



2022 ANNUAL REPORT

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Checkoff Funds Support Research for Louisiana Rice Farmers

Growers' interests prompt advance of conventional rice varieties



Adam Famoso, LSU AgCenter rice breeder, discusses variety development at a field day at the AgCenter H. Rouse Caffey Research Station. He is standing in front of a plot of PVL03, a new variety. Photo by Olivia McClure.

By Derek Albert

While Clearfield variety development had been a major focus of the LSU AgCenter rice breeding program over the past 15 years, for the last three to four years the emphasis on conventional lines has greatly increased based on growers' needs.

The latest Clearfield release from the AgCenter breeding program is CLL17. The long-grain Clearfield variety was grown commercially on significant acreage for the first time in 2021, rice breeder Adam Famoso said, and yield data are showing positive results from the variety.

"The overall feedback we are getting is positive in terms of yields," Famoso said. "It's milling well. Agronomically, it's pretty similar to our other varieties. We have seen the yield of CLL17 drop off in our breeding trials when it was planted later than the recommended planting window."

CLL17 is the latest variety to feature the pita blast resistance gene, which Famoso said is the best blast-resistance gene available among commercially released varieties.

The evolution of CLL17 from development to release started with preliminary yield trials in 2015, leading to multiple location trials the following year and seed production in 2019. The expansion of CLL17 as a leading variety planted among rice fields in the state is a testament to the increased yield.

PVL03, a Provisia line, will be available commercially within the next year, Famoso said. The variety was in seed production fields in Louisiana, Texas and Missouri. Yield trials indicate that PVL03 is producing competitively with other varieties, including Clearfield and conventional breeding lines.

"PVL03 has done really well in the seed fields—better than we could have hoped," he said. "We're continually

New faculty, ratoon crop highlights of growing year

The 2021 growing season has seen a variety of challenges and successes. Each year we are faced with a variety of obstacles, and this past year was no exception. It all started with an extremely cold and wet spring that got our crop to a slow start and, ultimately, delayed our harvest. Our crop yield numbers were lower than expected in much of the state, but our milling quality ended stronger than expected. Our ratoon crop has been a pleasant surprise to growers this year with strong yields for many producers.

Our Rice Research Field Day at the AgCenter H. Rouse Caffey Rice Research Station was back in person this year. It was a great opportunity for us as producers to network with our peers and review the great work the scientists are getting done on our behalf at the station and its affiliated locations on a variety of producer issues and topics. The rice verification program was another success as it implemented AgCenter best management practices for rice in fields across the state. This program has also educated growers and agents alike on industry changes and production challenges. On field tours we were excited to be able to see many of the new varieties ready for release as well as those in the pipeline for future releases. Many the new technological advances were presented in the field and displayed at the many booths available for growers to visit after the tours.

With every season we face changes, and our research station is also having several staff changes taking place. However, there are some great new faculty coming aboard in 2022 to fill these positions and move our station up to the next level.

Each year your Louisiana Rice Research Board works hard with scientists to provide the most relevant and important rice research with the funds you provide through the checkoff program. Our funding has diminished this year with collections and funding receipts from the Colombia tariff rate quota. Your board has had to make some tough funding priority choices to keep our producers' best interests in mind.

I would be remiss if I did not recognize the loss of two rice industry icons this past year, Linda Zaunbrecher and John Denison. They both worked to promote and advocate for the rice industry, serving on many committees with the Louisiana Farm Bureau Federation, Louisiana Rice Research Board and USA Rice Federation. Their contributions have left a legacy for generations to come. The Louisiana rice industry will forever be grateful for their service.

As we look forward, I hope we have weather that cooperates for all and affordable products available for each of us to have a bountiful rice crop in 2022.

**Richard Fontenot, Chairman
Louisiana Rice Research Board**



The Louisiana Rice Research Board decides how farmers' checkoff funds will be spent on research to help rice farmers. Board members, from left to right on the bottom row, are Lester Cannon, Louisiana Department of Agriculture and Forestry; John Earles; Richard Fontenot, chairman; John Denison, secretary and treasurer; and Damian Bollich. On the top row, from left to right, are Eric Savant, Sammy Noel, Jeffery Sylvester, Kim Frey, Alan Lawson, David LaCour and Jeremy Leonards. Not pictured are Jude Doise, Jason Waller and Dane Hebert.

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Rain-soaked season yielded positive results

By Derek Albert

Although Mother Nature dealt Louisiana rice producers some extremes — a late-February freeze and a rain-delayed planting season — the crop year yielded decent results across the state.

Louisiana rice producers planted about 411,700 acres of rice in 2021, according to preliminary reports, down from the 475,900 acres planted in 2020. The decrease in acreage is due largely to the increased price of soybeans, corn and other crops and constant spring precipitation that discouraged planting in some areas across the state, rice specialists said.

Jeremy Hebert, Acadia Parish extension agent, said it was a challenging year for rice growers. Acadia Parish producers cropped about 84,300 acres of rice in 2021, which marked about a 1,300-acre decrease from 2020.

“We had a lot of cloudy weather and more rainfall than normal,” Hebert said of early 2021. “It was a challenging year to get the rice up and growing.”

Hebert said Acadiana rice growers began their planting season a little later than most would like because of early spring rains. The consistent precipitation through spring also disrupted the timing of fertilizer and herbicide applications. He said the constant rain created problems with aerial applications of vital chemicals because air strips did not have ample time to dry.

Disease pressures also seemed mild compared to previous years, Hebert noted. That was until panicle blight and rot-neck blast propagated in some of the later-planted rice fields.

“The diseases we didn’t see early on definitely caught up with us on the later-planted fields,” Hebert said.

Mild early summer temperatures did offer a silver lining for the growing season, Hebert said.

“Whenever the rice was flowering, it wasn’t super hot,” Hebert said. “That can disrupt the pollination. We didn’t see that this year.”

The harvest brought lower yields than expected for some farmers. Hebert said the yield increase from PVL02 was absent, contributing to barrel yields that averaged around the low-to-mid 40s.

“The yields were all over the board,” Hebert said of the Acadia Parish harvest. “Overall, we will be down several barrels over last year.”

In Calcasieu, Cameron and Jefferson Davis parishes, producers were still reeling from the tumultuous 2020 hurricane season when it came time to prepare their fields for planting, said Jimmy Meaux, extension agent for those parishes. Farmers clearing debris and fallen trees were then hit with the late-February freeze that further delayed the planting season.

“We didn’t get the early start planting rice,” Meaux recalled of early 2021. “It seems like after most of them finished planting the rains started coming.”

Meaux said most farmers in his area saw unusually wet spring weather. Some near Lake Charles tallied 15 inches of rain in May. The persistent cloud cover and rainfall may have dampened the area’s harvest yields.

“It wasn’t a super year, but, overall, it turned out to be a decent year,” Meaux said.

Extension agent Todd Fontenot, who serves in Evangeline and Allen parishes, said the hard freeze in February may have actually helped lessen some pest and weed pressures in rice fields in his area.

“It looks like the freeze may have reduced some pest populations — particularly stink bugs,” Fontenot recalled. “It may have had some effect on disease pressure with some over-wintering disease pathogens. And it slowed down some weed growth in the spring.”

The persistently cool, cloudy and wet spring and early summer weather forced some producers to change plans for planting from drill-seeding to water-planting when they realized the rains would not relent. Fontenot said that considering the weather-related stressors that plagued growers during the growing season, he and some producers were pleasantly surprised at yield data.

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Adam Famoso, LSU AgCenter rice breeder, checks the progress of a rice plant that has been used to make a cross in a greenhouse at the AgCenter H. Rouse Caffey Rice Research Station. Seed from the cross will be grown, and the DNA from the plant's tissue will be tested to determine if the new line of rice has the desired traits. Photo by Bruce Schultz.

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closing the gap between the yield potential of the Provisia lines versus all the others.”

The positive seed production results indicate the variety will replace PVL02, the previous Provisia variety that was commercially released.

“It shows good yield advantage and much better disease resistance,” Famoso said, comparing PVL03 to its Provisia predecessors. “It has the pita blast resistance. It has a longer grain. It’s a sturdier plant that is much less prone to lodging.”

Louisiana rice growers have expressed interest into the AgCenter’s conventional rice varieties, which has prompted rice breeding researchers to shift some of their focus to examining more traditional lines.

“There is more and more demand for our conventional lines,” Famoso said. “Conventional lines are now a much more prevalent component of our program compared to a few years ago.”

Of the conventional lines being studied, Famoso said three have advanced to seed production. LA2126 may soon be marketed for uses that require high amylose varieties, such as for parboiling and packaging in processed meals and for specific export markets that prefer nonsticky rice. That variety fits characteristics that are preferred in Mexico and other Latin American markets.

LA2126 “has performed consistently equal to or better than Cheniere over the years,” Famoso said. “It offers us this unique cooking property in that it will be high amylose. We’re releasing this with the idea that is will be for specific markets and specific applications.”

Famoso said the Mars Corporation, the parent company of Ben’s Original (formerly Uncle Ben’s), has provided very favorable feedback in LA 2126 as a fit for their rice products.

LA2212, another conventional long grain variety, has shown high yields across the board, but this line has



While Clearfield variety development had been a major focus of the LSU AgCenter rice breeding program over the past 15 years, the emphasis is now on conventional lines. LSU AgCenter file photo by Bruce Schultz.

proven favorable to growers for its timing of maturity.

“It matures four or five days earlier than any of our other varieties on the market,” he said.

The LA2212 line is a short plant that is less susceptible to lodging to its taller counterparts. Adding that attribute to its package of favorable characteristics

prompted the breeding program to advance the line into seed production in Puerto Rico. The seed, to be harvested from Puerto Rico in January 2022, will then be released for increased seed production prior to its commercial market debut.

“It should be available by 2023 on a commercial basis,” he said.

Researchers study furrow-irrigated rice

By Derek Albert

LSU AgCenter researchers continue to study the benefits and challenges posed by the alternative rice growing method of planting rice on furrow-irrigated rows.

AgCenter extension rice specialist Ronnie Levy said in 2020 Louisiana rice growers produced about 480,000 acres of rice — 35,000 acres of which were grown on rows. While row rice tallied about 7.5% of the state’s total rice acreage, the burgeoning method constitutes about 30% of rice acreage in the northeast Louisiana region. For the 2021 growing season, researchers are seeing a 50% to 60% decline in those acreage numbers due to a delayed planting season caused by early precipitation and because of the market price of other commodities, such as soybeans and corn, competing for acreage across the state.

“The No. 1 invasive weed in row rice is \$14 soybeans,” Donnie Miller, LSU AgCenter weed scientist, said.

Growing rice on rows aids farmers by allowing flexibility when choosing what to plant based on commodity market prices.

“The reason we plant row rice is because it makes you prepared to produce either rice, soybeans, corn or whatever is most profitable,” Levy said. “For some producers, it just made sense to make the switch to soybeans, especially in the northeast part of the state.”

Planting row rice was also hindered this year by early spring rains because planting rice on rows requires drill seeding, Levy explained.

Levy said the key to seeing the benefits of growing rice on furrow-irrigated rows is proper timing.

“You have to do everything on time,” Levy said. “If you get behind on fertility or weed control you never catch up. Timing is critical.”

Though most of the state’s row rice is grown in northeast Louisiana, agronomist Dustin Harrell, resident coordinator of LSU AgCenter’s H. Rouse Caffey Rice Research Station in Crowley, is conducting field trials of row rice on silt loam soil, which is found predominantly in south Louisiana. At the Northeast Research Station, heavy clay soils are dominant.



Researchers are testing nitrogen application timing on furrow-irrigated rice at the LSU AgCenter Northeast Research Station. LSU AgCenter photo.

Of the many benefits of row rice is a reduction in water usage during the growing season. Harrell said some row rice growers have attested to using as much as a 35% less water than those who flood their entire crop. The water that irrigates row rice is applied via polypipe. When flooding fields, growers must move soil to make levees to retain the water. With row rice, that practice is not needed.

“One of the big benefits of row rice is farmers make fewer trips across the fields,” Harrell said. “So, we’re saving money on labor and diesel costs.”

Row rice does present some challenges for researchers. Disease-causing fungi, nitrogen intake losses and weed control are some of the hurdles that Harrell and other researchers are looking to clear. Flooding rice fields diminishes the spread of weeds, but growing row rice opens the door for nuisance vegetation. Row rice is also more susceptible to the plant pathogenic fungus known as blast because of

changing water levels within the fields.

“When you grow rice in upland conditions, you make it susceptible to blast,” Harrell said. “It’s very important that we use rice varieties and rice hybrids that have good blast resistance if you’re going to grow furrow-irrigated rice.”

Nitrogen-use efficiency is much lower in furrow-irrigated rice than is traditional rice fields. Harrell said the fluctuations from dry to wet conditions causes an increase in nitrogen-loss mechanisms. Research is currently being conducted to determine how much more nitrogen is needed in furrow-irrigated rice rather than flooded rice.

“We are trying to answer questions like ‘How do we apply nitrogen in furrow-irrigated rice?’” Harrell said. “Do we need to apply it like we do in our flooded fields, or do we need to spoon-feed it? And, if we spoon-feed it, how many applications do we need?”

Water management: Can less mean more?

By V. Todd Miller

With the volume of rainfall Louisiana has received over the course of 2021, rice producers may be forgiven if irrigation practices aren’t top of mind.

However, researchers must think both in the short and long term, so LSU AgCenter soil fertility specialist Manoch Kongchum is studying if large yields can be achieved with less water.

Kongchum is in the midst of a four-year study at the H. Rouse Caffey Rice Research Station that is examining water use and grain yield from four different water management practices: conventional delayed flooding, alternate wetting and drying, semiaerobic, and furrow irrigation, which is also known as row rice.

“Conventional delayed flooding is what most farmers do now,” Kongchum said. “We are trying to find more options if we can to reduce the water use, and that’s the idea of the grant.”

The study, which began in 2017, registered significantly less usage of irrigation water in 2017 and 2019, which saw 31.7 and 41.7 inches of rainfall, respectively, during those years’ growing seasons. The semiaerobic water management practice had the lowest water consumption, reducing water by 37% to 67% over delayed flooding, according to Kongchum. The alternate wetting and drying method reduced water usage by 10% to 50%. Furrow irrigation used more water than alternate wetting and drying because tailwater — water that runs off into the lower end of a field — wasn’t retained as much.

“In my trials, we didn’t see much water conservation with furrow irrigation because there was not enough tailwater saved,” Kongchum said. “By keeping the tailwater in their farms, growers could significantly reduce the amount of water use.”



AgCenter researchers are seeking irrigation alternatives to conventional delayed flooding (seen here) that use less water. LSU AgCenter photo.

Kongchum said that even though grain yield in the alternate wetting and drying management practice was not much different than that of delayed flooding, the practice hasn’t gained popularity in Louisiana as compared to furrow irrigation.

“Alternate wetting and drying is an insurable practice in the United States,” Kongchum said. “For this practice, water should be held the first three weeks after flooding to maximize nitrogen fertilizer efficiency. After that period, water can be allowed to go down until a certain

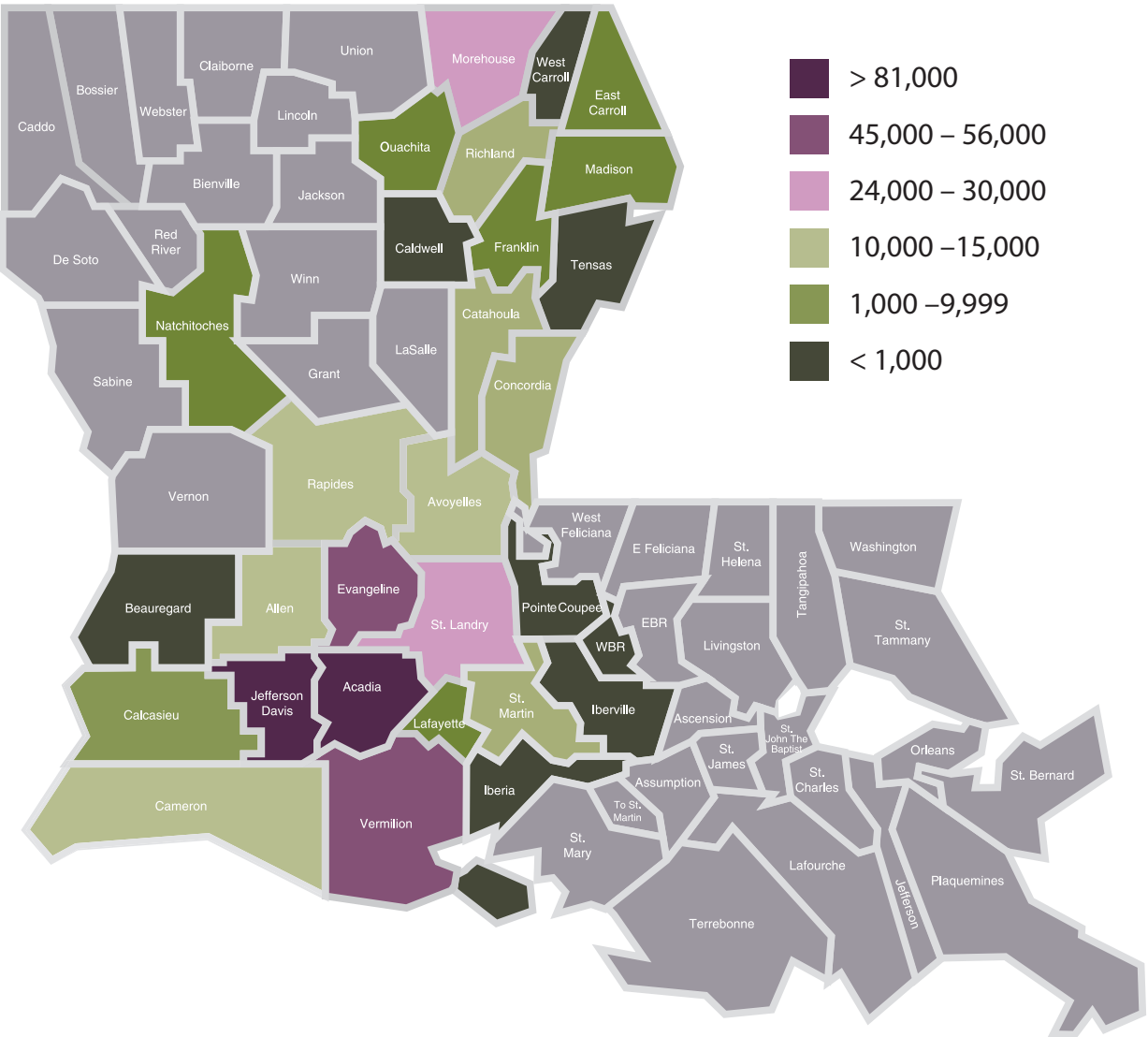
predetermined irrigation trigger point is reached.”

Kongchum said water availability, land preparation and crop rotation patterns all come into play when deciding which water management practice works best in what setting.

“The research is important to understand how to use water and how much producers can save by using less while getting more benefits,” Kongchum said. “Short-term solutions today could affect farming for years to come.”

2021 Louisiana Rice Acreage

by Parish, All Types



Top 10 Rice Parishes

Parish	2021 Total Acreage	2020 Total Acreage
Acadia	84,332	85,710
Jefferson Davis	81,489	81,850
Vermilion	55,562	53,337
Evangeline	46,451	38,131
Morehouse	26,740	50,144
St. Landry	24,774	26,858
Allen	14,500	15,891
Avoyelles	12,046	16,117
Cameron	10,582	12,426
Calcasieu	8,826	8,365

2021 Total: 411,690
2020 Total: 476,497



Louisiana rice producers planted less rice than last year, but overall yields were good. LSU AgCenter photo.

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“Everybody was just worried because of the way the year started and everything the rice went through,” Fontenot recalled. “Farmers were surprised in the end. Our overall yields won’t break records, but there were a lot of surprisingly good yields.”

In northeast Louisiana, rice farmers saw much of the same precipitation events during late winter and early spring that delayed planting. Dennis Burns, Tensas Parish extension agent, said there was another anomaly that triggered a drastic decrease in rice acreage over the northeast portion of the state — an increase in prices on the soybean market.

“A lot of acreage that is usually planted in rice went to soybeans,” Burns said.

Burns said about 4,000 acres of rice are typically planted in Tensas Parish. However, in 2021, farmers only planted about 650 acres.

Despite the rain-delayed planting, Burns said northeast growers were satisfied with yields across the board, with some fields marking yields of 190 to 200 bushels

“It was overall a fair year — pretty consistent with what we’ve been doing,” Burns said.

Though soybean acreage overshadowed rice for 2021, more farmers in northeast Louisiana have turned to

growing furrow-irrigated rice because of the added flexibility for growing other crops in fallow fields. Since 2017, furrow-irrigated rice acreage has nearly doubled annually in northeast and central Louisiana. Approximately 35,000 acres of furrow-irrigated rice were planted in 2021. Burns said the past two years have produced good results for the burgeoning practice.

“It’s added to the flexibility for us being able to diversify,” Burns said.

Looking toward the 2022 growing season, the price of soybeans, along with a projected increase in fertilizer costs, will dictate rice acreage, Burns said.

Plant pathologist studies disease in flooded and row rice

By Kyle Peveto and Johnnie Morgan

Over the past two rice-growing seasons, LSU AgCenter plant pathologist Trey Price has begun to research diseases common to both flooded and upland rice, also known as row rice.

The diseases being researched include sheath blight, kernel smut, leaf blast and salt toxicity.

To study sheath blight, over the 2020 and 2021 seasons, research plots were established at the AgCenter Macon Ridge Research Station near Winnsboro. Multiple varieties, including Jupiter, CL163, Cheniere, CLL16 and RT7521, were planted and grown under upland and flooded conditions with 14 total trials.

For the study, Cheniere, CLL16 and RT7521 were inoculated with *Rhizoctonia solani* to ensure sheath blight development. The test plots were treated using 11 different fungicide applications, while the control plots were left untreated.

These fungicides were applied on the test plots at these amounts: Amistar Top (12.5 fluid ounces per acre), Elegia (22 fluid ounces per acre), Flint (4 fluid ounces per acre), Quadris (12 fluid ounces per acre), Quilt Xcel (22 fluid ounces per acre), Stratego (5.5 fluid ounces per acre), Sercadis (17.5 fluid ounces per acre), Tilt (8 fluid ounces per acre), Excalia (2.5 fluid ounces per acre), Artisan (40 fluid ounces per acre) and Flint (4 fluid ounces per acre) plus Tilt (8 fluid ounces per acre).

All the tested fungicides resulted in lower sheath blight severity when compared to the nontreated control, Price said. Some fungicides performed better when checked later in the season.

When the plots in flooded conditions were checked in August, all the fungicides except for Quadris significantly reduced sheath blight compared to the control. Later in the study, in September, the plots treated with Elegia, Flint, Sercadis, Excalia and Artisan showed significantly lower sheath blight severity than the control.

All the upland plots treated with fungicide also showed lower sheath blight severity in mid-August. In early September, the plots treated with Elegia, Flint, Stratego, Sercadis, Excalia and Artisan had significantly lower sheath blight than the nontreated control.

For 2022 Price plans to continue to study the fungicide test at Macon Ridge.

During the 2020 and 2021 seasons, Price worked with AgCenter rice breeder Adam Famoso in variety development.

“We’ve managed nine variety trials containing conventional, Clearfield and Provisia lines for the breeding group,” Price said.

Plans are to continue this collaboration in the future.

Over the past two seasons, Price also worked with AgCenter plant geneticist Prasanta Subudhi to test



AgCenter researchers tested certain rice lines for salt damage. The researchers flooded the rice using a well with total salts and chloride levels that are considered extremely high for rice production. Photo by Trey Price.

salt-tolerant lines for salt toxicity at Macon Ridge.

“A site far removed from our traditional rice fields was selected where access to salty well water could be achieved,” Price said.

Total salts in the main irrigation well ranged from 2,100 to 2,700 parts per million with chloride values as high as 550 parts per million — levels that are

considered very high for rice production, Price said.

In 2020, the study focused on six salt-tolerant lines. No foliar symptoms of salt toxicity were observed during the growing season, Price said. In 2021 nine entries were provided for the study, and results are not yet available.

For 2022 Price plans to continue to test the salt-tolerant lines.

Endowment to include rice breeding specialist

By Derek Albert

To retain the personnel and resources required to continue the rich history of rice variety development at the H. Rouse Caffey Rice Research Station, the Louisiana Rice Research Board opted to expand its endowment offerings.

At its semiannual meeting on June 30, the board agreed to establish a new endowed chair specifically for the LSU AgCenter’s rice breeding program at the Rice Research Station.

“The Rice Research Board found that it was in its best interest to enhance our chair by subdividing our funds to recipients of chairs,” said Richard Fontenot, Evangeline Parish rice producer and chairman of the Louisiana Rice Research Board. “We thought it was beneficial for the board to have this opportunity to share the funding with an additional recipient for more specific research as it relates to

rice variety development.”

During the discussion at the June gathering, board members decided to split in half the existing \$3 million endowment — intended for enhancing some of the general operations of the Rice Research Station. Now, both the Rice Research Station and the variety development program will be endowed with \$1.5 million. The funding for both endowments stems from tariff-rate quota payments from the free-trade agreement between the United States and Colombia.

“Rice is one of the crops produced in Louisiana in which the AgCenter has a major investment, in terms of research,” said Mike Salassi, LSU AgCenter program leader for plant and animal sciences. “If you talk to any producer, they’re going to tell you the most important thing in our rice research program is to have a good breeder who can develop improved, high yielding varieties.”

“For sustainability in this sector for generations to come, it is critical we have the varieties that are adaptable for our environments and our economic needs and that satisfy the markets,” Fontenot said. “The only way we can do that is through a vibrant, robust breeding program. This chair provides that.”

The original endowment — the Louisiana Rice Research Board Chair for Excellence in Rice Research — was established to primarily support the operation of the Rice Research Station. The additional endowment further verifies the Louisiana Rice Research Board’s support to the LSU AgCenter.

“Over the years, the Rice Research Board has funded our research and extension work at the AgCenter to increasing degrees over time,” Salassi said. “They have been excellent supporters. We know what their production issues are, and we try to do research to address those issues.”



The rice verification program's success is established through a collaborative effort among producers, extension agents and AgCenter rice specialists. Examining a verification field in Acadia Parish in early June are, from left, Jeremy Hebert, Acadia Parish extension agent; Connor Webster, AgCenter weed research associate; Keith and Jonathon Rockett, of R&Z Farms; and Keith Fontenot, AgCenter extension associate. Photo by Ronnie Levy.

Verification program translates research data into proven results for rice growers



Extension rice specialist Ronnie Levy, left, and Jimmy Meaux, extension agent for Calcasieu, Cameron and Jefferson Davis parishes, examine a rice verification program field in Calcasieu Parish. Photo by Keith Fontenot.

By Derek Albert

The LSU AgCenter Rice Verification Program continues to serve as a conduit for research data from test plots to producers' fields across the state.

"We're verifying research that's being conducted at the Rice Research Station — and off station — to identify best management practices and recommended practices in all aspects of sustainable rice production," said AgCenter rice specialist Ronnie Levy. "The verification program gives us more environments to examine a potential problem and make adjustments in all aspects of crop production."

During the 2021 growing season, Levy and his colleagues examined CLL17 — one of the 57 rice varieties developed by breeders at the H. Rouse Caffey Rice Research Station — following its 2020 release. The variety's rapid release from the breeding program was in part due to its consistent increases in yield data and resistance to blast and other diseases.

"We wanted to monitor CLL17 closely to see if it would do well now that it is in larger acreage," Levy said.

Levy and Keith Fontenot, extension associate at the station, monitor every aspect of the rice production cycle from week to week on the designated fields in the verification program. Applications of fungicide, herbicide and fertilizers and dates of flooding and rainfall rates are recorded and evaluated for sites that dot the map of Louisiana. For 2021, verification fields were in: Acadia, Allen, Calcasieu and Vermilion parishes. Those locations then change for subsequent years due to crop rotation cycles. Following the initial rice harvest for each field, Levy makes visits to the fields every other week for ratoon crop monitoring.

The growing interest in furrow-irrigated rice, especially in northeast and central Louisiana, is on

the drawing board for Levy as more research data is harvested from AgCenter research plots. The practice of growing rice on rows irrigated with poly pipe is expanding as a method of growing the crop with less soil disruption and more flexibility for crop rotation for the producer.

"We're looking at including some row rice in northeast Louisiana," Levy said. "We couldn't do that this year because of heavy spring rains and the higher price of other crops, like soybeans and corn."

The verification program not only aids the growers, but also serves as an educational tool for AgCenter extension agents to expand their knowledge of rice production practices. Dustin Harrell, H. Rouse Caffey Rice Research Station resident coordinator, stressed the importance of the verification program as a learning tool.

"The verification program trains our new rice growers or growers who have been growing rice for only a few years on our best management practices," Harrell said. "It is also a training program for crop consultants, growers, new extension agents. All these groups benefit from this program."

Harrell said the verification program shows those involved what variables come into play during the regular course of a rice growing season.

"Every year has its own challenges," Harrell said. "This year we started the year with a tremendous amount of rainfall. We have our best management practices, but the weather can dictate whether or not they happen."

Harrell said the increases in precipitation caused difficulties in timing for applying fertilizers and herbicides, but he said that was one of the real-world experiences that makes the verification program so vital and so valuable.

"It's all part of the learning process," he said.

Study focuses on narrow brown leaf spot

By Olivia McClure

LSU AgCenter plant pathologist Jonathan Richards is studying ways to control narrow brown leaf spot, a disease that has become more widespread in Louisiana rice in recent years.

“Many popular commercial varieties are susceptible, and yield losses can range from 10% to 40%,” Richards said.

The disease, which causes linear brown lesions on rice plants’ leaves and a netlike pattern on the sheaths, tends to show up late in the growing season.

“It can have a substantial impact on ratoon crops,” Richards said.

He has been studying several facets of the disease and control methods. First, he is working to determine which varieties have resistance traits, and he wants to identify different races of the pathogen that are present in Louisiana and Texas.

Genetic analyses play a large role in this part of the project. With help from AgCenter rice breeder Adam Famoso, Richards is using some high-tech tools to look for genetic markers that indicate resistance to narrow brown leaf spot and that could influence future variety development.

So far, they’ve found a major resistance gene plus two quantitative resistance loci. When combined, these loci — specific points on a chromosome where genes or genetic markers are located — may offer durable resistance.

Technology also can help provide a clearer picture of the genetic diversity of pathogen populations. Richards used whole-genome sequencing to identify evidence of sexual reproduction within pathogen populations as well as gene flow between Louisiana and Texas rice fields. That means new pathogen races may develop quickly and migrate to threaten existing resistance genes, making monitoring efforts all the more important.



LSU AgCenter plant pathologist Jonathan Richards examines rice plants in his lab. Photo by Olivia McClure.

Another aspect of Richards’ work is evaluation of how well fungicides, particularly propiconazole and azoxystrobin, control the disease and the possibility for resistance.

This year, Richards has examined genome sequencing data for numerous isolates of *Cercospora janseana*, the fungal pathogen that causes narrow brown leaf spot. He found a mutation in 75% of

those samples that appears to lead to azoxystrobin resistance, meaning it’s not a viable option for disease control.

Propiconazole still seems to be a good choice for leaf spot management. However, Richards added, “fungicide resistance can develop quickly in fungal pathogen populations, and constant monitoring is required to ensure maintenance of efficacy.”

Big data aims to improve decision making

By Tobie Blanchard

Rice is grown from the ground up, but more and more, advances to grow the crop are happening in the cloud.

LSU AgCenter precision agriculture specialist Luciano Shiratsuchi and AgCenter statistician Thanos Gentimis are working to help rice farmers grow their crop more efficiently using large datasets collected on the ground and from satellites.

Shiratsuchi is using ground truth data — collecting sensor readings from more than 50 rice fields across the state so he can have an initial measurement of what may be inferred from satellites images.

“The satellite is saying I have this much biomass, but we have to have calibration to say, OK, yes, that makes sense,” Shiratsuchi said.

As the crop grows, Shiratsuchi’s sensors can tell him things like leaf area index or canopy temperature for water stress.

“Once you have that, the satellite’s imagery can extrapolate to a bigger area,” he said. “The handheld sensors are collecting data for us the same way the satellites are at the same time.”

He is working on collecting data from not only his sensors, but also from farmers because the more data he can take in, the better his software can become. His plan is to transform that data into models to predict input needs and best production practices for individual fields.

Currently farmers mainly use uniform nitrogen rate applications, but based on results from Shiratsuchi’s research, farmers will be able to use maps to support variable rate applications. Specifically for rice farmers, the data and models generated also can pinpoint timing for applying the first flood.

None of the data he collects is made public. It is only used to make predictive models.

“The idea is to provide farmers with unbiased

precision ag applications,” he said.

He said farmers could use the platform he is developing to draw a boundary, download satellite data for that area and then connect to the server to generate prescription maps.

Some big farms pay for monitoring and data collection, but Shiratsuchi envisions his platform would be available to any farmer interested in using it.

“The intelligence will handle the data, crunch this information and come up with some recommendation. It seems like magic, but it’s not magic,” he said.

If there is any magic, it is in the math, and that is where Gentimis comes in. A mathematician by training, he is working with a large dataset that researchers at the Rice Research Station had been collecting for years. He worked with a graduate student to untangle all the information in it, clean it up and establish protocols for adding to it.

With the clean data, his student was able to look at optimal planting dates for rice.

“The AgCenter comes up with an optimal window for planting, and it’s based on science, but the science was about 20 years old, and things have shifted,” Gentimis said.

Once the dataset was in place, Gentimis said it was easy to search by variety, planting times and locations.

“The information was always there, but it was so broken apart that you couldn’t put it together,” he said.

Combining data collected into something useful to growers is Gentimis’ aim. He said researchers are independently collecting data to answer a specific question, and once that research is done, the data are left. By putting it all together, valuable information may be extracted. And more data may follow.

“When you start publishing the utilization of datasets that already exists, stakeholders will give you more data on the off chance you can find something. That is a pillar of digital ag,” he said.

Gentimis also worked with a graduate student to fly drones over fields to replicate handheld GreenSeeker technology. They were trying to determine if they could use a drone to figure out how much pest pressure was occurring in the field.

The student would take the large image the drone created and use software to create a program that would segment the image.

“If you don’t have an automated system, it is time-consuming work analyzing the photos,” he said.

Gentimis said they encountered a problem in flooded rice fields. The background the water provided in the images made it difficult for the software to see whether one area looked more damaged than others. He said this technology may not work best for rice.

Even with mixed results, the statistician is helping his colleagues explore techniques they don’t normally use.

“A lot of people are trying to get into drones, but they don’t know how to use the output, so I help them extract information and do the appropriate analysis and help teach a lot of the students on how to do the work,” he said.

For Gentimis, digital ag is a huge umbrella. He said no projects are alike, and he is seeing digital agriculture techniques becoming more mainstream.

“It’s already being used by big companies, and they are already creating algorithms to determine the best seed, the best planting time,” he said. “For big applications in Brazil no one does inspection of the field anymore. They all fly drones and use image analysis.”



Producing seed in Puerto Rico's Lajas Valley gives Louisiana rice farmers flexibility in the event of tropical weather damaging seed plots in Louisiana. LSU AgCenter photo.

Puerto Rico experiment station vital to rice breeding project

By Derek Albert

While the U.S. territory of Puerto Rico may be widely known for its sandy beaches, rum distilleries and colonial charisma, few may know of its immeasurable value to the Louisiana rice industry, particularly within the realm of rice variety development.

LSU AgCenter rice breeder Adam Famoso touts the use of the facility at the Lajas Experiment Station, which is part of the University of Puerto Rico-Mayaguez, as a major time-saving component of the variety development program. He said growing rice for seed production there can save two to three years in the release of a new variety as compared to seed production on domestic soil alone.

“The Puerto Rico research station knocks off years of time toward the release of a new variety,” Famoso said. “Almost every variety goes through Puerto Rico.”

The recently released variety PVL03 owes its rapid release to the Puerto Rico research station, he said. Seed from the H. Rouse Caffey Rice Research Station in Crowley, Louisiana, was sent to Puerto Rico three times for further seed production. A new conventional rice variety, LA2212, which is expected to be released in 2023, was recently harvested in Crowley and immediately planted in Puerto Rico on Sept. 10 for seed production.

“Almost every winter we have a large seed production there along with the routine breeding operation,” he said.

Another benefit of producing seed in Puerto Rico’s Lajas Valley is the flexibility of having a contingency

plan in the chance of tropical weather damaging seed plots in Louisiana. Famoso said for the past two years Louisiana has experienced hurricanes or tropical storms at critical times for the harvesting of seed.

“It offers us the flexibility as a backup if something goes wrong,” Famoso said. “You just know if we lose all this stuff, it’s not good, but we can go to Puerto Rico and grow it over the winter. It might delay us a bit in the spring, but it’s not a catastrophe.”

The use of the facility gives the variety development program some risk mitigation benefits as well.

“We will send some seed down there and we’ll send some stuff to the greenhouse,” he said. “We’re not putting all our eggs in either basket.”

The Lajas Valley’s subhumid tropical climate makes for an ideal location for the University of Puerto Rico-Mayaguez Agricultural Experiment Station. The valley is bordered by the Cordillera Central and the Santa Marta hills, which provide rich, fertile soil, and the Boquerón and Guánica bays, which provide adequate shipping channels from the southwest corner of the island territory. The tropical climate allows researchers to plant rice under similar growing conditions year-round, providing time-saving opportunities.

Famoso said he would normally travel to the Lajas Valley about four times annually, but the COVID-19 pandemic has limited travel opportunities. That’s not to say the vital seed production operations are not in good hands.

“There is a longstanding history, and there is a really good crew,” Famoso said. “You can really count on them to get things done. We have a really good team of researchers down there. That’s the really important thing.”

The facility is operated through a cooperative agreement among the University of Puerto Rico and several U.S. universities, including LSU, Mississippi State University, Texas A&M University and the University of Arkansas, as well as the U.S. Department of Agriculture. The funding for the operations that the LSU AgCenter is involved with comes from the Louisiana Rice Research Board checkoff funds. Several private entities, such as RiceTec, Nutrien and HorizonAg, also conduct research in the area. The cooperative agreement allows costs to be dispersed among the separate entities.

“Pretty much everyone working on rice in the southern U.S. has a presence in the Lajas area,” he said.

Another benefit of the facility comes in the form of the island’s political ties to the United States. Stringent regulations restricting the international shipment of rice seed could greatly delay and hamper variety development efforts here stateside, but being that Puerto Rico is a U.S. territory, those delays such as, phytosanitary quarantine, can be avoided.

“It is very difficult to import rice from other countries into the U.S.,” Famoso said. “It’s a very complicated procedure. You can do it for a few lines, but we’re sending thousands and thousands of lines year after year.”

Researchers study ‘new generation’ hybrid varieties

By Derek Albert

An LSU AgCenter geneticist is focused on a new generation of long-grain hybrids for his research at the H. Rouse Caffey Rice Research Station.

James Oard said these new combinations feature such beneficial characteristics as early maturity, decreased susceptibility to lodging and yields that are comparable to some commercial hybrids.

“These hybrids are showing a yield advantage anywhere from 10% to 15% over inbred varieties that we are testing,” he said.

Some of the preliminary yield trials have shown the new generation of hybrids producing 10,000 to 12,000 pounds per acre.

Oard said the majority of the candidate hybrids are early maturing and can play an important role during the active Atlantic hurricane seasons.

Along with striving to attain higher yields, Oard said another major effort is to develop new candidate hybrids that are more tolerant to lodging.

“With the previous combinations, the plants were tall and they tended to lodge,” he said. “This year, we are seeing hybrids more tolerant to lodging, and that is mostly due to the reduced height.”

In addition, some of the new candidate hybrids have smooth leaves, which is beneficial to farmers for ease in harvesting and to millers for ease in processing.

Even with promising results from the new hybrids that are currently being studied, Oard and his team are also looking in other directions to further increase yields for producers.

“With this new generation of parents, we have identified what we think are some elite females that are giving us high yields and tolerance to lodging,” Oard said. “Now, we are looking for new males that will give us that yield kick. This year, we have identified a few that are giving us a yield advantage.”

The search for new vigorous male lines is parallel to the work being done in the hybrid development program.

Though the breeders’ and geneticists’ combined efforts start at the H. Rouse Caffey Rice Research Station, their most valuable data comes from the producers’ fields.

“That’s where the rubber meets the road. That’s the most important data for us,” Oard said.



Jim Oard, LSU AgCenter hybrid rice breeder, walks a through a field of hybrid rice lines. Photo by Bruce Schultz.

The researcher’s endeavor in creating promising hybrid varieties goes beyond Louisiana state lines. The Uniform Regional Nursery, from which hybrid yield data are being collected, is a conglomerate of test trial plots spread across Louisiana and five other states — Texas, Arkansas, California, Missouri and Mississippi.

Oard said it may take another two to three years for the new hybrids to be released commercially as he and his colleagues continue to collect data on the new lines in the multilocation field trials.

“We are still in the early phases of testing,” Oard said of the new hybrids. “We need to feel confident with the data.”

Economist helps farmers make sound business decisions

By Craig Gautreaux

LSU AgCenter researchers help develop new varieties, improve pest management strategies and increase crop yields. These advancements help improve the bottom lines of farmers, but there are other ways to strengthen their finances.

Economists in the Department of Agricultural Economics and Agribusiness help provide timely and relevant tools that producers can use to make sound financial decisions.

“We have designed decision-support tools for growers that allow them to input their own information,” said Michael Deliberto, an assistant professor in the department who specializes in farm management and crop production economics. “They are customizable Excel spreadsheets that can be used to evaluate the potential that changes in price, yield, land rent or input costs may have on their farm’s break-even analysis or cash flow for the upcoming crop year.”

Another way economists can help producers is providing farm policy analysis. Items in the farm bill

can be complex, and economists such as Deliberto can provide clarity on certain issues and program mechanics.

Deliberto provides insight on government support, such as the agriculture risk coverage and the price loss coverage programs for rice and soybeans. This service can help growers to pick the program that is most beneficial for their operation.

Most producers rent the majority of their cropland, and the rental arrangement with the landlord is a major financial decision. Deliberto does work in this area so growers can see the differences in land rental plans.

“There are differing land rental choices for producers,” Deliberto said. “We look at a cash option, input cost sharing and a percentage of crop gross.”

Deliberto said becoming informed on the arrangements can help producers in their negotiations with landlords and see which choice is most favorable to the grower subject to price and yield expectations.

A major cost in rice production is the price of seed. AgCenter economists provide analyses on cost and return looking at the seed options growers have.

“We analyze the cost and return on conventional versus Clearfield versus hybrids,” he said. “This decision can affect the cost of inputs significantly.”

In northeast Louisiana, the practice of growing row rice is increasing. Deliberto is working on estimated production costs of using this cultivation practice, which involves using traditional irrigation practices for crops such as corn or soybeans and involves no levees.

“Much of the information is found on the AgCenter website and is accessible to our producers,” Deliberto said.

Information is also shared with commodity groups, crop specialists and field agents.

Deliberto also produces a monthly crop newsletter that provides insight into trends such as acreage and prices both in Louisiana and nationally. He also does a quarterly policy newsletter focusing on rice issues.

Variety, furrow-irrigated rice studies continue

By Derek Albert

The LSU AgCenter’s efforts to offer best management practices for producing rice start with Dustin Harrell, resident coordinator of the LSU AgCenter H. Rouse Caffey Rice Research Station in Crowley.

Harrell said one of the recurring projects he has undertaken annually is studying the agronomic recommendations of potential varieties released by LSU AgCenter rice breeders. With each release, Harrell and fellow researchers evaluate many aspects of the propagation and growing cycles.

“That answers questions like, at what seeding rate do we need to plant of that particular variety to maximize yields? How much nitrogen do we need to apply to maximize yield without lodging this variety? Under high nitrogen rates are we seeing increased disease pressure?” Harrell said. “There’s a lot of data that we generate as far as knowing more about a variety when it is released from those programs.”

Work continues when it comes to evaluating CLL17, a Clearfield variety that has taken the top spot for rice acreage grown in Louisiana, surpassing CL153. CLL17 was released quickly because of its consistent yield increases and disease resistance over previous varieties. In particular, nitrogen response is being closely examined with CLL17 because that variety seems to need less nitrogen, Harrell said.

“When we test these things, not only do we do it at the rice station, but we do it at multiple locations across the state in farmers’ fields,” Harrell said. “We want to have at least three years of data before we make agronomic recommendations.”

LSU AgCenter rice researchers have reached across state lines for a new program examining agronomic performance in pre-commercial trials. Harrell said facilities in Texas, Arkansas and Louisiana are examining data collected from multiple sites throughout each state.

“We are going to get a lot of good data,” Harrell said. “This is going to help us tremendously because it is going to produce a lot of replicated data each year. We are going to learn a lot more and a lot quicker.”

Furrow-irrigated rice, or row rice, is being explored at several sites in Louisiana. The practice allows for versatility in planting other row crops, such as cotton or soybeans, on fallow rice acreage. Through replicated trials at the H. Rouse Caffey Rice Research Station near Crowley and at the Northeast Research Station in St. Joseph, Harrell and his team are evaluating nitrogen use and response in furrow-irrigated rice versus flooded fields.

“We have several replicated field trials here at the station on a silt loam soil, and we also have the same trials at the St. Joseph station on clay soil,” Harrell said. “That’s going to provide us a tremendous amount of data.”

In those trials, researchers are comparing nitrogen application rates, application timing and methods of nitrogen application that can be directly compared between row rice and the traditional flooded rice fields. Other trials are exploring the use of varied nitrogen sources in the form of enhanced-efficiency



Dustin Harrell, resident coordinator of the LSU AgCenter H. Rouse Caffey Rice Research Station, speaks to attendees of the facility’s 112th annual field day in June 2021. Harrell studies the agronomic recommendations of potential varieties released by LSU AgCenter rice breeders. Photo by Derek Albert.

fertilizers. Researchers are analyzing the crop’s response to urea, urease inhibitors, nitrification inhibitors and combinations of those in row rice because nitrogen loss in row rice is more significant.

“In flooded rice, we know that we really only need the urease inhibitor, but in furrow-irrigated rice you’re in a completely different environment. It’s not always flooded,” Harrell said. “It’s wet. Then, it’s dry, and it’s wet. So that causes a lot more nitrogen loss.”

Harrell also discussed the LSU AgCenter’s work with ratoon crop management.

“We are always trying to make improvements to the ratoon crop because it is very economically important to the producers of southwest Louisiana,” Harrell said.

The station’s ratoon crop trials do come with their own difficulties to undertake because of increased variabilities. For example, the tumultuous 2020 hurricane season caused grain shattering and harvesting difficulties. Harrell said weather is the major culprit for only being able to retrieve ample ratoon crop data approximately every other year.

A new trial that has been prompted by the Biden administration’s focus on climate change is underway at the Rice Research Station. The agronomy program

is working with Manoch Kongchum, LSU AgCenter agronomist, to measure greenhouse gas emissions in rice production. Harrell said soil aeration, which can occur when a field is drained, creates a reduction in greenhouse gases. This research quantifies how much greenhouse gas is reduced using alternate water management practices such as draining events or furrow-irrigated crops.

“We really need some good Louisiana data that quantifies that we can reduce emissions by implementing water management practices,” he said. “There should be some environmental incentive in the future.”

The quantity of arsenic in rice is an issue that has arisen in media reports and has affected consumer opinion. While arsenic is naturally produced in rice because it is grown in flooded conditions, excessive amounts of the element can be harmful when consumed. Harrell said according to Food and Drug Administration data collected this year, the amount of arsenic found in Louisiana-grown rice is below the daily recommended guidelines.

“This is an area where we need to have data to show that rice is a safe and nutritious crop, and the levels of arsenic in the grain are well below current standards,” Harrell said.

Efficacy of Loyant, Gambit top weed research

By Derek Albert

Weed scientists with the LSU AgCenter are focusing on a pair of herbicides as promising products to control broadleaf weeds and sedge in rice fields.

AgCenter research associate Connor Webster said the two products, Loyant and Gambit, are known for their broad-spectrum weed control characteristics.

They are being put to the test with application timing trials. Researchers are exploring the herbicides’ efficacies when they are applied before the seeding flood, after the flood directly on the seed and on the one-leaf pegging rice timing.

“Putting out the herbicides directly on germinating seed on the ground in water-seeded rice tends to be pretty injurious,” he said. “Less injury is observed when the rice begins to root and put out a true leaf at the time of application.”

Different application methods are also being tested with the two herbicides. Webster said surface coating Loyant on urea while the fields are flooded have produced some positive results in controlling duckweed emergence.

“When we drop it in the water, we’re getting a pretty lengthy residual. That was unexpected,” Webster said.

While Loyant and Gambit both have their own stout lists of weed species control, combining the two is showing promising results in field trials.

“The weeds that Gambit seems to be weaker on, Loyant seems to be strong on and vice versa,” Webster said. “They each pick up what the other one misses.”

Gambit is also being studied when applied in a mixture with Stam for control of alligatorweed and several other broadleaf weed species.

Webster and his colleagues are also looking into weed

populations in furrow-irrigated rice. Growing rice in upland conditions introduces johnsongrass and pigweed, which are not usually seen in traditional flooded fields.

“We’re seeing more weed pressure because we don’t have the flood on the field to provide cultural control of weed species,” Webster said. “We are seeing a different spectrum without the flood present. We’re seeing more traditional row crop species.”

He said there are several programs in the works to provide weed control in furrow-irrigated rice, but he recommends residual herbicide products like Facet, Gambit or Sharpen with a late post-emergence application.

“People who are applying a late post-emergence are throwing in Command or Prowl to give some residual control because you don’t have the flood to lock in weed control,” he said.

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Richard Fontenot, right, of the Louisiana Rice Research Board, presents Don Groth, retired LSU AgCenter plant pathologist and director of the H. Rouse Caffey Rice Research Station, a plaque recognizing Groth’s contributions to the rice industry at the station’s 112th annual rice field day on June 30, 2021. Photo by Olivia McClure.



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Another new tool in weed eradication that plant scientists are exploring is RiceTec’s Max-Ace rice — a herbicide-tolerant inbred line that can be paired with Adama’s HighCard herbicide to ward off red rice and other grassy weeds. RiceTec released a limited supply of the seed that Webster said differs from the Provisia system that uses the same herbicide, quizalofop.

“It’s the same herbicide, but it has a safener to protect the rice from injury a little bit more,” Webster said, comparing the Max-Ace and Provisia systems. “Max-Ace seems to not have the same tolerances as the Provisia system does.”

In other studies, researchers are revisiting RiceStar, a post-emergent herbicide used to combat grass weeds following Gowan’s purchase of the label from Bayer. The AgCenter is looking at this product with mixtures of residual herbicides.

Webster said the AgCenter is also studying two yet-to-be-released residual experimental herbicides that may soon be added to a grower’s arsenal.

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For more information on Louisiana
rice production and Rice Research
Board activities, visit this website:
[www.lsuagcenter.com/
topics/crops/rice](http://www.lsuagcenter.com/topics/crops/rice).

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Rice Research Projects for 2022

CONTINUING PROJECTS	
Agricultural Economics and Agribusiness	
Economic Analysis of Rice Production and Farm Management in Louisiana <i>Michael Deliberto</i>	\$30,000
Entomology	
Integrated Management Strategies for Insect Pests of Rice <i>Blake Wilson</i>	\$72,000
Macon Ridge Research Station	
Evaluation of Fungicides on Important Rice Diseases Under Upland (Row Rice) Condition <i>Trey Price</i>	\$35,000
Northeast Research Station	
Yield Evaluation of Commercial-Advanced Testing Program in Northeast Louisiana <i>Dennis Burns</i>	\$15,000

H. Rouse Caffey Rice Research Station	
	\$1,001,301
Applied Molecular Breeding <i>Brijesh Angira</i>	
Multiple Generation Rice Breeding Nursery <i>Adam Famoso</i>	
Development of Superior Rice Varieties for Louisiana <i>Adam Famoso</i>	
Enhancement of Rice Research and Extension Communications <i>Frankie Gould</i>	
Development of Disease Control Practices in Rice	
Rice Management Strategies for Efficient Utilization of Agronomic Inputs and Natural Resources	
Louisiana Rice Research Verification Program <i>Ron Levy</i>	
Rice Grain Quality Enhancement: Characterization of Elite High-Protein Lines and Development of Herbicide-Resistant Rice <i>Ida Wenefrida</i>	

School of Plant, Environmental and Soil Sciences	
Weed Management in Herbicide-Resistant/Tolerant and Conventional Rice	\$133,120
OTHER PROJECTS	
Black Bird Research <i>William Futch</i>	\$20,000
TOTAL	
Total funding for 2021: \$1,306,421	