The word is renovation, renovation and renovation! Over the winter, the Rice Research and Extension Center in Stuttgart underwent some major renovation projects. Our West reservoir was repaired to fix a couple of leaky levees and to restore eroded banks. This will increase our water holding capacity and improve safety. In addition, we demolished our old director’s house, which had structural damage beyond repair. We renovated two greenhouses, a chemical storage room and some indoor equipment storage areas. These renovations/repairs helped create better space for our many active research programs.

Other improvements include a new sound system in the granary to help with field days and new sound and visual equipment in the large conference room to enable Zoom video conferencing for meetings. Some of these improvements are made possible by our recently connected high-speed internet.

We have some great new University of Arkansas rice variety releases this year: a long grain (Jewel), a medium grain (Lynx), and a new high-yielding CL long grain (CLL16). In addition, this year marks the first time that Division breeding lines have been released for commercial development. These commercial release lines represent varieties similar to those on the market now, but they lack enough improvement in any one area to merit release or recommendation over what the University currently offers. However, they still have value. These lines were licensed to Progeny, which expects to increase seed supply and look for niche fits and commercial acceptance across the Mid-South rice growing region this year with availability to growers in 2021. The lines were not released for breeding purposes. We are excited to offer growers more options. (See new releases in this issue).

Bob Scott – Director, Rice Research and Extension Center

The work we do at the Rice Research and Extension Center is made possible by the generous support of the rice farmers of the State of Arkansas who we serve. We are grateful for the support of the Arkansas Rice Research and Promotion Board. For more information go to https://www.arkrice.org/.
A new high-yielding medium-grain variety Lynx – the latest release by Rice Research and Extension Center – will give Arkansas rice growers another option in variety selection. The U of A System Division of Agriculture released a new medium-grain rice variety to help Arkansas rice growers boost their production and improve their bottom line.

**“Lynx” From Dr. X. Sha**

Lynx (17AR1121) is an early-maturing, short-statured variety with excellent grain yield and good grain quality. Its pedigree consists of Earl/3/Bengal//Mercury/Rico 1/4/Jupiter. On average, Lynx has an approximate 5-6 bushels-per-acre yield advantage over Jupiter and Titan. It has a similar disease package and the same excellent seedling vigor as Titan. Lynx also has the typical medium-grain cooking quality, low chalky and a plump kernel size similar to Titan.

In 14 trials across Arkansas from 2017-2019, Jewel, Diamond, and LaKast had rough rice grain yields of 187, 205 and 191 bushels/acre respectively. In regional trials conducted in Arkansas during 2017-2019, Jewel’s average grain yield of 229 bushels/acre compared favorably with those of Diamond, LaKast and Roy J, at 239, 208 and 199 bushels/acre, respectively. Milling yields (whole kernel: total milled rice) at 12% moisture from Arkansas in 2017-2019, averaged 59:71, 55:69, and 56:69 for Jewel, Diamond and LaKast, respectively.

Jewel has the rice blast genes Pi-ta and Pi-ks and is resistant to common rice blast races IB-1, IB-17, IB-49, IC-17, and IE-1, rating 0, 3, 0, 0 and 0, respectively. It rates a 6 which is susceptible to race IE-1K from greenhouse tests using the standard disease scale of 0 = immune, 9 = maximum disease susceptibility. Jewel is rated MS to sheath blight which compares with Diamond (S), LaKast (MS), Roy J (MS), and Wells (S) using the standard disease R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible and VS = very susceptible to disease. Jewel is rated MS for false smut. Jewel is rated S to bacterial panicle blight compared to Roy J (S) and Diamond (MS).

Plants of Jewel have erect culms, dark green erect leaves, and glabrous lemma, palea, and leaf blades. The lemma and palea are straw-colored with red to purple apiculi, most of which fade to straw at maturity. Milled kernels of Jewel are 7.07mm compared to Diamond, LaKast, and Roy J, at 7.17, 7.56, and 7.31 mm, respectively. Individual milled kernel weights of Jewel, Diamond, LaKast, and Roy J averaged 19.9, 21.4, 22.3, and 21.1 mg/kernel, respectively, from the ARPT 2017-2018 data from the Riceland Foods Inc. Quality Laboratory.

**“Jewel” From Dr. K. Moldenhauer**

Jewel is a high-yielding, mid-season, long-grain rice cultivar that was developed at the Rice Research and Extension Center and approved for release after the 2019 growing season.

Jewel is about 3 to 4 days earlier than ‘Roy J’ in maturity. Jewel has straw strength similar to Diamond, which is an indicator of lodging resistance. Jewel has a canopy height of 37 inches which is comparable to Diamond and LaKast with canopy heights of 36 inches.
The endosperm of Jewel is nonglutinous, nonaromatic, and covered by a light brown pericarp. Rice quality parameters indicate that Jewel has L202 cook type with high amylose, a weak RVA and intermediate gelatinization temperature. Jewel has an average apparent starch amylose content of 25.6% and an intermediate gelatinization temperature of 70°C as measured by the Riceland Food Inc. Quality Laboratory.

Jewel was developed using Rice Grower check-off funds administered by the Arkansas Rice Research and Promotion Board.

**CLL16 RELEASED TO BASF/ HORIZON AG**

*Taken from an article by Fred Miller*

CLL16, a new high-yield, long-grain Clearfield® rice variety developed by the U of A System Division of Agriculture, will be available to rice growers from Horizon Ag in 2021.

Karen Moldenhauer, professor and rice breeder for the Division, said CLL16 has excellent rough rice yields, averaging 205 bushels per acre, slightly better than Diamond, which averages 204 bushels per acre.

“This Horizon Ag is excited to market CLL16, developed in partnership with the University of Arkansas System Division of Agriculture and BASF,” said Tim Walker, Horizon Ag general manager. “This variety promises a step change in yield potential while offering industry-leading blast tolerance and a milled product that continues to bring back the Gold Standard rice the southern USA has historically produced.”

CLL16 is resistant to blast in Arkansas growing conditions. It has demonstrated good milling yields, averaging 63 percent whole kernel and 69 percent total milled rice for samples from Arkansas Rice Performance Trials across the state. CLL16 is a very stable cultivated variety with an early maturity date, averaging 86 days to 50 percent heading, similar to CL172 and Wells and about four days earlier than Roy J, with standard height with a 36-inch canopy, similar to Diamond. It has typical southern U.S. long-grain cooking quality and good straw strength.
TECH CORNER: PRINTED PIPE FOR SURFACE IRRIGATION
By Chris Henry, PhD, PE

For surface irrigators in the South and other parts of the country, lay flat pipe is a popular method of flood irrigation. Although its use is simple, ensuring even and efficient distribution of water is a complex challenge.

Single-use lay flat pipe is unrolled across the field, and holes are punched along the pipe to allow water to flow into the furrows between the rows. A length of pipe can be as long as 1,300 feet, so managing water flow is important.

Rather than making all of the pipe holes the same size, surface irrigators have the option of using a computerized hole selection method that adjusts the size of the holes punched to control the amount of water flow. The software provides a pipe hole punch plan for a field that balances pressure, pipe size, elevation and flow rate to deliver uniform furrow flow. The field shape, terrain and row length all play into the appropriate hole size for each row.

Properly implementing computerized hole selection reduces water use by 25%-50%. Even though using these selection plans offers the highest potential to improve efficiency and profitability, current adoption in the Mid-South region is only around 40%. Difficulty in implementing a plan with multiple hole changes could be an obstacle which prevents adoption.

One of the challenges of using a computerized plan comes after the pipe installation. Although the plan indicates what size of hole to punch in each location, it is easy to lose track of where along the pipe the hole sizes change. To solve this problem, a system was developed using GPS, Bluetooth technology and a printer to aid in the implementation of the computerized hole selection plan to the pipe.

Before laying out the pipe in a field, the user uploads the computerized hole selection plan to a mobile device. As the pipe is unrolled along the field, the system communicates with a printer directly onto the pipe indicating the specific hole size in each location along the length of it. By utilizing WAAS and RTK GPS technology, the system knows the location with respect to the plan and prints the correct hole size along the pipe as it is installed in the field. The user then punches the hole with the correct size during pipe fill.

With this system, it is possible to put out 10 miles of pipe in one day. The result is less work, improved accuracy and increased irrigation efficiency. This system was patented in October 2019 and is under further development with a plan to make it available to farmers in the near future.

Chris Henry, PhD, PE is an associate professor and water management engineer at the University of Arkansas Rice Research and Extension Center.
Division of Agriculture’s first commercially released rice varieties give growers more options
By Fred Miller

The U of A System Division of Agriculture has licensed two commercially released rice varieties to an Arkansas seed company that will market them to growers in time for the 2021 growing season. The long-grain rice varieties, RU1701081 and RU1701084, will be available from Erwin-Keith Inc./Progeny Ag, based in Wynne, Arkansas.

“RU1701081 has traditional long-grain cooking quality, low chalk and can withstand the common rice blast races,” said Karen Moldenhauer, rice breeder for the Arkansas Agricultural Experiment Station, the research arm of the Division of Agriculture. “It has a very similar yield to LaKast.” RU1701081 was not released because it would have duplicated the advantages available from Jewel, Moldenhauer said. “But it is still a good variety for which a lot of testing has occurred, so it’s being made available for those who might want it,” she said.

“RU1701084 is a very high-yielding variety but not very different from Diamond, which had just been released,” Moldenhauer said. “Again, it’s a very good variety with lots of data, and it is also being made available to those who might want it.” Some rice breeding lines are advanced right to the brink of release as public varieties, said John Carlin, director of the Arkansas Crop Variety Improvement Program. But, like RU1701081 and RU1701084, some are not released as public varieties because they perform similarly to existing public varieties. They remain in the breeding program where they may offer genomic contributions to other breeding lines but are otherwise shelved.

Some of those lines, however, offer particular advantages for growers in some growing areas.

“We’ve decided to offer some of these breeding lines as commercially released varieties under exclusive license to a single company for two reasons,” Carlin said. “They offer growers more options in some parts of the state, and offering them for license helps recoup some of the investment we’ve made in advancing them to this stage of development.”

The division sells its public rice varieties at cost to many seed companies that, in turn, sell them to growers. Carlin said the Division of Agriculture receives no royalties from public varieties.

Erwin-Keith Inc. will rename and market the rice seed under the Progeny Ag label, said Nathan Cook, general manager. “These will be the first rice seed products we sell with our own brand,” he said.

Progeny Ag is the seed brand for Erwin-Keith Inc., Cook said. The company has its own brands of soybeans, corn and wheat and sells other brands of rice seed, including U of A System Division of Agriculture public varieties.

Erwin-Keith Inc./Progeny Ag was selected as the distributor for the commercially released varieties based on proposals submitted by several seed companies, Carlin said. The Division of Agriculture’s Foundation Seed Program will produce foundation seed annually for RU1701081 and RU1701084, Carlin said. Erwin-Keith Inc./Progeny Ag will purchase the foundation seed and grow certified seed from it for sale to rice growers.

Developing rice varieties — which take years of crossing, testing and advancing — is costly, Carlin said. Offering some advanced lines as commercial varieties to growers who can use them will help recover some of that cost.
Division of Agriculture’s first commercially released rice varieties give growers more options (continued)

The royalties from the sale of RU1701081 and RU1701084, and other varieties that may be released later, will be divided between the Division of Agriculture’s rice breeding and research program and the Arkansas Rice Research and Promotion Board, which helps fund rice breeding and research with rice check-off money.

“Many years ago, the producer community realized the value of research,” said Roger Pohlner, ARRPB chairman. “They initiated the rice check-off program to fund research for better yields and more economical production practices as well as market promotion to enhance the price realized for their crops in the market place.

“The Arkansas Rice Research and Promotion Board administers these check-off funds for both research and promotion,” Pohlner said. “High on the list of priorities for this board is new variety development. The goal is to find higher-yielding varieties that can be produced more economically in an environmentally friendly manner.”

Pohlner said the money the rice board receives from commercially released varieties goes back into the program to fund additional research.

ARoma17, Titan & Diamond
a hit at meetings & conferences

The Division promoted our current rice releases at the RREC summer field day, 2019 Rice Outlook Conference in Little Rock, the state Farm Bureau convention and at a new event called “Downtown on the Farm” that was organized by Arkansas Rice to educate the public about farming. More than 2,000 cooked samples of ARoma17, Diamond and Titan were given away at the events.

Below left: Rice Outlook Conference Division RREC booth. Right: Brian Helms and Tracy Courage dish up race samples at Downtown on the Farm to introduce folks to aromatic versus non-aromatic rice.

Seated from left: Dr. Karen Moldenhauer and Suzanne Delao; standing: Havier Delao, John Carlin, Grant Beckwith, and Dr. Bob Scott
The 2019 planting season started very cool and wet in Arkansas, but we were able to establish excellent stands in our Foundation Seed fields, and rice growth progressed well throughout the growing season. Our decision to treat our rice seed paid good dividends this year. Our State Plant Board field and seed inspectors said this was the highest quality crop they had seen in many years. Our rice yields were over 200 bu/a for many of our new varieties. We continued our close monitoring of our seed conditioning procedure by taking seed quality samples at several stages in the seed cleaning process. Our Foundation Seed team notes step-by-step documentation of each variety as it goes through the system to insure a thorough and effective job is performed.

We expanded our acreage of ARoma17 in 2019 to account for demand from both Arkansas seed dealers and rice growers. When enough seed dealers are producing certified seed of ARoma17 to satisfy demand from rice growers, the foundation seed program will drop back to only producing foundation-grade seed for the seed dealers. To increase the market penetration of ARoma17, we need the enhanced distribution brought to the marketplace by the combined sales force of our seed dealer partners. ARoma17 yielded about 200 bu/acre and we ended up with over 1,000 finished bushels, which is a phenomenal yield for an aromatic rice.

Foundation seed also produced expanded seed quantities of AR1121 (medium grain) and AR1087 (long grain) experimental rice varieties in anticipation of their promotion to commercial status. Lynx (500 bushels) and Jewel (900 bushels) were promoted, and we have significant quantities to introduce into the market in their first year of availability. We also had interest from an Arkansas company for seed of our short grain variety 1099, which was released over 10 years ago. Foundation seed also produced three Clearfield varieties for Horizon Ag: two commercial varieties (CLL15 and CLM04) and one experimental (CLXAR19). We produced one older long-grain variety, Spring, which Stratton Seed Company will market for use on Waterfowl Conservation acres.

We produced two conventional soybean varieties, Osage and UA5014C, and two Round-Up Ready I varieties, UA5414RR and UA5715GT. There has been consistent demand for our conventional varieties, and we have worked with the seed dealers to place these in areas that pay a premium for conventional soybean to provide the animal industry with this feed source. We averaged about 50 bu/ac in our foundation seed acres and had a high quality seed crop with tested germination above 85% for the seed produced in 2019.

We planted three varieties of wheat at the Pine Tree research station in late 2019. We will produce seed of Hilliard variety that we have used for several years and also seed of two Arkansas-bred varieties (AR06146E and ARO9137UC) from Esten Mason's program. Esten has proposed that we promote AR06146E to commercial status. These varieties have very desirable agronomic trait packages for the mid-South, and to date, these wheat fields look excellent.

Foundation seed was sold and shipped to 16 states in 2019. We also installed a Zaccaria ZX-3 rice mill that will provide us high-quality freshly milled rice of our newest and best varieties to give to growers, seed dealers and rice milling industry personnel in order to build market awareness for our rice breeding programs. We have milled about 6,000 pounds of rice from ARoma17, Diamond, Titan and Lynx already. This milled seed was distributed at numerous events this fall and used to promote Division efforts. The breeders also use this when they are asked to supply significant quantities of milled rice to various end-users to evaluate the desirability of newly developed varieties.
RREC Faculty and Staff Represent the Division of Agriculture at Rice Technical Working Group Meeting

Papers presented:

Identification of Genetic Sources of Restorability in Arkansas Restorer Rice Plants
Ozgur Azapoglu, Vibha Srivastava, Xueyan Sha, Kris Brye, Ehsan Shakiba

Characterization and Application of Arkansas Male Sterile Lines for Hybrid Rice Production
D.G. North, E. Shakiba, K.A.K. Moldenhauer, & P. A. Counce

Public Rice Breeding at Crossroads - Challenges and Opportunities
Sha, X., Beaty, B.A., and Bulloch, J.A.

A Five Year Summary of the University of Arkansas Rice Research Verification Program
Mazzanti, R., Baker, R.P, Hardke, J.T., Watkins, K.B.

Boot Nitrogen Applications for Hybrid Rice in Direct-Seeded, Delayed-Flood System

An Evaluation of Changes in Rice Acreage and Irrigation Water Sustainability in Arkansas
Gautam, T.K. and Watkins, K.B.

Comparing the Effects of Multiple Planting Dates on Rice Grain Yield and Quality
Courtland Hemphill, Dr Manuel Esguerra, Dr Paul Counce

Impacts of Arkansas Rice Foundation Seed Sales on Proportions of Acres Planted to Public and Proprietary Rice Lines in Arkansas

Evaluation of Water Volume for Coverage in Fungicide Application to Manage Rice Sheath Blight
Wamishe, Y.A., Hardke, J. Gebremariam, T.A., Belmar, S.B., Kelsey, C.D., Mulaw, T

Seed Dressing to Manage Seed Rots and Seedling Diseases of Rice Caused by Rhizoctonia sp.
Wamishe, Y.A., Gebremariam, T.A., Belmar, S.B., Mulaw T, Kelsey, C.D

Determining Rice Blast Disease Resistance Conferred by the Pi-40 Gene

From Cross to Release: The Journey of a Rice Variety Through the Arkansas Long-Grain Breeding Program
Papers presented (continued):

Performance of Popular Arkansas Rice Varieties under High Night Temperature Treated at R2 and R5 Reproductive Stages
Esguerra, M.Q., Hemphill C.C., Counce, P.A.

Rice Stink Bug Management in Arkansas Rice Production

Effects of defoliation on growth and yield in rice

Dr. Karen Moldenhauer accepts the Rice Technical Working Group Award for Distinguished Service. She has worked for the Division for 38 years, and her varieties have been planted on over 20 million acres of Arkansas rice throughout her career. She plans to retire in June.

2020 RICE MANAGEMENT GUIDE AVAILABLE
Submitted by Dr. Jarrod Hardke

The 2020 Rice Management Guide publication is now available. It contains the most requested production recommendations for rice in a single, easy-to-reference PDF. Access the publication by following the link below.

This information will also be posted to the Extension rice page (http://uaex.edu/rice) and the Arkansas Row Crops blog (http://arkansas-crops.com).

CALENDAR OF EVENTS
Station Field Day set for Aug. 7, 2020