwt.); and Jupiter (500 cwt.).

Limited amounts of Ecrevisse, Pirogue, Della, and Dellrose will also be available.

Foundation seed is allocated to each rice-producing parish, based on the previous year's rice acreage. The allocation formula was developed in cooperation with the Louisiana Seed Rice Grower's Association a number of years ago.

Tentative allotments will be sent to county agents by mid-November. Please contact your county agent if you are interested in obtaining foundation seed in 2006.



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Ridding Rice of Weevils

The rice water weevil is the most important early-season insect pest of rice in Louisiana. Yield losses from this insect are caused primarily by feeding of larvae on the roots of young rice plants. This insect is a particularly severe pest in southwestern Louisiana, where its population densities are very high and where widely used cultural practices (particularly pinpoint flooding) invite severe infestations of young rice. Yield losses from this insect regularly exceed 20% in small plot experiments at the Rice Research Station.

Over the past several years, the Rice Entomology Program has tested numerous insecticides against the rice water weevil as potential alternatives to currently registered insecticides. A number of seed treatments have been evaluated, and three of them have provided larval control comparable to, or better than, the control given by Icon. These seed treatments have been tested under secrecy agreements, and it is still unclear whether the manufacturers of these products plan to pursue registrations in rice.

"Yield losses from this insect regularly exceed 20% in small plot experiments at the Rice Research Station."

Two granular formulations of insecticides have been tested for weevil control in recent years. One major benefit associated with the use of granular formulations is that they are less likely to drift when applied by air. One of these granular insecticides, Dinotefuran, provided outstanding control of weevil larvae when a pre-flood application was followed by a post-flood application made 6 to 20 days after flooding. Single post-flood applications of this insecticide also reduced larval numbers, showing that this insecticide has some larvacidal activity. This insecticide also appears to be less toxic to crawfish than the pyrethroids, based on preliminary screens conducted in collaboration with Dr. Ray McClain.

Another granular insecticide, etofenprox, has now been tested over two years. 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 Station, but its mediocre performance in these tests was probably related to extremely high weevil pressures in the tests in which it 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 may possibly be available under a Section 18 registration during the 2006 growing season. Etofenprox is toxic to crawfish but, as a granular, is less likely to drift into crawfish ponds when applied to rice fields.

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Potential Rice Varieties of the Future

The Rice Research Station has numerous advanced experimental lines being evaluated as potential future releases. Four of the most promising lines include a conventional semidwarf long-grain, a Clearfield semidwarf long-grain, a short stature Basmati-type aromatic long-grain and a short stature medium-grain.

LA0302082 is a very early maturing, semidwarf long-grain that has consistently outyielded Cocodrie and Cheniere in multi-environment testing. The line is three days earlier than Cocodrie and has displayed very good milling and grain quality characteristics. The line also has excellent resistance to lodging.

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Potential Rice Varieties of the Future (cont.)

LACL003 is a very early, semidwarf Clearfield long-grain that has consistently yielded comparably to Cocodrie and Cheniere in multi-environment testing. The line has excellent head rice yields and good quality characteristics. The line is similar in maturity to CL131.

LA2177 is an early maturing, short stature Basmati-type aromatic line derived from the cross L202/Leah//Toro/3/IR67016. It has the similar slender grain and lengthwise kernel elongation as Dellmati, while has much improved yield potential and lodging resistance. Milling yield is fair but consistent.

LA2125 is an early maturing, short stature, and high-yielding medium-grain experimental line developed from the cross Mercury/Rico 1//Bengal/4/Short Mars/Mars//Mars/3/Bengal. It matures the same as Bengal, and is 1-2 inches taller than Bengal. This line has excellent yield potential and very good milling yield. It has a large, plump grain, which resembles that of Bengal.

These lines are all in early stages of seed increase, and all are excellent candidates for future release.

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Dr. QiRen Chu recently resigned from the rice anther culture/breeding position at the Rice Research Station. During his 13-year tenure at the station, he made numerous contributions to the variety development team including development of an effective anther culture system, which accelerated varietal release, and the development of numerous improved breeding lines. He is currently with RiceTec in Alvin, Texas.

Comings and Goings

Dr. Brooks Blanch joined the Rice Research Station's varietal development team as an assistant professor-research. He recently received his Ph.D. in cotton genetics from the LSU Department of Agronomy and Environmental Management. His duties will involve medium-grain variety development.

Jeff Jackson, farm laborer, recently retired from the station after 25 years of service. We wish Jeff the best in his retirement.

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Focus on Research Associates

Larry White's job as manager of the seed program at the LSU AgCenter's Rice Research Station requires him to tear things apart, then put them back together.

With each harvest of a different rice variety, White and his crew have to disassemble and clean the combine to make sure the next variety harvested is pure. Next, the seed has to be cleaned in a state-of-the-art foundation seed facility containing $2 million worth of machinery. After a variety is cleaned of weed seed, stems and other undesired material, that machinery has to be broken down, cleaned with compressed air and put back together, a procedure that takes three days. The result is a workplace more sanitary than most kitchens.

"We have to do that because we're selling pure seed," White said. "It's all got to be cleaned. Anything that touches the rice, down to the brooms."

Farming comes naturally for White.

"I grew up on a farm next to my grandfather's house," he said.

White, 50, graduated from LSU in 1978 with a degree in agriculture business.

For a couple of years, he farmed with his grandfather, Elzy Faulk, and uncle, Johnny Faulk, near Crowley.

Then a job as research associate opened at the Rice Station to work with Earl Sonnier. After Sonnier retired, White transferred to his current job.

"I do everything from planting it, harvesting it, drying it, cleaning it and selling it," White said.

In December, White starts selling foundation seed to seed growers.

Dr. Steve Linscombe, station director, said White's work is valuable to rice growers.

"Larry's hard work, perseverance and dedication have made the Rice Research Station's Foundation Seed Program an outstanding asset to the rice industry," Linscombe said. "He is dedicated to achieving the highest level of quality and purity for all seed produced from his efforts. He is also always willing to lend a helping hand to all other research projects on the station."

Away from work, White can be found in a deer stand or climbing in the Colorado mountains pursuing elk. He recently returned from a trip to the Rockies with a 4x4 bull elk.

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