

# RICE RESEARCH STATION NEWSLETTER



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## RICE RESEARCH STATION

### Golden Rice Research

The Rice Research Station conducted the world's first field trials of Golden Rice during the 2004 growing season. This research was conducted in cooperation with an international agricultural company, the Rockefeller Foundation, and others. Golden Rice has been genetically enhanced to provide vitamin A. This level of vitamin A comes about through the production of beta-carotene, the source for the gold color in the milled grains.

Golden Rice was developed by two European researchers, Drs. Peter Beyer and Ingo Potrykus, in 1999. In 2001, in a Japanese lab, a gene was inserted into the Cocodrie variety that allows the grain to produce beta-carotene. Since its release in 1998 by the

LSU AgCenter, Cocodrie has been the most widely grown rice variety in the United States.

Several "events" of Cocodrie containing the Golden Rice gene were evaluated in two field trials this summer. The yield and agronomic characteristics of these lines appear very similar to the conventional variety. This is the first step of many that will be necessary to distribute this technology where it will have the most benefits.

It is hoped that Golden Rice will help developing countries around the world alleviate vitamin A deficiency, which can cause a variety of problems, including blindness and a weakened immune system.



Cocodrie with Golden Rice gene above conventional long grain

### Crawfish Production Strategy Determines Harvest Profile

Most crawfish aquaculture occurs either in permanent ponds year after year (under a monoculture strategy) or in rotational ponds where rice and crawfish are grown in sequence (rotational cropping strategy) but usually not in the same physical location each year.

Several pros and cons are associated with each production approach. Among those is the difference in the timing of the harvest. Typical harvest profiles for each scenario are presented in the accompanying chart for commercial production in permanent ponds at the Aquaculture Re-

search Station in Baton Rouge and in rotational ponds at the Rice Research Station.

It should be noted that harvesting was justified as early as November using a monoculture approach in permanent ponds, while harvesting

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#### Special points of interest:

- La. Seed Rice Growers Meeting**, Rice Research Stn. November 17, 2004, 8:30 a.m.
- Seminar on Rice Drying**, Rice Research Station November 30, 2004, 8:30 a.m.
- Rice Outlook Conference**, New Orleans December 5-8, 2004
- La. Crawfish Farmers' Expo**, Acadia Extn. Conf. Ctr. December 9, 2004, 8:00 a.m.

## Crawfish Production (cont.)

was not justified until January in a typical rotational cropping approach.

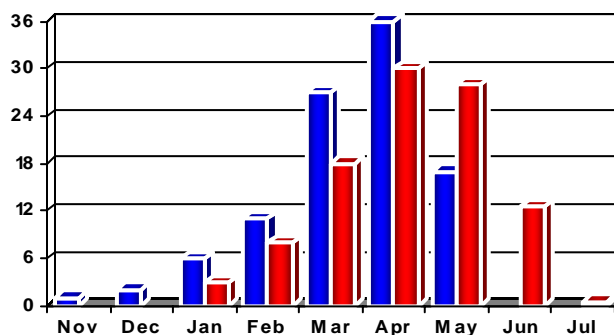
By the end of March, only 29 percent of the annual harvest was realized with rotational ponds, while 47 percent was achieved in the permanent ponds. This is significant because crawfish prices are customarily much higher early in the season and usually drop considerably after Easter. Peak yields for both categories of

ponds occurred in April, and while yields from permanent ponds declined rapidly (in part because of low demand for smaller size crawfish), yields from rotational ponds (producing larger crawfish because of lower densities) continued until July in some years.

This complement of production strategies benefits consumers

by extending the availability of quality crawfish over a longer season and benefits producers by lessening the potential for oversupply in the marketplace while providing unique benefits to the producers of each production approach.

**Chart:** Permanent ponds, blue; Rotational ponds, red. Percent of Total Annual Harvest by Month.



## Crawfish Expo Planned

The first Crawfish Expo is set for Dec. 9 at 8:00 a.m. at the Acadia Extension Conference Center adjacent to the LSU AgCenter's Acadia Parish Extension Service office on Cherokee Drive.

An educational program will start at 10 a.m., followed by a business meeting for the re-organized Crawfish Producers Association. Lunch will be served.

Dr. Ray McClain, aquaculture professor at the LSU AgCenter Rice Research Station, said more than 30 vendors in the crawfish business have reserved booth space.

McClain said several educational programs about raising crawfish also will be presented, but no field tours are planned. The event is similar to a trade show and it's intended for current and potential

crawfish producers and associated agribusiness representatives, McClain said.



The Crawfish Expo is set for Dec. 9, 2004, and will include educational programs and a trade show.

## Foundation Seed Rice Program

The Foundation Seed Rice Program began in 1949 to maintain the genetic purity of rice seed.

The program based at the Rice Research Station ensures that farmers get the benefit of years of dedicated work by rice breeders to develop a variety.

In its 55-year existence, the program has allocated 145,000 hundredweight of seed representing 34 rice varieties, according to the program's manager, Larry White.

This year, the program had 65 acres with six established varieties of foundation seed and

three potential new varieties.

The process starts with headrow seed grown at the Rice Station or at the Station's winter nursery in Puerto Rico. This seed is planted to produce breeder seed. The breeder seed is planted to produce foundation seed. This is the planting stock

from which registered and certified seed are produced. Foundation seed is the first generation from breeder seed that has been released for commercial use.

Weeds, red rice, and off-type rice plants that aren't uniform in size or

## Foundation Seed Rice Program (cont.)

appearance, are removed by rogues who walk the fields at least three times between heading and harvest.

After harvest, the seed is cleaned and precise machinery removes any foreign matter, including broken or misshapened kernels, straw, and weed seeds. A dryer system with eight bins, each

21 feet in diameter, and a processing facility were built at the Station in 1996. "It was designed and built for ease of cleanup, to avoid contamination," White said.

All trucks, equipment and storage facilities are cleaned to reduce the chance of contamination by mechanical mixtures and noxious weeds.

The State Department of Agriculture and Forestry inspects seed rice fields. The agency also samples bagged rice to verify purity and germination.

Distribution of pedigreed rice seed produced by the Station is determined by a formula established by the Louisiana Seed Rice Growers Association.



## Soybeans - An Important Rotational Crop for Rice

Soybeans are an important rotational crop for rice, and soybean research at the Rice Research Station focuses on developing management strategies to optimize yield and economic returns for producers in southwest Louisiana.

The Station is responsible for one location of the statewide soybean variety trial, which is essential for producers in determining which varieties perform best under local environmental conditions.

Other soybean research targets soybean plant populations and tillage systems. In 2003, optimum soybean plant population was 130,000 plants/A. The three varieties

used in the experiment yielded an average of 47 bushels/A when the plant population was 130,000 plants/A.

Tillage systems also influenced soybean production. In research conducted in 2002 and 2003, soybeans grown under a conventional tillage system out-performed soybeans grown in a fall stale seedbed system or in a no-till system following wheat.

Valor herbicide is labeled as a pre-emergence herbicide for soybeans, and the LSU AgCenter recommends application at 2 to 3 ounces/A. Research has evaluated Valor as a component of weed control programs in conventional

tillage, Roundup Ready soybeans. Control of redweed, alligatorweed, and annual grasses was excellent 2 weeks following Roundup Weathermax application. When environmental conditions prevent timely application of Roundup, Valor could provide flexibility for weed control in soybeans by allowing a broader window for postemergence applications of Roundup.

The Rice Research Station focuses on developing optimum management strategies for soybeans.



## Research Grants Support Work on Station

Two grants (from the Rice Foundation and the USDA) will help support ongoing research at the Rice Research Station.

LSU AgCenter faculty obtained the grants totaling \$140,000 to study the use of DNA markers to identify

good milling qualities in breeding lines and resistance to sheath blight.

Typically, evaluations for both of these traits need large quantities of seed, but large amounts of seeds are not available until later generations. This

means that breeders have to carry along many lines for several years to have a chance of having the trait in later generations.

The DNA technology allows identification of important traits earlier in the development process.

Early positive identification of desired traits will allow fewer lines to be advanced and ensure that the traits are present in these lines. This technology will also allow crossing in earlier generations to combine several traits into a commercially acceptable line in less time.

## Choosing Rice Varieties for 2005

The predominant rice varieties grown by Louisiana rice producers in 2004 were Cocodrie, CL161, Cypress, and Cheniere, which accounted for 49, 22, 16, and 11 percent of Louisiana's long-grain rice acreage, respectively. Those varieties should also be grown on a large acreage in 2005.

Each has inherent strengths, as well as some weaknesses. Cocodrie and Cheniere are very high-yielding semidwarf long-grain varieties. Both varieties have good lodging resistance but are susceptible to sheath blight.

Cheniere has better resistance to straighthead disorder. Both varieties generally have good milling yields but neither has the milling stability (at low harvest moisture) shown by Cypress and CL161. Cheniere generally has better grain color and appearance and will probably be favored by millers and processors.

Cypress is also a semidwarf variety but is more

susceptible to lodging than Cocodrie or Cheniere. Cypress also typically yields somewhat lower (on average) but has excellent milling yields even at lower grain harvest moisture. Cypress is also fairly resistant to straighthead but susceptible to sheath blight.

CL161 is a Clearfield variety that can be used in combination with Newpath and Beyond herbicides to control red rice, as well as other weeds. CL161 performs very similar to Cypress in all agronomic aspects.

Cocodrie, Cheniere, Cypress, and CL161 also all have good second crop production potential.

Several RiceTec hybrids were grown on limited acreage in 2004. Those included XL-8, which has very high yield potential and normally acceptable milling. CLXL-8 is very similar to XL-8 but has resistance to Newpath herbicide thus can be used with the Clearfield system.

Other long-grain varieties grown on limited acreage included:

- Jefferson - a very early semidwarf.
- Wells and Francis - both very high-yielding, conventional height varieties.

Two potential new long-grain varieties for 2005 include LA2008 and CL20. LA2008 is a high-yielding, very early semidwarf. This line is similar to Jefferson in maturity and has good milling quality. CL20 is a Clearfield line that (if released) will be called CL131. Its good yield potential is somewhat higher than CL161. It is also earlier and shorter with better lodging resistance than the predominant Clearfield variety.

On the medium-grain side, Bengal remains the predominant variety. A potential new medium-grain release for 2005 is LA 2183. This line has higher yield potential and much better blast and straighthead resistance.

Cocodrie accounted for 49% of Louisiana's long-grain rice acreage in 2004.



[www.lsuagcenter.com/inst/research/stations/rice/](http://www.lsuagcenter.com/inst/research/stations/rice/)

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## Sheath Blight-Resistant Variety

LSU AgCenter Pathologist Dr. Chuck Rush has been working with Drs. Xueyan Sha and Don Groth at the Rice Research Station to develop a rice variety that strikes a balance between sheath blight resistance and good yield potential.

A plant only has so much energy, and a line that directs its efforts at warding off disease probably won't produce a high yield, Rush explained.

To test for disease resistance, plants are deliberately infected with sheath blight and no fungicides are used. The plants are graded on a scale of 0 to 9 for disease, with the lower ratings indicating the best resistance, Rush said. "We're shooting for a 3 or 4 rating, but it's difficult to get good yield with that."

A variety from Arkansas, Katy, has good sheath blight resistance, with a rating of 6, but its yield was low because of poor tillering, Rush said.

Patience is essential, Rush said. Each year, testing is done with 15,000 to 18,000 progeny rows a year. "We've had one or two lines in the variety track, but they didn't quite make it for one reason or the other."

But, they have come up with a line, currently designated as MCR 02-1534, that may change that pattern. It has the rice varieties Katy, Cypress, and Jasmine 85 in its pedigree, and it has scored a rating of 5 to 6, according to Rush. It also has shown good yield potential in state-wide testing for the past 3 years. The breeding project is evaluating this line for a possible future release.

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