

Louisiana Rice Research Board ANNUAL REPORT

2019

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Checkoff Funds Support Research for Louisiana Rice Farmers

LSU AgCenter rice breeders work to improve varieties and hybrids



Breeders at the LSU AgCenter H. Rouse Caffey Rice Research Station work continuously to develop new varieties and hybrids.

A significant portion of the research station's mission is to provide farmers with more improved options to consider at planting time.

The hybrid line LAH169 continues to perform well in uniform regional nursery trials in the five southern rice growing states, said Jim Oard, LSU AgCenter hybrid breeder.

"It's consistently performed quite well," Oard said.

In Louisiana, the 2018 yield exceeded 9,000 pounds per acre, but in Arkansas the yield was more than 11,000 pounds.

Oard said this hybrid has good grain quality with low chalk. Because it is early maturing, it will have good ratoon potential, he said. It has good disease resistance, making it attractive to farmers who grow row rice, he said.

Hurricane Maria caused a delay in the 2018 planting of the parents of LAH169, which resulted in an insufficient amount of seed to bring this hybrid to the marketplace. Rogers Leonard, LSU AgCenter associate vice president, said bids for LAH169 will be solicited this spring after more parental seed is obtained from Puerto Rico, which is expected in March.

Work continues on additional hybrid lines. Oard said four new candidate hybrids showed good results in 2018, with competitive yields and good lodging resistance.

"The goal is to move them along as quickly as possible," he said.

Oard said he is also working on developing sheath blight-resistant lines of nonhybrid rice, and five lines will be advanced in 2019 for a preliminary yield trial by LSU AgCenter rice breeder Adam Famoso.

"This is our best-looking material so far, as far as sheath blight tolerance," Oard said. "If they meet our threshold for acceptance, we will use them as crosses for parents."

The next potential Provisia variety, PVL108, was planted on Oct. 2 on a 7-acre field in Puerto Rico for a seed increase. It could be available for a limited commercial release in 2020.

In past years, PVL108 out-yielded PVL01 by 10 percent, according to Famoso. However, this year's yield from PVL108 was the same as PVL01, as PVL01 demonstrated improved yields in 2018 over the previous years.

Across five locations and 10 trials in 2018, the average yield of PVL108 was 7,960 pounds per acre (49 bbls) compared to PVL01 at 7,604 pounds per acre (47 bbls), Famoso said. This is compared to 8,100 and 8,320 pounds per acre for Cheniere and CLI53, respectively, in the same trials.

"Additionally, PVL108 has consistently demonstrated an improved ratoon yield over the last three years, with an average ratoon yield advantage of 20 percent over PVL01," Famoso said.

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TOP RIGHT: The hybrid LAH169 has been developed with an emphasis on quality, with good disease resistance and yields exceeding 9,000 pounds per acre in Louisiana trials. Bids are expected to be solicited this spring with the anticipated production of more parental seed in Puerto Rico. **ABOVE LEFT:** Adam Famoso, LSU AgCenter rice breeder, evaluates lines of rice in small plots at the H. Rouse Caffey Rice Research Station. In addition to developing new varieties of Provisia and Clearfield, Famoso is also working to develop conventional varieties.

Expecting change, we prepare for the future

Change is inevitable in life, and so it is with the Louisiana Rice Research Board.

Gov. John Bel Edwards appointed eight new members to the 15-member board, which consists of 14 producer members and the commissioner of agriculture or his designee.

With that change, board members with a considerable amount of institutional knowledge are no longer serving, but their leadership and service is not lost. Each has offered continued support and insight through these challenging and uncertain times facing our rice industry. I would be remiss if I did not express appreciation to former chairman Jackie Loewer and the other retired board members for their years of sacrifice, dedication and unselfish service to the Louisiana rice industry. They have left the footprints for us to follow as we move our industry forward.

There is a determination and pride with the new board, which was definitely evident as we held our first meeting and began addressing industry issues. The board is made up of producers from around the state representing all rice growing regions and various representative rice groups throughout the state. The board is charged with expending funds collected and entering into contracts with research organizations and agencies related to the production, handling, marketing or utilization of rice for the purposes of research. This is a tremendous fiduciary responsibility that this board does not take lightly. Board members are determined to enhance our rice industry.

The board meets each fall to review and discuss the various ongoing research projects and new proposals to determine the appropriate funding available. It is no small task and typically takes a full day of presentations from scientists, followed by a board discussion to allocate the available funds. The board has limited funding available from checkoff assessments and the Colombian and European tariff-rate quota (TRQ) allocations.

The board cannot spend more money than it receives from either checkoff or any of the TRQ sources. In response to significantly lower income for this funding cycle, the board decided at its November budget meeting to fund a large majority of the continuing projects at a reduced level and to support only four new projects for the coming year. Many worthy projects were considered, but in the end the board had no choice but to live within its means.



The Louisiana Rice Research Board decides how farmers' checkoff funds will be spent on research to help rice farmers. Board members, left to right, bottom row, are Jerry Leonards, Vice Chairman Dane Hebert, Chairman Richard Fontenot, Secretary and Treasurer John Denison, Damian Bollich and Eric Savant; top row, David LaCour, Jude Doise, Alan Lawson, John Earles, Jeffery Sylvester, Kim Frey, Benjamin Rayburn for the Louisiana Department of Agriculture and Forestry and Sammy Noel.

This was a good year for checkoff receipts as we had an increase of approximately \$238,000 over what was projected last year. The increase in the size of the Louisiana rice crop strengthened the checkoff funding for projects this year. This is the core funding for research projects. This year, Louisiana rice producers will be reinvesting \$1.5 million of their checkoff dollars back into rice development to benefit our industry for the generations to come.

Unfortunately, the board faced an unexpected \$890,000 shortfall the previous year from the Colombian Free Trade Agreement (TRQ funds). These funds have historically been used for both research projects and capital improvements at the H. Rouse Caffey Rice Research Station. Because of the decrease in the certificate values of rice sold to Colombia, our revenue has decreased significantly.

The board also reaffirmed the prior commitment of \$1 million from previous budgets to fund an endowed chair to provide endless years of support for rice research at the H. Rouse Caffey Station. The new board members not only supported this effort, they also agreed to contribute an additional \$500,000 of this year's TRQ funds to strengthen the chair. The interest from the endowment will be used to support the work of the talented researchers at the station in perpetuity. A new state-of-the-art milling lab that will be ready for the 2019 rice crop has also been made possible

with these TRQ funds. This will help develop sustainable superior rice varieties that are acceptable to our end users, and it is just one of the many capital improvements the board has supported. This year a spray rig was added, and greenhouse renovations were approved through TRQ funding totaling \$305,000.

The Colombian Free Trade Agreement (TRQ funding) that has generated these funds has been a windfall for rice research, and the board has made sure that this money — as well as your checkoff dollars — has been put to good use. In times of state budgetary restrictions, the Colombian funds have made it possible to make these improvements at the station to continue its prestigious position as the most outstanding rice research facility in the nation.

Our rice industry is not without challenges like those faced by other industries in the state. Fortunately, we have the rice checkoff program, which allows us to reinvest in our future each year to protect and expand our efforts so generations coming behind us will have a vibrant industry. The year 2018 has seen many changes. Your Rice Research Board recognizes these changes and is committed to strengthening our efforts to enhance a program that will be here for generations to come.

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Increases in rice acreage, yields suppress prices

Increased rice acreage and yields in 2018 have suppressed prices, according to an LSU AgCenter economist who says that trend is expected to continue.

“Production was up for all rice by 23 percent,” said Michael Deliberto.

Deliberto said U.S. rice acreage increased by 528,000 acres in 2018, or 22 percent, from 2017, and most of that increase was in Arkansas. Louisiana’s acreage increased by almost 10 percent to 434,123, compared to 391,071 in 2017.

According to the U.S. Department of Agriculture, Louisiana’s average yield in 2017 increased from 6,710 pounds an acre to 7,000 pounds — still below the 7,600-pound record set in 2013.

The USDA statistics show the U.S. average yield was 7,563 pounds, up from 7,507. California also had a slight increase, and the Arkansas yield was roughly the same as 2017. Missouri, Texas and Mississippi had slight decreases.

Deliberto said exports increased by 13 percent from 2017. Part of that increase was two major sales to Iraq.

“But we can’t ignore the facts that a large part of our rice exports go to Latin America,” he said.

Deliberto said potential exists for increased medium-grain sales in the Middle East because of water restrictions in Egypt, a country that has gone from a net rice exporter to a net importer.

The U.S. Department of Agriculture price forecast for long-grain rice is for \$11 a hundredweight (\$17.82 per barrel, or \$4 per bushel). The USDA forecast for



Harvest is underway near Midland at the Thibodeaux Farm. The outlook for rice prices calls for prices to remain low because of high production levels in the U.S.

medium-grain is \$11.10 per hundredweight. Lower prices for U.S. rice make the American commodity more competitive on the global market, he said.

But Deliberto said the demand, even with increased exports, is not enough to offset the large supply.

Besides forecasting the rice market, Deliberto works on several other projects, including one to chart energy costs for drying rice, a budget model for row rice in north Louisiana, and rent and cash flow models.



Student worker Zach Hanks uses a stick to distribute pollen from a male sterile plant onto a recipient plant to make a hybrid. The hybrid breeding project is working to develop commercially available hybrids with improved grain quality.

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The quality of Provisia is excellent, he said.

“Both lines exhibit low chalk and are consistently among the lowest chalk lines compared to all the other varieties on the market,” Famoso said. “Work is also underway for a third generation of Provisia, with the emphasis on increasing yield and blast resistance.”

Famoso said two conventional lines that out-yielded varieties such as CL153, CL111 and Cheniere and produced more than 9,000 pounds per acre will undergo continued statewide testing and initial seed purification in 2019. One of the lines is a cross between Cheniere and Mermentau.

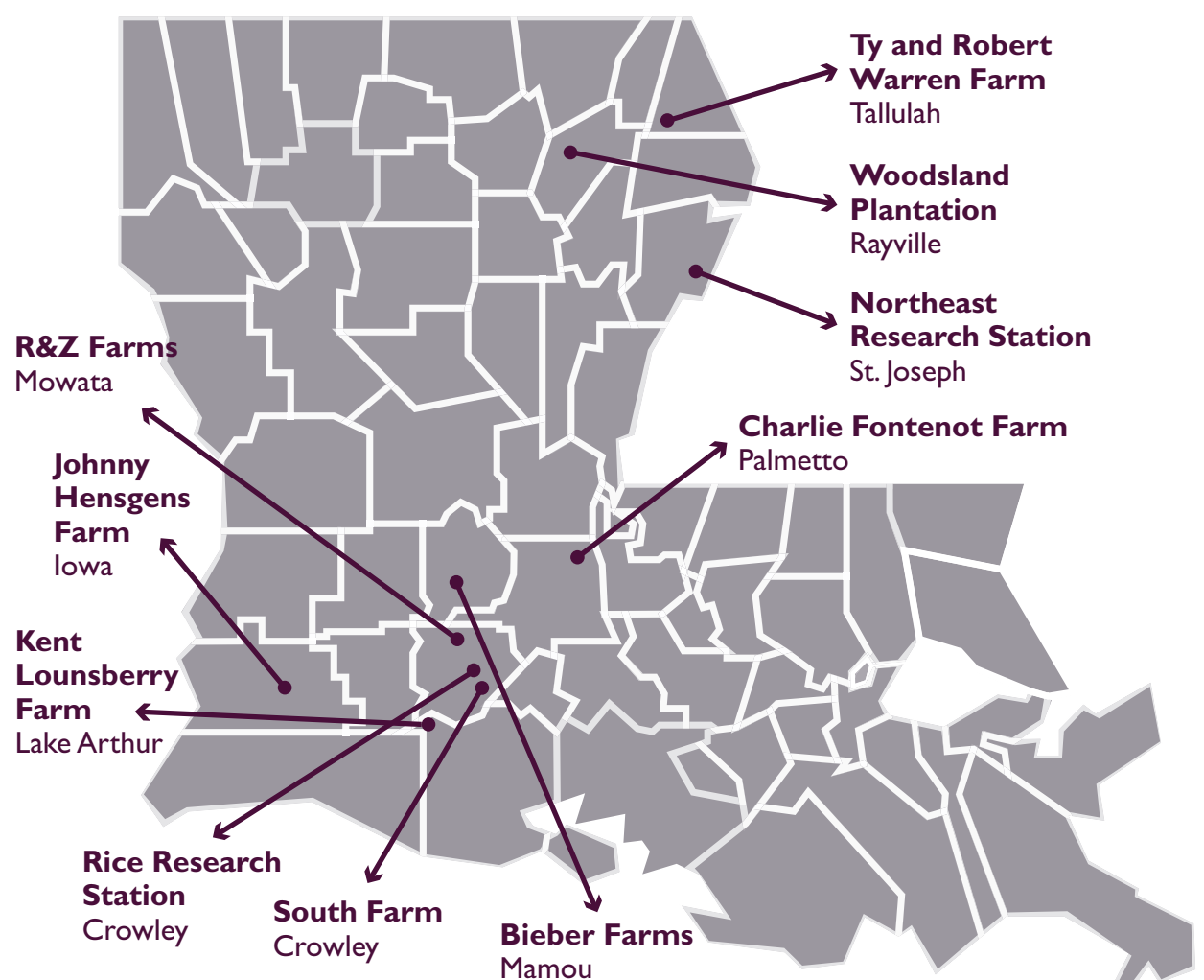
“If they continue to perform as well, it’s very likely they will be candidates for release,” he said.

Two Clearfield long-grain lines were tested for a third year in 2018. Both have good blast resistance, and one could be a candidate for limited release in 2020.

The breeding program has improved its efficiency. In 2018, 42,000 progeny rows were planted, about 40 percent fewer than in previous years, Famoso said.

“We’re reallocating some resources to have more early generation selection at the F2 stage with markers and more yield test plots in multilocation testing,” he said.

Research Trial Locations



Along with the testing plots at the Rice Research Station, yield testing is conducted at eight locations across the state. Advanced yield testing is typically conducted with 60 lines tested at eight locations each year.

In 2018, an additional test, the regional yield test, was added. It includes 150 entries tested across five locations in Louisiana.

“This is a significant increase in the amount of materials tested in multi-location testing, but multilocation testing is critical to getting a good understanding of an experimental line’s potential, and the more lines we test, the more likely we are to find a winner,” Famoso said.



Two combines harvest rice on the Woodsland Plantation near Monroe. The 2018 crop turned out to be above average, exceeding the harvests of the past two years.

After two tough years, 2018 rice crop ‘good but not great’

After two challenging years, most Louisiana rice farmers had a good crop in 2018.

For the first time in three years, Louisiana rice farmers did not have to deal with a tropical weather system.

“Good but not great,” is how Don Groth, resident coordinator of the H. Rouse Caffey Rice Research Station, described the 2018 crop.

Groth anticipates the average yield in Louisiana will exceed 7,000 pounds an acre — less than the record of 7,600 pounds in 2013 but better than the past two years, which were less than 7,000 pounds. An excellent ratoon crop could push the crop to the state’s second-best overall harvest, said Dustin Harrell, the LSU AgCenter rice extension specialist.

Groth said growers benefitted from minimal pest and disease problems.

“I hardly saw any stink bugs this year,” he said.

Harrell expects the state’s rice acreage to be about the same in 2019 but that could change.

“It’s too early to predict anything because the market could change between now and then,” he said.

Northeast Louisiana growers have the flexibility to shift to other commodities if those prices improve, he said, and it’s possible that soybean acreage there could shift to rice if soybean prices remain low. He expects more acreage in northeast Louisiana to be grown in furrow-irrigated rice, which is also called row rice. The amount grown with that practice doubled in the past year.

Keith Fontenot, a research associate with the LSU AgCenter Rice Verification Program, said farmers faced several challenges early in the season with cool weather followed by hot, dry weather.

“They had a little bit of everything thrown at them,” he said. “Overall, I think most producers had good rice crops, and most were happy with the yields they had.”

He said farmers are now looking at cutting expenses without risking production levels.

Producers were generally pleased with the outcome, but they were hoping for better prices.

Crop consultant B.D. Fontenot said rice farmers had a better-than-average crop. He said sheath blight became a problem for some that could not be controlled with Amistar Top fungicide, but an earlier application is probably needed, he said. Insects were not as much of a problem, he said.

“I don’t think the rice acreage is going to change a whole lot next year,” Fontenot said.

Across the state, rice producers saw slight differences in conditions and outcomes.

Acadia Parish

Jeremy Hebert, an LSU AgCenter agent in Acadia Parish, said growers there had a good year.

“It wasn’t a record year,” he said, “but we had some extremely high yields this year.”

Growing conditions were good, and grain quality was very good, Hebert said. Rain and reduced sunshine at pollination didn’t seem to have as much of an effect as expected. Yields were mostly in the upper 40-barrel range (more than 145 bushels or 65 cwt.) with some in the upper 50s (more than 180 bushels or 80 cwt.). He said disease was mild.

“The pressure wasn’t as bad as we thought because we had a lot of rain in June,” he said.

Insect pressure was light, Hebert said, and most growers did not spray for stink bugs.

Second crop reports also were good, he said, with many growers reporting 28 barrels (100 bushels or 45 cwt.).

“There are second-crop fields that look like first-crop fields,” Hebert said.

Rice acreage in Acadia Parish probably will stay about the same, Hebert said, but he expects crawfish acreage to increase in 2019.

“Farmers seem optimistic for next year,” he added.

Jefferson Davis Parish

Frances Guidry, an LSU AgCenter agent in Jefferson Davis Parish, said main crop yields there were mostly in the 40-barrel range, and second-crop yields were around 15 barrels (54 bushels or 24 cwt.).

“It was a good year,” she said. “Better than the past couple of years.”

Vermilion Parish

Andrew Granger, an LSU AgCenter agent in Vermilion Parish, said farmers had an average year overall.

“It’s better than the last two years,” he said.

Some had excellent first crop yields for Vermilion Parish, he said, with a few making over 50 barrels (180 bushels or 81 cwt.).

Fields that could be mowed or rolled after the first harvest were having “decent” second-crop yields 5 to 7 barrels higher, he said.

He agreed that disease and insects were not as much of a problem.

To cut costs, Granger said many farmers have returned to conventional varieties, such as Cheniere and Mermentau, with pinpoint flooding even though the yield might only reach 40 barrels (145 bushels or 65 cwt.).

“They’re trying to make as cheap of a crop as possible,” he said.

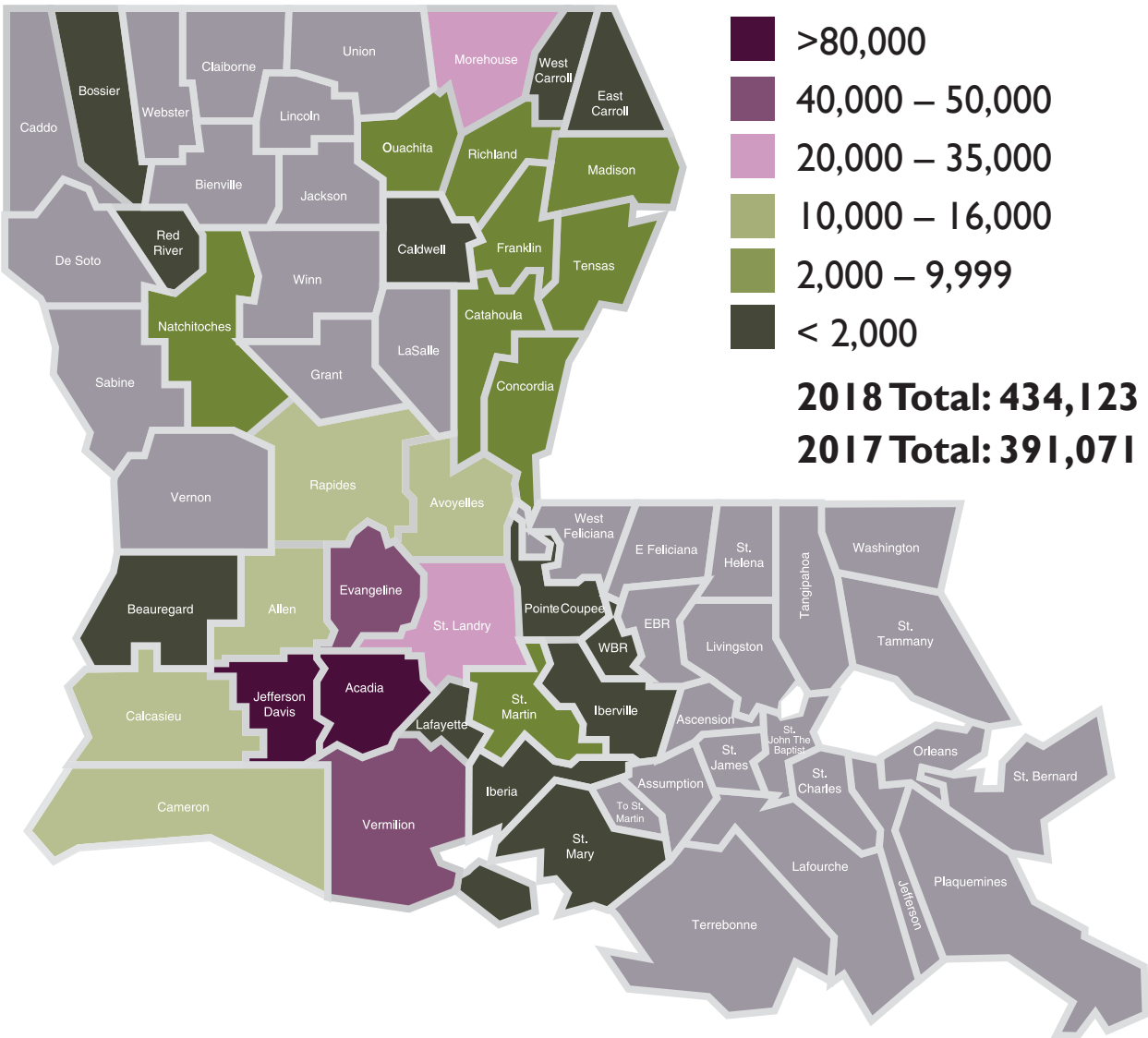
For 2019, Granger expects acreage to remain about the same. Vermilion Parish rice acreage increased by almost 4,000 acres in 2018 from the previous year to a total of 49,182.

Christian Richard of Vermilion Parish said his crop was slightly above average.

“It wasn’t nearly what it was in 2013 or 2014,” he said.

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2018 Louisiana Rice Acreage by Parish, All Types



Top 10 Rice Parishes

Parish	2018 Total Acreage	2017 Total Acreage
Acadia	83,831	80,324
Jefferson Davis	82,671	76,377
Vermilion	49,182	45,380
Evangeline	45,185	41,829
Morehouse	29,062	20,624
St. Landry	26,076	21,329
Allen	15,672	14,452
Avoyelles	14,283	12,203
Calcasieu	11,844	11,136
Rapides	10,654	8,040

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Richard said a dry May and June on his farm were followed by a wet July.

“Once August started, it seemed like it rained every day,” he said.

That continuous rain complicated harvest, he said. He was late getting started on harvesting a second crop because he ran out of bin space because of soybeans he hadn’t been able to sell.

“Who would have thought we could not get rid of one of the better bean crops we ever had?” he said.

Richard said he will continue with the same amount of rice acreage in 2019, and he anticipates a larger percentage will be planted in Provisia to address weedy rice problems.

Calcasieu Parish

Jimmy Meaux, an LSU AgCenter agent in Calcasieu Parish, said the 2018 crop there was average — a bit better than the previous year.

He estimated the average yield to be slightly above 40 barrels. Some areas in southwest Louisiana were hit with heavy rain at flowering, which affected yield, he said.

He expects 2019 rice acreage to remain about the same and possibly increase because of an anticipated decrease in soybean plantings.

Northeast Louisiana

Keith Collins, an LSU AgCenter agent who works with rice farmers in northeast Louisiana, said farmers there made a good crop, but the harvest was complicated.

“It just kept raining,” he said. “We just had adverse weather at harvest.”

Some farmers were delayed as long as a month to get their crop out of the fields, he said, and that affected quality. He expects an increase in rice acreage in the northeast part of the state because of low prices for other commodities.

“I think the majority of that is going to be with row rice,” he said.

Madison Parish

Garrett Marsh of Madison Parish was pleased with his crop.

“We probably had one of the better yields we’ve had,” he said.

He said his hybrid crop of more than 300 acres produced an average of about 200 bushels. He said he had to leave about 30 acres that stayed wet too long in the field.

Marsh said he grew all his crop using the row rice system because it saves money on pumping costs and on land work. He said he will plant rice next year, but he’s not sure how much because of the uncertainty with most commodities now.

Evangeline Parish

Todd Fontenot, an LSU AgCenter agent in Evangeline Parish, said 2018 wasn’t a banner year for farmers there.

“Across the board, yields are down a little bit, but they are still good,” he said.

Fontenot said farmers had to pump through much of the summer to keep fields flooded because of excessively dry weather.

“It’s going to be an expensive year,” he said.

He said more farmers seemed to have problems with weedy rice, and longer times to flood up fields that had dried may have allowed weeds to gain a foothold.

Night temperatures were high early in the season, and that could have affected yield, he said, but disease and insect pressure were light. Like other areas, the harvest in Evangeline Parish was hampered by rain, he said.

Fontenot expects Evangeline Parish acreage to slip in 2019 or remain the same because of prices.

“Some are saying they are not going to plant because of the price except where they have crawfish,” he said.

Midland Area

Ross Thibodeaux, who farms in the Midland area, said the first crop probably averaged 50 barrels, and the second crop average could be as high as 30 barrels.

“It was a pretty good year,” he said.

But Thibodeaux couldn’t say the same thing about what he got for his crop.

“The price needs to go back up where it started this year,” he said.

DNA testing leads to more efficient rice research

Genetic marker technology is leading to a more efficient process for developing new varieties.

Recently, the technology was used at the H. Rouse Caffey Rice Research Station near Crowley to find a new gene for *Cercospora* resistance.

After three years of field testing, this gene appears to confer complete resistance in the materials in which it has been tested. The discovery and validation of this gene is a major component of graduate student Christopher Addison’s doctoral research.

“The discovery and validation of the new *Cercospora* gene is another tool we have in our efforts to breed improved varieties with enhanced disease resistance,” said Adam Famoso, LSU AgCenter rice breeder.

In addition to *Cercospora*, the rice breeding program has developed and validated DNA markers for multiple traits, such as plant height, grain shape, amylose, gel temperature, aroma, herbicide tolerance, pubescence and multiple blast resistance genes. The plants are grown in a greenhouse, then DNA is extracted from the plant tissue and tested to determine which lines contain the desired trait before anything is planted in the field. If the desired characteristics are found, the seed is planted in progeny rows.

“The breeding rows going into the field have a higher probability of having the desired characteristics for the traits we screen with markers,” Famoso said. “Over time this will allow us to focus more attention on yield and grain-quality traits in the later stages of the breeding program.”

Scientists continue researching Amistar Top fungicide



Don Groth, an LSU AgCenter plant pathologist, talks at a field day near Rayville about using a T stick to scout for disease. Groth said the new guidelines are being developed for a new fungicide, Amistar Top.

Amistar Top, a new fungicide, made its debut in 2018 with mixed reviews.

Some farmers gave it a thumbs-down because their fields were hit with heavy concentrations of sheath blight.

“Some people had good experiences, and some people had bad experiences with it,” said Don Groth, an LSU AgCenter plant pathologist. “As with any new product, we learned a lot.”

He said testing had been done on strip plots using ground-rig sprayers that allowed for good penetration into a plant.

“It performed very well in these tests,” Groth said.

Spraying Amistar Top earlier — at five days after panicle differentiation — was more effective than the usual boot stage because the canopy was more open, allowing the fungicide to penetrate the understory of the plant canopy, Groth said.

He also said Amistar Top’s effectiveness seemed to improve when it was mixed with Tilt fungicide, an emulsifiable concentration that may act as a surfactant and help spread more of the product into the lower canopy.

“In one trial this year, where Amistar Top’s control was poor, yield was as high as better-performing fungicides,” Groth said. “We are planning next year to have an extensive program to find the best ways to use Amistar Top.”

Puerto Rico winter nursery a valuable resource for La. rice breeding

The winter nursery in Puerto Rico continues to help save time in the development of new rice options for farmers, researchers say.

In the spring of 2018, more than 400 experimental rows were selected and harvested in Puerto Rico and immediately planted into plots for yield testing at the H. Rouse Caffey Rice Research Station near Crowley.

“We harvested that rice in Puerto Rico on a Wednesday, and it was all planted into plots on station in nine days,” said Adam Famoso, LSU AgCenter rice breeder.

All those rows were from lines of rice developed the previous year.

“That is two years off the breeding process,” Famoso said.

The new Provisia line, PVL108, was grown in 100 rows in Puerto Rico. It produced 60 pounds of seed, which was brought back to the Rice Research Station for a seed increase.

In 2017, Hurricane Maria devastated the island. While the nursery at Lajas was relatively unharmed, the storm’s aftermath and cleanup delayed planting.

The nursery also is vital for expediting hybrid development. Female plants for the hybrid project require specific environmental conditions, such as warm winter temperatures and the short day lengths that occur in Puerto Rico.

The hybrid breeding program relies heavily on the Puerto Rico winter nursery to advance new crosses.

“The Puerto Rico nursery is a very valuable resource,” said Jim Oard, LSU AgCenter hybrid breeder. “It’s a crucial site for us for hybrid breeding of environmentally sensitive sterile lines.”

Male sterile lines are required to make hybrids. Certain lines will be pollen-sterile during the summer in Louisiana but produce fertile pollen when grown in the winter nursery in Puerto Rico.

Oard said the nursery allows for a seed increase and to advance generations quicker with extra growing seasons. He credited farm manager Anthony Rivera for the well-run facility.

Last year, he said, the usual planting in Puerto Rico in October had to be delayed until December because of Hurricane Maria.

“That did cause us to get less than optimum seed yields,” he said.

But the amount of seed was enough for selection and purification purposes, Oard said.



John Sonnier, an LSU AgCenter research farm specialist, harvests red rice seed to be planted in studies of different herbicides. The red rice plot is at the South Farm of the Rice Research Station in a remote corner to prevent unintentionally introducing red rice to research plots.

Farmers, researchers react positively to new Provisia rice

In 2018, farmers grew Provisia rice commercially for the first time, and the reaction to the technology’s weed-control capability was positive.

“I think people were real pleased,” said Eric Webster, LSU AgCenter weed scientist. “Yields met or exceeded expectations.”

Webster said Provisia’s weed control proved effective on grasses and weedy rice that could not be controlled before.

“If I had a difficult-to-control grass, I wouldn’t hesitate to use Provisia,” he said.

Webster is continuing to study the use of crop oils and adjuvants with the Provisia herbicide. He said he obtained a proprietary crop oil called Dash,

which is no longer available in the U.S., that helps to reduce antagonism when Provisia is mixed with some herbicides.

“However, it is not a silver bullet for reducing antagonism from all herbicide tank-mix options,” Webster said.

Tests conducted in 2018 showed that a tank mix of Provisia with ammonium sulfate causes the herbicide to work more slowly. Loyant herbicide caused some injury on rice, but the biggest problems were reported in Texas on hybrid rice, Webster said.

Loyant requires moisture to be effective, he said. The 2018 growing season started cool and damp but turned hot and dry suddenly.

The herbicide was less effective than expected on grasses, he said, but it worked well on broadleaf and aquatic weeds.

Loyant doesn’t seem to volatilize after spraying, according to Webster, but it will drift offsite because of wind or temperature inversions.

Gambit herbicide is proving to be a good burndown herbicide at the optimal rate of 1.5 ounces per acre. It has good activity on sesbania, eclipta and sedges.

“I like it post-emergence on alligatorweed,” Webster said.

Webster said benzobicyclon could be labeled and available for use on rice in Louisiana in 2019. California producers were able to use it in 2018, and Webster said it showed excellent results on aquatic weeds and worked especially well on duckweed.

New insect treatments, applications researched

Insect research under Blake Wilson, an LSU AgCenter entomologist, continued in 2018 with several ongoing projects.

Foliar applications of Prevathon, manufactured by FMC Agricultural Products, are showing good effectiveness against stem borers, Wilson said. The product is already in use in sugarcane, and a label for rice will be pursued, he said.

A study of spatial distribution of rice water weevils and stem borers continued in 2018 has shown the highest densities of the insects are found on the edges

of fields, Wilson said. This work could lead to a variable rate of insecticide used across a field, with the largest amount applied on a field’s outside acreage.

Wilson said insecticide trials were conducted on new seed and foliar treatments. He said a test of using Dermacor with neonicotinoids is showing promise to address a wider range of insects.

He said the second year of a Dermacor rate study showed a reduced amount of the product can still be effective when used in tandem with other seed treatments.

A study of Tenchu on stinkbugs had good results in 2018, he said.

“It seems to be as effective as pyrethroids,” Wilson said.

Wilson said a study conducted by graduate student James Villegas continued this year to determine which varieties best tolerate rice water weevil infestation. He said the study is showing that hybrids have lower yield losses than inbred varieties.

Row rice tested on three farms in north La.



ABOVE: Keith Collins, an LSU AgCenter agent in northeast Louisiana, talks at a field day near Rayville about the possible benefits of row rice. **RIGHT:** Polypipe is used to irrigate a 23-acre field in Richland Parish north of Rayville. Growing row rice by irrigating a field to keep the soil moist is a practice gaining popularity in north Louisiana because of the flexibility it provides in addition to the potential for reduced water usage.



LSU AgCenter researchers are developing best management practices for growing row rice in north Louisiana.

Row rice is planted on flat ground without levees. Polypipe is used for irrigation to keep the soil moist, and fields are not flooded.

Three on-farm sites were used in the study, the Jason Waller farm in Morehouse Parish, the Darrell and Donnie VandeVen farm in Tensas Parish and the Elliot Colvin farm in Richland Parish.

“I think we got a lot of good information this first year,” said Keith Collins, an LSU AgCenter agent.

The data should help establish guidelines for fertilizer amounts and application timing, he said. Also, hybrids and varieties are being evaluated for their use as row rice.

Collins said the fields in Richland and Morehouse had severe weather episodes that resulted in lodging that reduced yields in variety evaluations, but field yields were good.

The yield on the Richland Parish field was 235 bushels (65 barrels or 105 cwt.), compared to 216 bushels (60 barrels or 97 cwt.) in Morehouse and 239 in Tensas (66 barrels or 107 cwt.).

Water pumping totaled 21.2 inches in Richland Parish and 25 inches in Morehouse. Water on both of those fields was retained with gated field drains. In Tensas water was not retained, and the pumping totaled 29.7 inches. Collins said moisture sensors at the field were monitored remotely to help determine when watering was needed.

With rain and pumping, the Tensas field received 48.5 inches of water, compared to 36.3 inches in Richland and 46 inches in Morehouse.

Two hybrids, XL745 and XL753, were used at all three test sites, and Gemini was used only in Morehouse Parish. Cheniere and CL153 were the two pure line varieties in the project.

Collins said the study also will help producers with more baseline research data that could result in crop insurance policies being written for this practice.

The VandeVen brothers have used row rice since 2015. This year, they had 150 acres of rice.

“This was our fourth crop with it, and it has worked real well for us,” Darrell VandeVen said.

The VandeVens also grow cotton, corn and soybeans, and row rice gives them more flexibility at planting time. He said they prepare all their fields the same in the fall, and they don’t have to decide until the spring what to plant.

Using a hybrid is essential, he said, because of the disease resistance.

With row rice, they don’t have to make levees and then flatten them to plant a different crop, he said, and they save water and pumping costs.

“We don’t even have a levee plow, and I’ve never installed a levee gate,” VandeVen said.

He said irrigation is done often enough to prevent the ground from drying. They irrigate once a week in the early part of the season. Then, as days get longer and hotter, the interval is reduced to every five to six days. By late June or early July, watering is done every three days.

Weed control requires starting with a clean field and using a pre-emergence herbicide early. He said they used three fertilizer applications 10 days apart, all just before watering.

Darrell VandeVen said they have gotten calls from several farmers interested in the method.

“It’s a natural fit for someone who’s never grown rice before,” he said.

LSU AgCenter-developed high-protein rice on grocery shelves



Ida Wenefrida, an LSU AgCenter rice researcher, has been developing a high-protein rice variety that is being grown in southern Illinois for packaged sales under the brand Cahokia, which is named after an Indian tribe that settled in Illinois and Missouri.

A high-protein rice variety developed by LSU AgCenter rice researcher Ida Wenefrida is being grown for commercial production in southern Illinois.

Shanghai Farms obtained exclusive rights from the AgCenter to grow the Frontière variety, Wenefrida said.

Wenefrida said she first had the idea of a high-protein rice when considering the nutritional possibility of using grain to help people improve their diet with more protein.

“Rice is the staple food for close to 500 million people around the world,” she said.

However, people in developing countries often cannot afford meat and other sources of protein,

she said. Wenefrida developed Frontière from the Cypress variety using mutational breeding and spent seven years refining the variety.

Wenefrida said the rice has a protein level of 10.6 percent, compared to the level of 7 to 8 percent found in most rice.

She said the rice is being sold under the name Cahokia, which is the site of a pre-Columbian Native American city in Illinois east of St. Louis, Missouri. She said most of the Cahokia rice is sold to restaurants in the St. Louis area, and customers seem to prefer it because of its softer, creamier texture.

Wenefrida said LSU AgCenter molecular biologist Herry Utomo is working on a genetic marker to

identify rice lines with high protein levels to help develop more lines with this trait.

LSU AgCenter nutritionists also are looking at flour made from Frontière rice to explore its use in baking. Rice is naturally gluten free, and the higher protein level makes it attractive for baking items.

Wenefrida also wants to improve the yield potential. Currently, Frontière produces about 6,000 pounds per acre or about 34 barrels or 120 bushels.

“We need to get it to 7,500 pounds,” she said. “That’s my next goal.”

More information about Cahokia rice can be found at the company’s website, www.cahokiarice.com.

Soil-borne fungi AMF benefits tested

In other parts of the world, soil-borne arbuscular mycorrhizal fungi are helpful to some crops, improving the uptake of nitrogen and phosphorous and providing other benefits.

For her doctoral dissertation, Lina Bernaola, a graduate student in the LSU Department of Entomology, has been studying whether arbuscular mycorrhizal fungi (AMF) can help rice plants with insect resistance and improved rice growth.

However, the effects of these fungi have varied depending on the species of AMF, the crop species and soil conditions. Bernaola said this is the first time the AMF has been tested in rice in the southern U.S.

Bernaola first tested the effect of AMF in rice resistance to the rice water weevil and fall armyworm as well as the sheath blight pathogen. In all of these she found that rice plants inoculated with AMF were more susceptible to these pests in this

test. However, the nutritional analysis (nitrogen and phosphorous) of root and shoot tissues indicated no major changes in the concentration of nutrients that can explain this susceptibility.

She also tested if the effect of AMF is soil dependent. The results in rice were mixed, she said. In a test at the H. Rouse Caffey Rice Research Station near Crowley, inoculation with mycorrhizae showed inoculated plants benefitted from some insect resistance, but in a test near Mamou they showed no advantage. Bernaola said that could be explained because the soil near Mamou lacks phosphorous, which mycorrhizae needs to thrive.

In addition, she demonstrated that all rice-producing areas in the southern U.S. have the natural presence of this fungi, which can be used for future research. Bernaola also showed AMF used on rice in field experiments provided tolerance against weevils after the insects fed on the plants. The three years of trials

have been limited to CL I I I, but she said more variety testing needs to be done.

She said a rice plant’s increased nutrient uptake from mycorrhizae results in more biomass, which could help with the production of more panicles to compensate for the losses from insects. Even though mycorrhizal fungi did not translate to increased insect resistance in this study, the increased yields from the tolerance experiment open a new window to keep working on the effects of this fungi on rice plants.

“I believe mycorrhizae can be incorporated into integrated pest management, but more studies need to be done because my research shows the complexity of these interactions,” Bernaola said. “Soil microbes are an important component for sustainable agriculture that need to be exploited.”

She also is looking at identifying genes in rice that activate chemical responses to pathogens and insects.

Improvements at LSU AgCenter research station funded by free trade agreement

Ongoing improvements at the LSU AgCenter H. Rouse Caffey Rice Research Station are aimed at modernizing the facility and maintaining its global prominence in the study of rice propagation.

All the improvements are funded with money from the Colombian Free Trade Agreement that was earmarked for research.

An addition to the administration building will include four offices and a larger conference room along with storage space. The old conference room in the existing building will be converted into two offices.

A backup generator system is being installed to ensure that perishable research tissue and seed will remain viable even if electricity is lost.

An equipment storage building near the rice dryer has been built, and a new commercial

milling lab will be functional for the 2019 growing season. Also, the station's labs will be renovated and modernized.

Still on the drawing board are a maintenance shop and a greenhouse.

Several major equipment purchases have been made, including a seed analyzer to scan rice for shape, size and chalk; an autoclave; two new tractors; and a land-leveling laser system.

Last year, a new well and irrigation piping were installed, allowing some fields at the Rice Research Station to be used for growing rice for the first time.

“These improvements are an investment in the future viability of Louisiana rice farming,” said Don Groth, the Rice Research Station resident coordinator. “They will maintain the station’s level of high-quality research that Louisiana farmers will need to remain viable.”



Emily Kraus counts panicles on a rice plant at the Rice Research Station in a test of jasmonic acid as a seed treatment to reduce rice water weevil infestations. She worked on the project while earning her doctoral degree in entomology.

Jasmonic acid shows promise as seed treatment in fight against water weevils

For the first time a researcher tested a field-scale rice seed treatment of jasmonic acid for its potential to impart resistance against insect pests.

“It looks like it’s going to be an asset for water seeding and organic growers,” said Emily Kraus, who studied the use of jasmonic acid for her doctoral dissertation.

Kraus was studying whether jasmonic acid can be used as a seed treatment to reduce rice water weevil populations.

She said her work in 2017 showed that seed treated with the material showed fewer weevil larvae than untreated seed. The testing in 2018 did not show a difference in weevil populations, but she suspects it was because the jasmonic acid dissipated during the long lag time between the seed treatment and flooding, which occurred because of an unusually cold spring.

The highest reduction of weevil populations came with the use of jasmonic acid in tandem with Karate insecticide, she said.

Jasmonic acid does appear to delay heading of rice by a few days, she said, and it does tend to result in decreased biomass.

“There is no significant reduction in grain yield,” she said.

Kraus said it is possible that using a growth hormone could offset the biomass reduction.



A new milling lab will be operational for the 2019 rice crop year. The commercial-scale mill will be able to process and analyze rice grown at the station.



A new equipment shed is one of several improvements at the H. Rouse Caffey Rice Research Station that has been funded by the Louisiana Rice Research Board. The structure will accommodate larger farm equipment.

Alternate wetting and drying, other irrigation methods studied

LSU AgCenter researcher Manoch Kongchum is studying nitrogen-use efficiency and yield for rice grown under three different irrigation protocols. In the study Kongchum is comparing conventional delayed flooding with two other methods — alternate wetting and drying and semi-aerobic conditions. Preliminary results in 2017 showed that alternate wetting and drying reduced the amount of irrigation water by 31 percent. However, this practice reduced grain yield by 4 percent. In 2018, the alternate wetting and drying water management practice reduced irrigation water requirements by 50 percent and resulted in a 3 percent yield increase compared to conventional, delayed flooding. The yield difference could be attributed to rainfall. The 2017 rainfall was recorded at 32 inches, but only 12 inches in 2018. Because of the excessive rainfall in 2017, the alternate wetting and drying plot was watered only once, but in 2018 it was irrigated four times, Kongchum said. The study used CL153 and the hybrid CLXL745 in 2018. The 2017 study used CL153 and CLXL729. Kongchum said the project will be continued for 2019 at the AgCenter H. Rouse Caffey Rice Research Station. Then it will be conducted on a larger scale at a farm. “The research will be continued in order to determine the best option on a large farm scale to maximize profit with less resources or water requirements,” he said. Kongchum also is studying the differences in methane gas released from the different methods of growing rice.



Nutifafa Adotey, an LSU AgCenter post-doctorate agronomy researcher, places an acrylic chamber over an area of rice plants grown in a semi-aerobic environment for an alternate wetting and drying project being conducted by Manoch Kongchum, an LSU AgCenter rice researcher.

Researchers study effect of fertilizers on new rice varieties

The agronomy project under Dustin Harrell, LSU AgCenter rice extension specialist, is an all-encompassing series of studies aimed at improving production efficiency and increasing yields. “We’re looking at nitrogen fertilizer requirements and optimum plant populations for soon-to-be-released varieties and hybrids,” Harrell said. “This information is extremely important, so producers will know how to manage newly released varieties.” He said small plot trials are used across the rice-growing area of the state at eight locations. “The past two years, we’ve been looking at a new urease inhibitor,” Harrell said. “It looks like it will be a new tool for rice producers, and hopefully it will be available for the 2019 growing season.”

He said the optimal nitrogen rate, time of application and number of fertilizer applications have been studied for furrow-irrigated rice production. Work in 2018 showed that the optimal fertilizer timing was three split applications seven days apart. In addition, he said, the 2018 work showed that an additional 50 pounds of nitrogen was needed for furrow-irrigated rice compared to conventionally flooded rice. Harrell said a drone has been used to capture reflectance data of rice fields, which was compared with data obtained from a Greenseeker sensor to find if there is a correlation between the two devices in an effort to develop a midseason nitrogen rate calculator.

“We hope to have a new midseason nitrogen fertilizer recommendation calculator using this technology within five years,” Harrell said. He said improved ratoon management is another objective of the agronomy project. He wants to know if fertilizer recommendations need to be modified if stubble management is done. Harrell said he also is studying the use of gibberellic acid in the first crop to enhance ratoon yield. Previous work in Louisiana and in Texas has shown that gibberellic acid can increase second-crop yields in some years. Harrell also conducts volatility studies to measure gaseous losses of nitrogen from fertilizer applications in the field. His lab also has the capability to determine gaseous nitrogen losses from different soil types.

Federal official visits research station



Anne Idsal, regional administrator for the U.S. Environmental Protection Agency, at right, watches rice planting by Dustin Harrell, an LSU AgCenter rice extension specialist. Idsal visited the H. Rouse Caffey Rice Research Station in March to learn about the challenges faced by rice farmers. Harrell informed her about the problem of blackbirds feeding on mature rice, and he also detailed the threat to crawfish posed by apple snails, an invasive species. Idsal also toured the station to learn about research being conducted and genetic marker technology. Mike Strain, secretary of the Louisiana Department of Agriculture and Forestry, joined Idsal on the visit. During the station's field day, Idsal was among the speakers, and she said the EPA has become more focused on problem-solving.

Louisiana Rice Research-January 2019

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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.

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Rice Research Projects for 2019

CONTINUING PROJECTS		
Agricultural Economics and Agribusiness \$38,000 Economic Analysis of Rice Production and Farm Management in Louisiana <i>Michael Deliberto (Salassi)</i>	H. Rouse Caffey Rice Research Station \$1,228,438	
	Applied Molecular Breeding <i>Adam Famoso</i>	School of Plant, Environmental and Soil Sciences \$207,648 Breeding Salt-Tolerant Rice Varieties <i>Prasanta Subudhi</i> Weed Management in Herbicide-Resistant/Tolerant and Conventional Rice <i>Eric Webster</i>
	Multiple Generation Rice Breeding Nursery <i>Adam Famoso</i>	
Entomology \$103,906 Integrated Management Strategies for Insect Pests of Rice <i>Blake Wilson (Stout)</i>	Development of Superior Rice Varieties for Louisiana <i>Adam Famoso</i>	
	Enhancement of Rice Research and Extension Communications <i>Frankie Gould</i>	NEW PROJECTS Experimental Statistics \$25,000 Implementation of Digital Agricultural Techniques to Improve Outcomes and Practices at the Rice Research Station <i>Thanos Gentimis</i>
Bob R. Jones Idlewild Research Station \$28,500 Development of an Encapsulation Protocol for Sodium Nitrite for Control of Feral Swine in Rice <i>Glen Gentry</i>	Development of Disease Control Practices in Rice <i>Don Groth</i>	
	Rice Management Strategies for Efficient Utilization of Agronomic Inputs and Natural Resources <i>Dustin Harrell</i>	
Northeast Research Station \$47,500 Yield Evaluation of Commercial-Advanced Testing Program in Northeast Louisiana Development of Best Management Practices for Row Rice Production Systems in Northeast Louisiana <i>Donnie Miller</i>	Louisiana Rice Research Verification Program <i>Dustin Harrell</i>	Entomology \$38,000 Development of Best Management Practices for Insects of Stored Rice <i>Blake Wilson</i>
	Effect of Water Management Practices on Nitrogen-Use Efficiency and Yield of Drill-Seeded, Delayed Flood Rice Production <i>Manoch Kongchum</i>	
Plant Pathology and Crop Physiology \$56,668 Characterization and Utilization of Genetic Traits for Resistance to Multiple Diseases of Rice <i>Jong Hyun Ham</i>	Development of Hybrid Rice and Sheath Blight-Resistant Germplasm for Louisiana <i>James Oard</i>	
	Marker-Assisted Breeding and Development of Molecular Makers for Important Traits in Louisiana Rice Production <i>Herry Utomo</i>	Northeast Research Station \$44,200 Nitrogen Fertilization of Furrow-Irrigated Rice Using Surge Valve Irrigation <i>Josh Copes</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 \$33,700 Remote Sensing Ground Control Point Network to Support Precision Agriculture in Rice Farms <i>Luciano Shiratsuchi</i>
		COLTRQ Funding \$305,000 Rice Research Station Infrastructure, Facilities Upgrade and Support Sprayer \$250,000; Laser System \$55,000 <i>Don Groth</i>
		TOTAL Total Funding for 2018 \$2,156,559