LSU AgCenter
Research · Extension · Teaching

H. Rouse Caffey Rice Research Station News

Volume 18 Issue 1 – February 2021

Inside This Issue:

Special Dates of Interest:

- H. Rouse Caffey Rice Research Station Annual Field Day
  June 30, 2021

Contact Information:

Dr. Dustin Harrell
Resident Coordinator
H. Rouse Caffey
Rice Research Station
1373 Caffey Road
Rayne, LA 70578
Phone: (337) 788-7531
Fax: (337) 788-7553
https://www.lsuagcenter.com/portals/our_offices/research_stations/rice

Big Changes in Louisiana Rice Varieties On-Tap for 2021

There are a handful of new rice varieties and rice hybrids that will be available in 2021 that will change the landscape of the rice grown in Louisiana. There are also a few rice varieties and hybrids that will virtually disappear in the coming season. I will do my best to cover the biggest variety and hybrid changes for 2021 in each rice class below.

Conventional long-grain rice variety offerings for 2021 will still have its two cornerstone varieties Cheniere and Mermentau. These two conventional long-grain varieties made up 17% of the total acres in Louisiana in 2020 and over 98% of the Louisiana acres in the conventional long-grain (non-hybrid) class. Both varieties have good to excellent grain quality, milling and yield potential. Both are early maturing and have a good ratoon potential. Cheniere is moderately susceptible to blast while Mermentau is susceptible.

There will be a new conventional long-grain inbred variety from the Nutrien breeding program that will be available in 2021. The Dyna-Gro variety will be called DG-263L. This variety has shown a tremendous yield potential in early testing. It was the top yielding non-hybrid variety when averaged across all locations in Dr. Famoso's variety trials in 2020. In fact, the mean yield of DG-263L was less than a bushel lower than that of the hybrid CLXL745. The variety does not contain the Pita gene but has shown good blast resistance in limited testing. It is moderately resistant to bacterial panicle blight and susceptible to sheath blight. Milling was lower for DG-263L than Cheniere and Mermentau in limited LSU testing.

Available Clearfield long grains for 2021 will once again include the high quality CL111 and high yielding CL151 varieties that we are all familiar with. CL153 was grown on 19.5% of the total acres in Louisiana in 2020; however, it will not be available on a widespread basis in 2021. Replacing CL153 will be CLL17, which was developed by the LSU rice breeding program. CLL17 is a couple days earlier in maturity and a couple inches taller than CL153. It has shown a good yield potential and also contains the Pita gene for good blast resistance. The variety is moderately susceptible to lodging. The nitrogen (N) fertilizer recommendation for CLL17 is between 90 and 130 pounds of N per acre, similar to the N fertilizer programs recommended for CL151 and Jupiter. CLL15 and CLL16 are two other Clearfield long-grain varieties developed by the Arkansas rice breeding program which have also shown good yield potential.

The Provisia long-grain variety PVL02 will once again be available in 2021. PVL02 has shown an improved yield potential and disease package over the initial Provisia variety release, PVL01. PVL02 matures 11 days earlier than PVL01. Ratoon yields from the 2020 cropping season indicated that the variety has a very good yield potential, something that PVL01 lacked. PVL02 is moderately susceptible to blast and sheath blight. The

Continued on page 2.

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

smaller grain size of PVL01 has improved whole milling.

PVL03, a new Provisia long-grain variety developed by the LSU rice breeding program, will be available on a very limited basis in 2021. The new Provisia variety will have greatly improved blast resistance due to the inclusion of the Pita gene. It will also have improved yield potential. Grain length will be longer than that of PVL02 but shorter than PVL01. The variety has shown good milling and grain quality in testing. PVL01 will not be available in 2021.

RiceTec will offer non-herbicide tolerant hybrids XP753, RT 7301, RT 7401, and RT 7501 for the 2021 season in Louisiana. If you are looking for IMI resistance, the Full Page line-up will include RT7321 FP and RT7521 FP. These hybrids have a yield potential advantage over the non-hybrid lines and have very good resistance to blast. The blast resistance makes rice hybrids well suited for furrow irrigated rice which is increasing in acreage in Louisiana at a rapid pace.

Medium-grain rice varieties will once again include the non-herbicide tolerant varieties, Jupiter and Titan, which made up the bulk of the medium-grain acres in Louisiana in 2020. CLM04 will be the only Clearfield available medium-grain variety in 2021. All three varieties have a good yield potential. CLM04 and Jupiter are both susceptible to blast while Titan is moderately susceptible. Varieties susceptible to blast should be avoided in a furrow irrigated rice production system.

Figure 1. Variety x Nitrogen trial of CLL17.

Dr. Dustin Harrell
dharrell@agcenter.lsu.edu

Rice Breeding in the Age of Data Science

Technology has changed a lot in the past decade, and the breeding project at the H. Rouse Caffey Rice Research Station (HRCRRS) is working to harness these new technologies to bring better rice varieties to farmers faster and more efficiently. Emerging technologies in the breeding sphere include advances in DNA markers, high-throughput digital data collection systems, like drones, and availability of high-performance computing capabilities through so-called cloud computing platforms. Being able to effectively incorporate these new tools and approaches into the breeding project requires thinking about old problems in new ways, different infrastructure, diverse skill sets, and more collaboration.

How is the way that new rice varieties are developed changing, and why do we need to manage our data differently? To answer these questions, it is important to first understand how things have traditionally been done. The breeding process involves crossing elite parents and selecting the best progeny after extensive field trialing. Historically, breeders collected data from trials using spreadsheet software, like Excel. The current year's data were tabulated and used to cull low preforming lines. Starting in 2016, with support from the Louisiana Rice Research Board, the breeding project began collecting a new type of data: DNA marker data. Using DNA markers was a leap forward because it allowed for the breeding program to select on simple characteristics, like tall vs short stature, prior to any field testing and, more importantly, the data were easily accommodated by the same spreadsheet format. The success and experience gained from this initial investment in DNA marker technology were a launchpad to what is likely to be an even more revolutionary technology for the program: genomic prediction. This technique comes with a greater burden on data storage and analysis.

The breeding project began research into genomic prediction in June of 2019 with funding from Horizon Ag. Genomic prediction is a more powerful version of DNA marker-assisted selection. Rather than using a handful of DNA markers to track simple traits, genomic prediction uses many markers to predict complex traits

Continued on page 3.

like chalkiness and yield. Just as meteorologists rely on a combination of historic and newer data to train their weather forecasting models, the breeding program is now combining data across many years with DNA markers to build genetic forecasting models. These genetic models are used to pick lines with variety potential earlier in the breeding process. Now, more than ever, information needs to be in a digital format that is computer readable. A child can look at the variety name “Cypress” and “CYPRESS” and know that they are the same; however, a computer sees them as completely different. To support this new approach, the breeding project must contend with more data, the data need to be more connected, and they must adhere to strict standards for computer processing. New constraints call for new solutions.

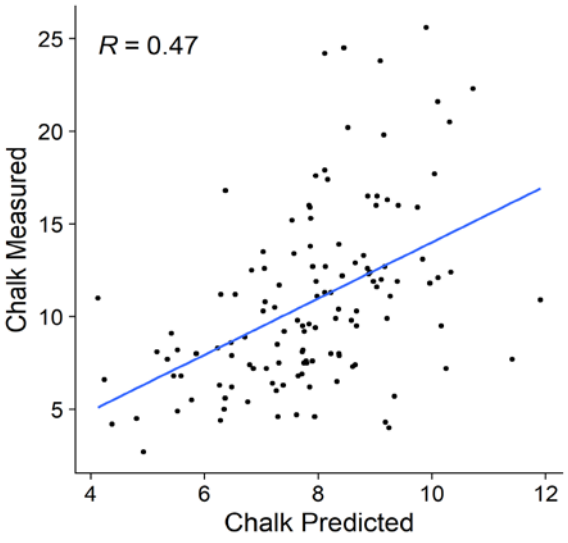
You probably are not doing taxes this year with pen and paper or even in a spreadsheet, but most likely you will use specialized tax software. Most people do this because tailor-made software is more reliable and can get the job done quicker than a do-it-yourself approach. Along these lines, specialized breeding software is needed to ensure that genetic modeling is accurate and can be accomplished in a time frame meaningful to the breeding program. Towards this end, a customized breeding database and other software were established in late 2020 for the rice breeding program, and in 2021, all breeding data are being migrated to this system. Additionally, the program continues to embrace mobile apps and other data collection methods that integrate with the established system. Making this system a reality was a complex process and required collaboration with IT and data scientists across institutions. If your taxes get too complicated, you need an accountant.

As the saying goes, it takes a village to support a rice breeding program. To bring in the latest technology, the program needed to forge new relationships with AgCenter IT and bring in outside collaborators. Databases and software applications need somewhere to live, someone to look after them, and someone to help them develop. The Cloud, racks of computer hardware connected through the internet across large data centers with redundant power and ample bandwidth, provides prime real estate for database systems. The breeding project worked extensively with AgCenter IT specialists to find the best cloud computing resources and ensure data security. After finding a home, the breeding project contracted a database maintainer to take on the burden of software and security updates. Much of the software that powers new breeding applications and methods like genomic prediction is open-source, free academic software. The breeding project is working directly with Dr. Kelly Robbins, Dr. Susan McCouch, and others at Cornell University, and across other universities and programs, to build and deploy new tools for rice breeding. These tools will help produce the next wave of rice varieties for farmers.

Adapting to changing technologies is a challenge for the rice breeding program, as it is for many other programs and industries. It has also provided an opportunity to strengthen connections between the breeding program and other arms of the AgCenter. We have branched out to work across universities. Currently, the program is in the process of hiring two new postdoctoral researcher positions with data science and statistics expertise, one of which will be based with a collaborator at Cornell University in Ithaca, NY. The breeding project has benefited from working with others and so too have graduate students and research technicians in the program. They are gaining new skills and expertise that they will take with them throughout their careers here at the AgCenter and elsewhere in the U.S. rice industry.

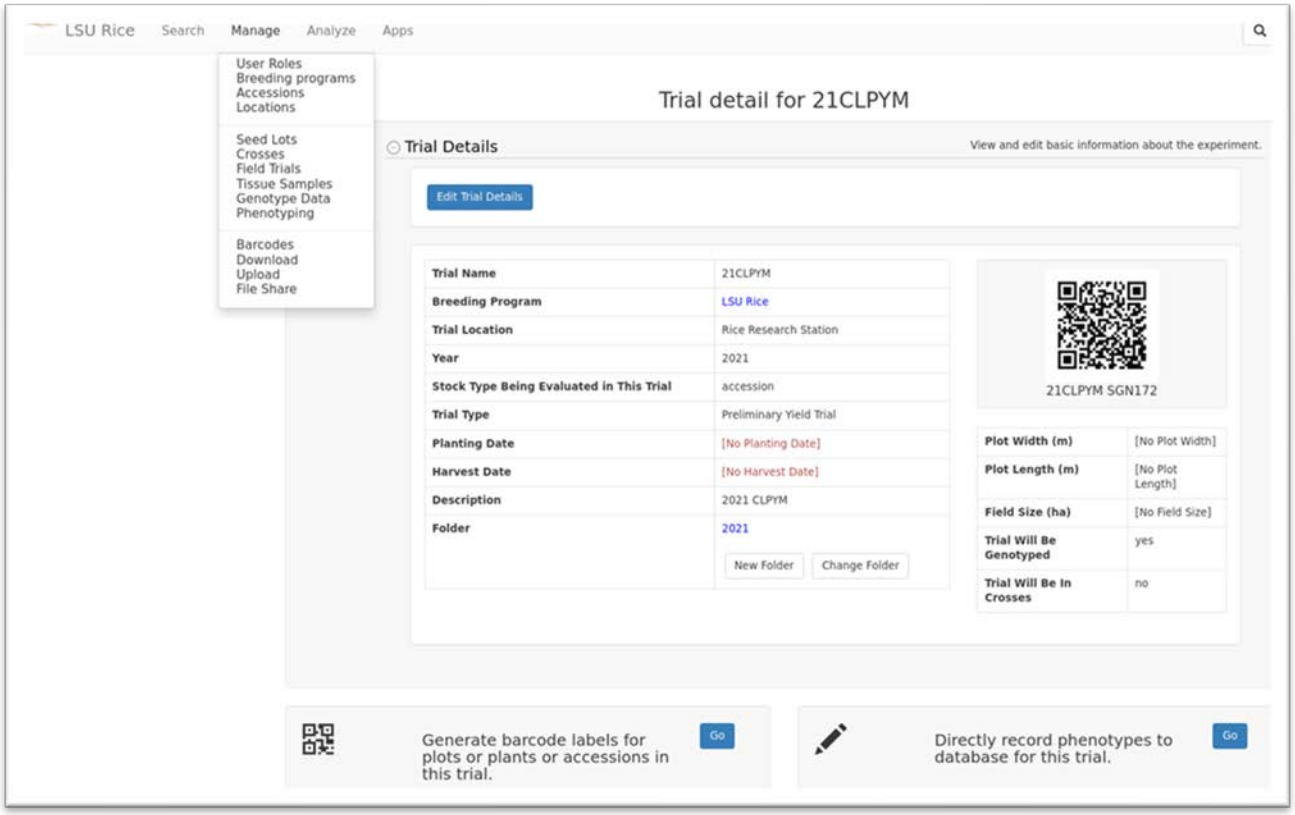
As we look to the sky--literally, as we contemplate the use of drones--we see a bright future for the HRCRRS rice breeding project and U.S. rice farmers in this age of data science.

Figure 1. Early results from the project’s research into genomic selection is promising. Here chalkiness predicted by our forecasting models, using marker data alone, is shown on the x-axis and results from the field are shown on the y-axis. The predictions do not perfectly match field results but are still reliable enough for selection in early breeding generations where it is normally impossible to get a chalk measurement.



Continued on page 4.

Figure 2. Screenshot from the LSU rice breeding database interface. In addition to storing trial data, the database supports pedigree data, DNA marker information, and provides a suite of tools for bring these data together to support new methods like genomic prediction. Establishing this system was the result of collaboration between the breeding project, AgCenter IT, and researchers at Cornell University.



Dr. Christopher Hernandez
chernandez@agcenter.lsu.edu

Dr. Adam Famoso
afamoso@agcenter.lsu.edu

Changes in Available Rice Fungicides

Fungicides are important tools in rice disease management. All too often sheath blight, blast, grain smuts or Cercospora require a fungicide application to reduce damage below economic levels. Fungicides are specific to what diseases they control, along with the growth stage they are applied at to be effective. Therefore, knowing what diseases are present in your field, selection of the most active fungicides against those diseases, and applying them at the correct growth stage are critical for effective disease control. Several changes in fungicide availability will impact which fungicides and how you use them in 2021.

Stratego, which is a combination of Trifloxystrobin and propiconazole, will not be marketed by Bayer this year due to label changes that prevent it from being applied at heading, which is the most important timing for blast. They will be marketing Trifloxystrobin, as Flint, which will be applied at 3.6 to 4.7 oz/A and can be applied from boot to heading. To obtain the same spectrum of disease control activity as Stratego, farmers will have to add 6 to 10 oz/A of propiconazole with Flint as a tank mix. If your target is blast, kernel, or false smut, the propiconazole must be applied separately at booting, and the Flint at heading.

Continued on page 5.

Another rice fungicide, which I have not discussed much but was marketed last year, is Artisan, which is a premix of flutolanil and propiconazole. Flutolanil is the active ingredient in Elegia which has good activity against both the wild-type and strobilurin-resistant sheath blight fungus strains. Elegia is used at 32 oz/A where the labeled rate of Artisan is 40 oz/A. The propiconazole in Artisan increases activity against Cercospora and the grain smuts. You can add propiconazole to Elegia and have a very similar activity.

Remember that the maximum amount of propiconazole at one application is 10 oz/A with a maximum of 12 oz/A per year. You can use two 6-ounce applications which is slightly more effective against sheath blight than a single 10-ounce application. Be careful how much propiconazole you add to the tank, especially with fungicides that already have propiconazole in them, so you do not exceed the maximum amount.

Figure 1. Airplane applying fungicides.

Dr. Donald Groth
dgroth@agcenter.lsu.edu

Insecticidal Seed Treatment Considerations

In today's industry, rice farmers need to consider pest management strategies well before rice is planted. Insecticidal seed treatments have become central to rice pest management programs in recent years, and deciding which product to select will determine how pest control is approached during the growing season. The rice water weevil (*Lissorhoptrus oryzophilus*) is such a rampant and damaging pest that insecticidal seed treatments are justified on nearly every rice acre in Louisiana. The treatments have been shown to provide a return on investment in more than 80% of fields in South Louisiana in which they are used, based on control of weevils alone. Available products can provide adequate control of a wide variety of rice pests, and deciding which options are most appropriate for your fields requires some consideration.

There are currently four products available to Louisiana rice farms which can be used alone or in combination. Dermacor X-100 (chlorantraniliprole) is the most effective product available for controlling rice water weevil and is also effective against caterpillar pests, such as stem borers and armyworms. Dermacor X-100 is the only product labeled for water-seeded rice and is highly recommended for use in these fields.

Two neonicotinoid seed treatments are also available, Cruiser (thiamethoxam) and NipsIt Inside (clothianidin). These products can also provide good weevil control, but yield-reducing infestations may still occur. The neonicotinoids do not have activity against caterpillar pests, but they are effective against colaspis, chinch bugs, adult billbugs, and minor pests, including aphids and thrips. The neonicotinoid seed treatments are applied at variable rates per acre depending on seeding rates, and weevil control declines when planting at less than 40 lb seed/acre.

RiceTec's hybrid seed will be available with Dermacor X-100 in Louisiana and Texas which will maintain a high level of control, even at low seeding rates. Fortenza (cyantraniliprole) is another option which has been registered since 2019. This chemistry is in the same class of insecticides (diamides) as Dermacor X-100 and has shown improved control over the two neonicotinoids. Efficacy of Fortenza when used alone still lags behind that of Dermacor X-100 but provides a high level of control when used in combination with

Continued on page 6.

Cruiser. This combination will broaden the spectrum of pests controlled and offers a good alternative to Dermacor X-100 in fields where stem borer infestations are minimal.

Predicting which pests will be problematic in a given field is not easy. With the exception of the rice water weevil, other rice pests do not reliably infest rice in damaging numbers. Stem borers are most problematic in the southwestern parishes, including Calcasieu, Cameron, Vermilion, Jefferson Davis, and Acadia where Mexican rice borer populations are high. In these regions, late-planted rice can benefit from the use of Dermacor X-100. Studies show early-planted fields can avoid damaging stem borer infestation levels. Similarly, armyworms are more damaging in late-planted fields across the state. Grape colaspis is only damaging in rice fields following soybeans grown the previous year. Overwintering larvae are present at planting and can severely reduce stand. Colaspis can only be controlled using NipsIt Inside or Cruiser. Chinch bugs and adult billbugs have been sporadic pests in late-planted rice in recent years that can also be controlled by NipsIt or Cruiser.

None of these products prohibit the use of other insecticidal seed treatments, so combinations of multiple products are an option. The addition of either Fortenza or Dermacor X-100 to a neonicotinoid will greatly improve control of a neonicotinoid alone. If Dermacor X-100 is used, the addition of a second product may not be economical in many cases. Trials in Crowley since 2018, have not shown this treatment improves yield over Dermacor X-100 alone, regardless of planting date. Producers should consider pest issues experienced in past years to determine if the combination can be justified on their farms. The addition of a neonicotinoid to Dermacor X-100 may be a good fit when planting at low seeding rates and the added input cost is relatively small. Use of multiple products in the same insecticide class (for example, Fortenza + Dermacor X-100 or Cruiser + NipsIt Inside) is generally not recommended.

More information on insecticidal seed treatments, as well as seed treatment alternatives, is available in the 2021 Rice Varieties and Management Tips.

Dr. Blake Wilson
bwilson@agcenter.lsu.edu

Focus

Dr. Ronnie Levy

Dr. Ronnie Levy is the new rice extension specialist, stationed at the H. Rouse Caffey Rice Research Station.

He took the job after the previous rice specialist, Dr. Dustin Harrell, was selected as the new resident coordinator at the Rice Research Station with the retirement of Dr. Don Groth.

Levy's interest in agriculture started as a boy when he worked on a dairy planting pastures, cutting feed and spraying fields for weeds. "I loved fishing and hunting and didn't like being inside."

He earned his bachelor's degree in Animal Science in 1979 from Southeastern Louisiana State University, and his master's and doctorate degrees in Agronomy are from LSU.

He started working for the LSU AgCenter in 1979 as a 4-H agent in Calcasieu Parish, and he later became a 4-H agent in Jefferson Davis Parish. He moved to Acadia Parish in 1986 as a county agent. From 2008 until 2020, he held several positions with the LSU AgCenter including state soybean, corn and grain sorghum specialist, interim director of the Central Region and the Dean Lee Research and Extension Center, and coordinator of the Louisiana Master Farmer Program.

As rice extension specialist, Levy will be working closely with county agents. One of those county agents is Jeremy Hebert in Acadia Parish.

"I'm excited about the opportunity to work with Dr. Levy," Hebert said. "His experience in rice production in general, makes him a huge asset to the LSU AgCenter, especially with his extension background."

Ronnie and his wife, Donna, had two sons, Richard and Ron, who is deceased. They have 2 grandchildren, Gabriella and Braxton, from Richard and daughter-in-law, Emily, and a third grandchild is on the way.

In his spare time, he enjoys hunting and fishing.

Bruce Schultz
bschultz@agcenter.lsu.edu

Like us on Facebook

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

LSU AgCenter
Research · Extension · Teaching

Online Store

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

This newsletter is produced by Valerie Dartez, Bruce Schultz, Dustin Harrell, Darlene Regan, and Roxanne Trahan.