LSU AgCenter
Research · Extension · Teaching

H. Rouse Caffey Rice Research Station News

Volume 18 Issue 4 – November 2021

1909-2021
58 released varieties

Inside This Issue:

Special Dates of Interest:

- Dec. 5-7, 2021 – USA Rice Outlook Conference, New Orleans, LA
- June 29, 2022 – H. Rouse Caffey Rice Research Station Annual Field Day, Crowley, LA

Contact Information:

Dr. Kurt Guidry
Southwest Region Director and Interim Resident Coordinator
H. Rouse Caffey
Rice Research Station
1373 Caffey Road
Rayne, LA 70578
Phone: (337) 788-7531
Fax: (337) 788-7553
https://www.lsuagcenter.com/portals/our_offices/research_stations/rice

Rice Breeding and the Importance of Multi-Location Testing

The development of a new rice variety typically takes 7-8 years, which includes four or more years of testing across locations and years. These multi-location trials are the foundation of any successful breeding program, as it is critical to evaluate the line across the target environments. The LSU AgCenter Rice Breeding Program accomplishes its multi-location trials through the generous support and collaboration of rice producers who allow us to conduct trials on their farms and through collaboration with AgCenter researchers at different research stations. For many years, these multi-location trials consisted of the "Commercial Advanced" test, which was conducted at eight locations and consisted of 60 entries that included released varieties and advanced experimental lines. To increase the number of experimental lines evaluated in multi-location trials, a new breeding stage was initiated in 2018. This test is referred to as the Regional Yield Test and consists of 165 entries tested across five locations. The top lines from the Regional Yield Trial are advanced to the Commercial Advanced test. Although the Commercial Advanced test is planted at eight locations, it is not uncommon that some of these locations do not produce quality data due to poor stands, delayed planting, herbicide drift, bird damage, or excessive disease.

The goal of advanced yield trials is to determine the strengths and weaknesses of a potential variety and to determine whether it should be released and to provide recommendations if it is released. The more environments an experimental line can be tested in the better. Testing in multiple locations is important not only for understanding how a line does across locations, but it is also facilitating the evaluation of the line under different environmental conditions that vary year to year within a given location, such as precipitation, solar radiation, disease, and temperature. In recent years, the only thing that is "normal" about a growing season is that it seems to be completely different than the previous year. This trend complicates the breeding process but can be mitigated by increasing the environments that we evaluate new experimental lines in each year.

Figure 1. Image of the Pre-Commercial Trial planted at Bieber Farms in Mamou, LA.

However, a single program is limited on how many environments it can test in, so collaboration is critical. Starting in 2021, we began a collaborative "Pre-commercial" testing network between the LSU AgCenter and the University of Arkansas Breeding and Agronomy Programs, Nutrien Ag., and Horizon Ag.

Continued on page 2.

This project was partially supported by USDA National Institute of Food and Agriculture and the Louisiana Rice Research Board.

This collaboration allows each organization to test their materials across many more locations with a much wider geography than they can on their own. Another advantage of this testing network is that we can extensively test potential varieties from other programs prior to release to identify how they perform in Louisiana and whether they may be a good fit for Louisiana rice producers. Harrell told participants of the field tours about growing rice using furrow irrigation, a practice that is growing in popularity.

In 2021, the Pre-Commercial test was conducted in 25 experiments across Louisiana, Texas, and Arkansas. It included 20 entries, made up of four entries nominated by each of the participants, plus four commercial checks. The experimental LSU entries included one Clearfield long grain (LA19-2026), two conventional long grains (LA19-2207 and LA19-2212), and one Provisia long grain (PVL03). In addition to being included in the PC test, these experimental lines were also included in the Commercial Advanced test and the Date of Planting test. Across all trials, these lines were compared to each other and commercial checks in over 40 tests and 145 yield plots.

Based on the results of these trials, we are very confident in the release of PVL03 as a significant improvement over PVL01 and PVL02. PVL03 showed very strong yields in 2021 in plot trials and in seed production fields. In addition, PVL03 has a more desirable grain length, significantly improved disease resistance, and very good lodging resistance. PVL03 will be commercially available in 2022.

The Clearfield long grain, LA19-2026, did very well in 2021 and has been selected for release after four years of multi-location testing. It has shown very strong and consistent yields across years, locations, and planting dates. It is on-track for a commercial release in 2024.

The conventional long grain, LA19-2212, has also been selected for release after four years of multi-location testing. It offers significantly improved yields over Cheniere and has been very competitive with the Clearfield varieties. LA19-2212 is very early, with heading date three days earlier than CL111. Seed production of LA19-2212 is underway with a two-acre field planted in Puerto Rico on Sept. 6. It is expected that it will be commercially available for release in 2023. In addition, another conventional long grain, LA20-2126, is planned for release. This line is unique in that it is a high amylose line that is desirable to certain export markets and for parboiling and processed foods. In 2021, it yielded similarly to Cheniere; however, in previous years, it had consistently shown yield advantages over Cheniere. It also is in seed production and has a 2023 commercial release target.

Dr. Adam Famoso – Associate Professor
afamoso@agcenter.lsu.edu

2021 Growing Rice in the Rain – A Challenging Season in Louisiana

Many farmers and others related to rice industry will tell you that when it comes to rice farming, every year it has its challenges. Many farmers have told me that 2021 will go down as one of the most agronomically challenging seasons they ever witnessed in their careers. The simple answer is rain. Rainfall started prior to planting and did not consistently slow down until well after heading.

Figure 1. Flooded field after heavy rain in southwest Louisiana.

Continued on page 3.

The frequent rainfall caused many early-season problems. First and foremost was stand establishment. There was a very short window where the soil was dry enough to plant, which occurred during the early part of March. Most producers in south Louisiana scrambled to plant as much as they could during this brief window. North Louisiana was not as lucky because the rain just fell continuously. Many producers water-planted not knowing if the rain would ever cease. The frequent rainfall events continued causing many of the newly emerged seedlings to become submerged. I received numerous calls during this time asking, "How long can seedling rice stay submerged before dying?" We felt confident that in most situations the seedlings could survive for eight to ten days. In many cases, rice had germinated but not emerged when the rains started again, and the result was a lot of less than adequate stands which had to be replanted.

Figure 2. Flooded roadways due to heavy rain in southwest Louisiana.

Another problem with the early-season rainfall was with preflood nitrogen (N) fertilization. The preflood N fertilizer should be applied on dry ground and then the field should be flooded as quickly as possible to maximize the efficiency of the fertilizer. Wet soil conditions also caused a lot of problems for midseason N applications. In many cases, this was due to the airplanes' inability to use the muddy grass strips to take off or land and, therefore, had to use paved air strips. In many cases, if a producer's field was not near the paved strip, an additional taxi fee was charged. Since producers did not want to pay the additional charge, they often asked, "How long can I wait to apply midseason N before I start to lose yield?"

In Louisiana, we saw an early occurrence and a very high leaf blast incidence in several varieties. The blast pressure was so great that many producers opted to make two fungicide applications for the disease. Luckily, the incidence of rotten neck blast was not as bad as expected in most varieties.

If you couple N fertilizer deficiencies and excessively cloudy weather that came with the rain during the first three-fourths of the season, the result suggested a lower-than-normal yield. Fortunately, the rains started to slow during the beginning of harvest. Dry conditions during harvest reduced rutting fields and aided producers in establishing a ratoon crop. The state average yield has not been determined, but it is expected to be about 6,900 pounds per acre, slightly lower than the record yields that we saw in 2020. Not too bad considering it was one of the most challenging seasons ever!

The ratoon crop in south Louisiana is well underway and most of it looks good! Ratoon yields may give our overall yield a boost when all is said and done this year. We continue to see increased crawfish production acres in south Louisiana. As rice - crawfish rotation continue to expand, some of these ratoon rice acres may go into crawfish production instead of harvest.

With the high fertilizer and input cost we are seeing now, I don't think anyone knows what next year's rice production in Louisiana will look like.

Dr. Ronnie Levy – Rice Specialist
rlevy@agcenter.lsu.edu

Breeding for Low GI Rice: Not Just for Producing More but also Providing the Right Food

Rice is an important food ingredient in many famous traditional Louisiana cuisines, such as jambalaya, gumbo, dirty rice, and etouffee to name a few. Rice consumers who love and enjoy eating rice are avoiding it once they become diabetic. Rice has a high glycemic index (GI) of 73 and that is one of the main reasons for low per capita rice consumption. Both diabetes and obesity are a major problem both in Louisiana and the United States. Louisiana's diabetes mortality rate is the fifth highest in the nation. Diabetes and prediabetes cost an estimated $5.4 billion in Louisiana each year. For obesity, Louisiana ranks among the top 10 states in the United States.

No cure for diabetes currently exists. A diet consisting of low glycemic foods, however, can be used to manage diabetes and stay healthy. A new rice breeding platform is being established to breed for rice with low GI with improving yield. The breeding platform is also directed to unlock new potentials that have not been seen before to enhance food function further to provide a solution to three major problems, nutrition insecurity, diabetes, and obesity. With this platform, the goal is not only about getting higher yields but also providing the right food.

In lowering GI value, our strategy is to induce genetic mutations that change specific chemical properties of carbohydrate in the rice grain to allow the sugars to be absorbed more gradually into the body, rather than absorbed rapidly. More gradual sugar absorption minimizes the blood sugar level spikes. By minimizing spikes in blood sugar and insulin levels, low GI rice is useful, particularly for type 2 diabetes or those at risk of developing it. Low glycemic rice will allow people with diabetes to safely eat rice again. The low glycemic diets will benefit not only diabetic but also non-diabetic people since it increases high-density lipoprotein (HDL) levels that help prevent cardiovascular diseases, reduce serum lipids, increase insulin sensitivity, and improve B-cell functions. In addition, the low glycemic rice can also help regulate hunger compulsion, prevent unnecessary snacking, and reduce excess calorie consumption that are useful in preventing or controlling obesity.

The first low GI rice is available this year. This low GI rice has an average GI of 41± 9, the lowest reported. The GI value was determined in clinical/human trials by a GI certified laboratory using its white (polished) rice following the method in ISO 26642:2010 using 10 human subjects (seven males and three females) from diverse ethnicity and age with a variable body mass index. Louisiana and Illinois rice growers grew the first low glycemic rice this year and are preparing to market it in the Fall under trade names “Parish Rice” and “Cahokia, low GI rice.” This low GI rice has a protein content of 53% more than protein content of long-grain rice cultivars. Its grain appearance, quality, taste, color, and other grain characteristics are indistinguishable from the popular long-grain cultivars, such as Cypress, Cocodrie, and CL151.

Figure 1. Head-row progeny of low GI rice evaluated in 2021.

Figure 2. New advanced lines of low GI rice in the 2021 Preliminary Yield trials.

Continued on page 5.

New low GI lines with higher yield potential are being developed using the grant provided by the LSU Board of Supervisors - LIFT2 (Leverage Innovation for Technology Transfer) program. A total of 16 advanced low glycemic-high protein breeding lines developed by our lab were evaluated in the preliminary yield (PY) tests this year. One of the advanced lines, LGR 20191, has a GI estimate of 42 ± 9 with very promising yield potential. In addition to the advanced lines, 4,000 low GI headrow progeny lines were also evaluated in the field. A total of 35 crosses, 21 crosses for forward breeding and 14 backcrosses for gene introgression, were made. In rapid selections and genetic enhancement, introgressed lines from BC1 - BC3 that reach more than 91% recurrent parental genome recovery threshold will be subjected to the GI verification. The selected lines will be advanced to field evaluations (headrow, PY, and multi-location trials).

Widely available low GI rice cultivars (long- and medium-grain rice) with high yielding potential are needed to increase production efficiency that are important for the growers' profitability. The conservative estimate of market for the low glycemic rice is about $0.35 billion within the U.S., and according to Grand View Res. Inc., the global low GI rice market is estimated to reach $4.6 billion by 2027.

Figure 3. "Parish Rice" one of the brand names of the first low GI rice to be marketed in Fall of 2021.

Dr. Herry Utomo – Professor
hutomo@agcenter.lsu.edu

Insect Management in Row Rice

Water management impacts all aspects of rice production, and insect issues are no exception. Just as with fertilizer and weed control strategies, the increasing prevalence of furrow-irrigated rice (row rice) has raised many questions about how insect management should be approached. The rice water weevil (RWW) is the most damaging insect pest of rice in Louisiana, but as its name implies, it requires water. So, will RWW be a concern in row rice?

Not likely. Research from the St. Joseph Station in northeast Louisiana shows RWW infestations are almost non-existent in a traditional row rice system. A study from Mississippi, however, shows RWW infestations can occur in the bottom portion of the fields if drainage is blocked and water is held. While RWW infestations are greatly reduced in row rice, another weevil has emerged as a growing problem.

Rice billbugs are another member of the Curculionidae family of insects (AKA weevils or snout beetles). These weevils are larger than RWW and light tan in color. Billbug larvae (Fig. 1) are also larger than RWW larvae and more closely resemble white grubs.

Figure 1. Billbug larva at the base of a rice tiller.

Continued on page 6.

Specimens collected from Louisiana have been identified as *Sphenophorus pertinax*, but other species in the genus *Sphenophorus* may also attack rice. Larval feeding occurs inside the root crown and lower stem often resulting in plant death. Feeding cavities are filled with powdery frass. Primary symptoms of billbug infestations are the presence of "whiteheads" similar to those produced by stem borers. Research into impacts of billbugs is only just beginning, but early evidence suggests yield losses could exceed 10% in some cases. Control with insecticidal seed treatments appears to be limited, but foliar applications of Belay have shown promising results in limited research. More information on billbugs is available here.

Additionally, early season pests such as armyworms and chinch bugs may be worsened in row rice as the lack of flood allows infestations to persist later into the season. These infestations are most often sporadic, but widespread outbreaks have occurred with armyworms. Increased problems with soil insects, particularly colaspis, have been reported from Arkansas, but the status of these pests in Louisiana is unclear.

Investigations into the benefits of insecticidal seed treatments in row rice are ongoing. The primary target of these treatments is the RWW, which is not an issue in row rice. Trials from Louisiana saw little benefit from the treatments. The products do control a broader spectrum of pests, however, and are widely recommended for row rice in Arkansas. With so much about potential pest problems in row rice still unknown, insecticidal seed treatments are certainly worth consideration.

Dr. Blake Wilson – Assistant Professor
and Mr. Dennis Burns – Extension Agent
bwilson@agcenter.lsu.edu
dburns@agcenter.lsu.edu

USA Rice Outlook Conference

The USA Rice Outlook Conference will be held December 5-7, 2021

at the Hyatt Regency in New Orleans, LA.

For more information, please visit the conference website

https://www.usarice.com/news-and-events/meetings-events/usa-rice-outlook-conference

or contact Jeanette Davis at 240-682-0059 or by e-mail jdavis@usarice.com.

Focus

Ty Henderson

Though Research Farm Specialist Ty Henderson's current tenure at the H. Rouse Caffey Rice Research Station began in late September 2020, his experiences at the facility—and within the rice industry—go back quite a bit further.

The Iota native is no stranger to the South Louisiana rice industry. Growing up and working on the Henderson family farm primed Ty for two stints at the Rice Research Station. He first worked at the Rice Station while attending Iota High School. As a student worker, he worked in the hybrid breeding lab. After high school, his interests led him to pursue an electrician's license from the Southwest Training Center in Westlake, LA. From there, he earned certifications in electrical work and instrumentation. His formal training earned him an electrician's position working for a natural gas plant in Branch, LA. Then, the Covid-19 pandemic brought an early end to his tenure there. That's when he returned to the Rice Station breeding lab to fill a temporary position. Shortly thereafter, he was hired to his current position as a research farm specialist.

His position offers Ty the flexibility of working both in the Foundation Seed Production facility and throughout the research farm, depending on the season. In October, Ty and his colleagues find themselves busy drying, cleaning, processing, and packaging the year's rice seed bounty. He said he has learned the intricacies of the foundation seed program.

"I had not realized how in-depth the seed production was," he said. "In the seed program, it is pretty interesting to see everything that goes into keeping the quality as pure as possible--how clean everything needs to be out in the field and after the harvest."

"It's pretty rewarding to see the seed go from an idea to an actual product," he said about serving in his vital role within the foundation seed program. "It's pretty cool seeing it going from a small plant in the greenhouse to stacks and stacks of sacks."

When not packaging rice seed or harrowing rice fields at the station, Ty has plenty to keep himself busy. He runs his own landscaping and lawncare business with aspirations of starting an ornamental and vegetable plant nursery to accompany it in the future. He also serves in his local community as president of the Iota-Egan Lions Club, a volunteer with the Iota Volunteer Fire Department, and a member of the Knights of Columbus.

"He's a valuable asset to our farm crew program," said Brent Theunissen, HRCRRS research farm manager. "He's a young guy who brings with him a farming background. He filled a big void in our program left open by some recent retirements."

Ty and his wife Morgan are raising their daughter Amelia in a what sounds like a perfect picture of rural life on their seven-acre farm alongside sheep, rabbits, and chickens. "Our little homestead keeps us busy," he said.

Mr. Derek Albert – Assistant Communications Specialist
dalbert@agcenter.lsu.edu

Focus

Jennie Gary

Upon entering the main lobby of the H. Rouse Caffey Rice Research Station, visitors are greeted with a smile from Administrative Coordinator Jennie Gary, the newest addition to the facility's administrative staff.

The array of tasks that Jennie engages in to keep the station running smoothly includes such broad duties as management, maintenance, and inventory but get as specific as maintaining employee safety training certifications.

"In the daily business of running an office, there are so many things," she said about describing her varied duties.

Jennie's warm, sociable demeanor is an asset to her position as she often greets visitors to the Rice Research Station. She said even though she is a new face to those who use the Research Station for its varied resources, she doesn't feel like a stranger to them. "They are all very down-to-Earth and friendly," she said. "Whether they have met you before or not, they come in with a smile and are very welcoming."

"We are excited to have Jennie working with us," said Carol LeDoux, administrative program specialist. "She's cheerful and a very hard worker and will be an asset to the HRC Rice Research Station."

Jennie said of her brief time she has worked at the Rice Research Station she has learned about different aspects of the operation, but she says she'd like to learn more about the facility's laboratories. "I find that so interesting—the experimentation of everything."

As a native of Acadia Parish, Jennie says she has always been interested by the abundance of crops that are produced in Cajun Country. That interest in the area's agriculture is what she says drove her to pursue a position at the H. Rouse Caffey Rice Research Station. "I've always been interested in the harvests in the area because being from Kaplan, and living in the Cove, I'm surrounded by farmers and farmland," she said. "I truly appreciate seeing that we can live off of the land in this area."

Having served in numerous clerical or administrative positions—with 20 years logged in the medical field—Jennie said the Rice Research Station was not her first professional experience working with agricultural commodities. She previously worked with Myriant, a Boston-based biotechnology firm that focuses on the production of biofuels from agricultural feedstocks. "This has been a different step for me going from a medical background to agriculture," she said.

Jennie, her husband Stephen, and children, Ainsley and Ethan, may call Robert's Cove home, but the Gary's enjoy hitting the open road to fulfill their wanderlust across the United States. She said some of their previous family excursions included such destinations as San Francisco, Yosemite National Park, and the Grand Canyon. Next summer, she said the family is expecting to travel to Yellowstone National Park. "Our kids will be graduating, but we still plan on taking family vacations. It's just our thing."

Mr. Derek Albert – Assistant
Communications Specialist
dalbert@agcenter.lsu.edu

Like us on Facebook

The LSU AgCenter H. Rouse Caffey Rice Research Station is on Facebook. The page provides timely updates on research conducted at the station as well as other useful information. The page can be accessed at the link below. Simply go to the page and click on LIKE. Updates will then be posted to your Facebook newsfeed. If you are not currently a user of Facebook, signing up is easy and free.
https://www.facebook.com/LSU-AgCenter-H-Rouse-Caffey-Rice-Research-Station-212812622077680/

LSU AgCenter
Research · Extension · Teaching

Online Store

Visit the LSU AgCenter online store at the following website to purchase our publications or view free ones.
https://store.lsuagcenter.com/default.aspx

This newsletter is produced by Valerie Dartez, Derek Albert, Kurt Guidry, Darlene Regan, and Jennie Gary.