

ARKANSAS RICE RESEARCH AND PROMOTION BOARD MEETING

Minutes

June 26, 2024

8:30 a.m.

The Arkansas Rice Research and Promotion Board meeting was held at the University of Arkansas Division of Agriculture Rice Research and Extension Center, 2900 Highway 130 East, Stuttgart, AR.

Member(s) Present: Joe Christian, Jay Coker, David Gairhan, John King, Scott Matthews, Jeff Rutledge, Jim Whitaker, Charles Williams

Member(s) present via Zoom: Roger Pohlner

Chair Jim Whitaker called the meeting to order and welcomed all members and guests.

Chair Whitaker stated the purpose of this meeting is to discuss the hybrid rice breeding program, the draft hybrid rice breeding program Memorandum of Understanding (MOU) between the board and the University of Arkansas Division of Agriculture (UADA), and other potential research topics, particularly those based on needs identified by producers.

Cynthia Edwards, Deputy Secretary of Agriculture and Administrator of the Arkansas Rice Research and Promotion Board, announced she will be retiring as Deputy Secretary of Agriculture in September. Plans are for Edwards to continue serving as the administrator of the Arkansas Rice Research and Promotion Board (Board).

Edwards introduced Alex Johnston, who will become the new Deputy Secretary of Agriculture in September.

Minutes of the February 8, 2024 Rice Research and Promotion Board meeting were presented for review and approval.

Moved by King, seconded by Rutledge to approve the minutes as presented.

Motion carried.

Inoussa Zaki, Chief Fiscal Office presented the financial report shown at **Attachment 1**. The Board began the fiscal year with \$503,914 cash on hand. With more than 231 million bushels of rice assessed, \$6,247,557 was collected between July 1, 2023 and June 15, 2024. The board ended this reporting period with an accumulated revenue of \$1,484,548 million. With a contingency reserve of \$50,000 and \$48,355 in payables to the USA Rice, \$1,386,193 is available for future projects.

Joe Christian asked about a TRQ funding report. Edwards stated that a full TRQ report was not prepared for this special called meeting but would be presented at the next regularly scheduled meeting, currently scheduled for July 31.

Chair Whitaker stated he had been in discussions with the USA Rice Foundation about TRQ investments, including investing some of those funds in Arkansas banks. He also stated Arkansas's portion of the June 24 COL-RICE auction is estimated to be \$382,686. He reminded the board there are four years remaining on the agreement and the rates are declining.

After additional discussion, Chair Whitaker stated he would ask the USA Rice Foundation to provide a detailed overview of the TRQ investments and the process they follow in making investment decisions. Members were asked to submit their questions about the TRQ investment process prior to the next meeting.

Moved by Christian, seconded by King to approve the financial report as presented.

Motion carried.

Dr. Slaton, University of Arkansas Division of Agriculture, presented information on the UADA Rice Breeding Program Strategic Plan – 2025 – 2035. **Attachment 2**

Dr. Slaton discussed research projects and how they are moving forward, focusing on the hybrid rice breeding program. The board discussed the merits of continuing to fund the hybrid breeding program, its potential future benefits to Arkansas rice producers, and the draft hybrid breeding program MOU. **Attachment 3**

Moved by Rutledge, seconded by Coker for the Chair to sign the MOU as presented.

Motion carried.

Dr. Tim Burcham, Director of the Northeast Rice Research and Extension Center, provided an update on the facility, including information about a rice field day on August 8 and the grand opening of the facility on August 30.

Chair Whitaker asked the Board to share topics they would like to have included as research projects. Chair Whitaker began with straw management, side-by-side crop additive trials, and ways to cut cost as potential research topics. Other potential research topics and other topics of interest included row rice, water conservation, economic thresholds, consultant training and education, slow-release nitrogen for row rice, herbicides that can be flown on, and drone technology, including ultra-low volume spray.

Chair Whitaker stated the next Rice Research and Promotion Board meeting is set for July 31st at 2:00 p.m. in Stuttgart. He also encouraged all members to attend the UADA rice field days in Stuttgart and Northeast Arkansas.

Meeting adjourned.



Jim Whitaker, Chairman

Attachment 1

Arkansas Rice Research and Promotion Board Income, Expenses, and Accumulated Revenue July 1, 2023 Through June 15, 2024

REVENUE:

Beginning Fund Balance	\$	503,914
Gross Collections	\$	6,247,557
Producer	\$	3,122,538
Buyer	\$	3,122,538
Audit penalties and interest	\$	2,482

DEDUCTIONS:

Less Revenue and Treas. (3.1%)	\$	193,674
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TOTAL AVAILABLE REVENUE \$ 6,557,797

EXPENDITURES:

Board Member Expenses	\$	6,732
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Program Expenses:

USA Rice Council	\$	3,056,517
University of Arkansas	\$	2,000,000
Producer Information	\$	10,000
Rice Foundation	\$	-
Coop. Ext. Service	\$	-
Total Program	\$	5,066,517

TOTAL EXPENDITURES \$ 5,073,249

ACCUMULATED REVENUE: \$ 1,484,548

Contingency Reserve	\$	50,000
Payable to Rice Foundation	\$	-
Payable to USA Rice Council	\$	48,355
Payable to UofA	\$	-
Unallocated Balance	\$	1,386,193

Arkansas Rice Research and Promotion Board
Projection of Collections
As of June 15, 2024

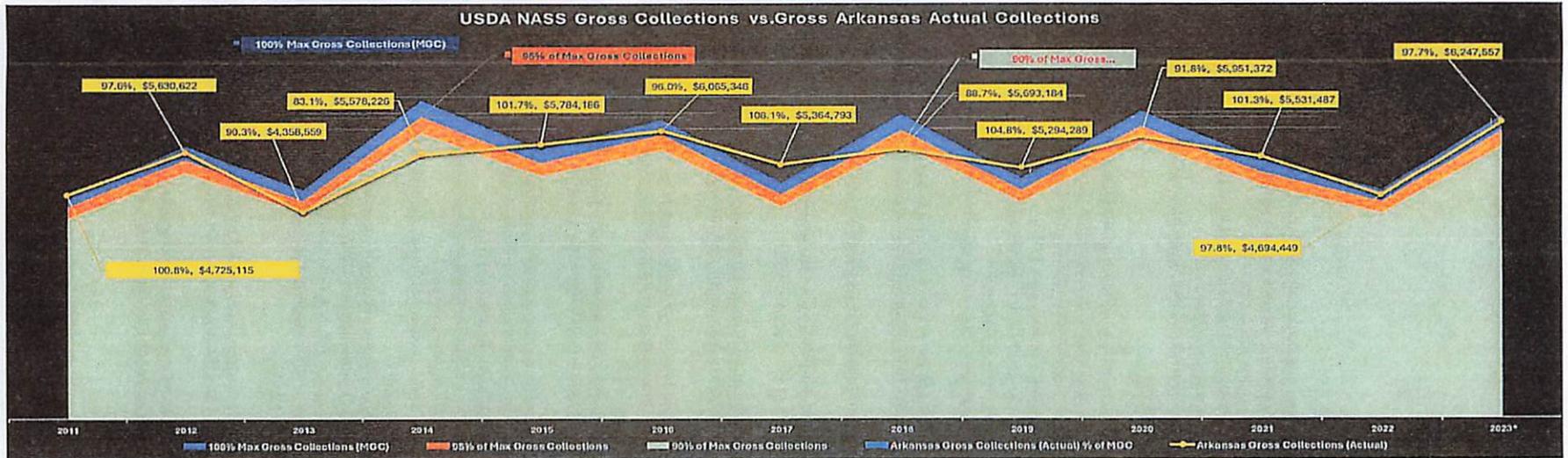
	PROJECTED			Current Year Actual
	@ 100% of Max. Gross Collections	@ 95% of Max. Gross Collections	@ 90% of Max. Gross Collections	
Production, measured in bushels	236,734,444	224,897,722	213,061,000	231,391,003
Rate	\$0.027	\$0.027	\$0.027	\$0.027
Max. Gross Collections (MGC)	\$6,391,830	\$6,072,238	\$5,752,647	\$6,247,557
ACTUAL COLLECTIONS:				
Producer Collections	\$3,195,915	\$3,036,119	\$2,876,323	\$3,122,538
Buyer Collections	\$3,195,915	\$3,036,119	\$2,876,323	\$3,122,538
Audit Settlements (Penalties and Interr)	\$0	\$0	\$0	\$2,482
TOTAL COLLECTIONS	\$6,391,830	\$6,072,238	\$5,752,647	\$6,247,557
Percent of MGC Realized				98% †
Less:				
Revenue and Treasury (3.1%)	\$198,147	\$188,239	\$178,332	\$193,674
Board Expenses	\$5,000	\$5,000	\$5,000	\$6,732
Total	\$203,147	\$193,239	\$183,332	\$200,406
NET COLLECTIONS	\$6,193,683	\$5,883,999	\$5,574,315	\$6,053,883
Beginning Balance	\$503,914	\$503,914	\$503,914	\$503,914
Due USA Rice from Previous Year	\$81,296	\$81,296	\$81,296	\$81,296
Unallocated Beginning Balance (Resea	\$422,618	\$422,618	\$422,618	\$422,618
PROMOTION/MARKET DEVELOPMENT:				
AVAILABLE FUNDS	\$3,175,638	\$3,020,796	\$2,865,954	\$3,104,872
USA Rice Council	\$3,173,138	\$3,018,296	\$2,863,454	\$3,056,517
RESEARCH:				
AVAILABLE FUNDS	\$3,516,959	\$3,362,117	\$3,207,275	\$3,446,193
2024-25 Research Funding	\$2,860,746	\$2,860,746	\$2,860,746	\$2,010,000
Contingency Reserve	\$50,000	\$50,000	\$50,000	\$50,000
Unallocated Balance	\$606,214	\$451,372	\$296,530	\$1,386,193

* 2023 Production est. based on January Annual USDA est. of 1.411 mil. Acres harvested @ 7550 lbs/acre
† Percent of the \$6,391,830 (MGC) realized to date. Page 2 of 4

USDA NASS Gross Collections vs Arkansas Actual Gross Collections

USDA NASS Arkansas acreage, yield, production, and price; check-off rate per bushel; USDA NASS estimated gross collections by fiscal year; and Arkansas actual gross collections by fiscal year for production years 2011 to 2023

Production Year Fiscal Year, July 1 - June 30	2011 FY-2012	2012 FY-2013	2013 FY-2014	2014 FY-2015	2015 FY-2016	2016 FY-2017	2017 FY-2018	2018 FY-2019	2019 FY-2020	2020 FY-2021	2021 FY-2022	2022 FY-2023	2023* FY-2024
Planted Acres	1,195,000	1,291,000	1,076,000	1,480,000	1,311,000	1,546,000	1,161,000	1,441,000	1,161,000	1,461,000	1,211,000	1,108,000	1,436,000
Harvested Acres	1,154,000	1,285,000	1,064,000	1,460,000	1,291,000	1,521,000	1,104,000	1,422,000	1,125,000	1,441,000	1,193,000	1,080,000	1,411,000
Yield, measured in pounds / acre	6,770	7,480	7,560	7,560	7,340	6,920	7,490	7,520	7,480	7,500	7,630	7,410	7,550
Yield, measured in bushels / acre	150	166	168	168	163	154	166	167	166	167	170	165	168
Production, measured in pounds	7,812,580,000	9,611,800,000	8,043,840,000	11,188,000,000	9,475,940,000	10,525,320,000	8,268,960,000	10,693,440,000	8,422,480,000	10,807,500,000	9,102,590,000	8,002,000,000	10,653,050,000
Production, measured in bushels	173,612,869	213,595,556	178,752,000	248,640,000	210,576,444	233,896,000	183,754,667	237,632,000	187,166,222	240,166,657	202,279,778	177,840,000	236,734,444
Price received, measured in \$ / cwt	\$ 13.40	\$ 14.30	\$ 15.20	\$ 12.00	\$ 10.90	\$ 9.39	\$ 11.10	\$ 10.70	\$ 11.90	\$ 12.50	\$ 13.50	\$ 16.70	\$ 16.00
Price received, measured in \$ / bushels	\$ 6.03	\$ 6.44	\$ 6.84	\$ 5.40	\$ 4.91	\$ 4.23	\$ 5.00	\$ 4.62	\$ 5.36	\$ 5.63	\$ 6.08	\$ 7.52	\$ 7.20
Rate	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270
Rate - Arkansas rice farmers and handlers each pay \$0.0135 per bushel sold for the Arkansas Rice Checkoff program.													
100% Max Gross Collections (MGC)	\$ 4,687,548	\$ 5,767,080	\$ 4,826,304	\$ 6,713,280	\$ 5,685,564	\$ 6,315,192	\$ 4,961,376	\$ 6,416,064	\$ 5,053,488	\$ 6,484,500	\$ 5,461,554	\$ 4,801,680	\$ 6,391,030
95% of Max Gross Collections	\$ 4,453,171	\$ 5,478,726	\$ 4,584,989	\$ 6,377,616	\$ 5,401,286	\$ 5,999,432	\$ 4,713,307	\$ 6,095,261	\$ 4,800,814	\$ 6,160,275	\$ 5,188,476	\$ 4,561,596	\$ 6,072,239
90% of Max Gross Collections	\$ 4,218,793	\$ 5,190,372	\$ 4,343,674	\$ 6,041,952	\$ 5,117,008	\$ 5,683,673	\$ 4,465,238	\$ 5,774,458	\$ 4,548,139	\$ 5,836,050	\$ 4,915,399	\$ 4,321,512	\$ 5,752,647
Arkansas Gross Collections (Actual)	\$ 4,725,115	\$ 5,630,622	\$ 4,358,559	\$ 5,578,226	\$ 5,784,166	\$ 6,065,346	\$ 5,364,793	\$ 5,693,104	\$ 5,294,289	\$ 5,951,372	\$ 5,531,487	\$ 4,694,449	\$ 6,247,557
Arkansas Gross Collections (Actual) % of MGC	100.8%	97.6%	90.3%	83.1%	101.7%	99.0%	109.1%	88.7%	104.6%	91.8%	101.3%	97.0%	97.7%



2024-2025 Funding Disbursements Report

Project Title	2024-2025 Board Awarded Amount	Disbursements Through June 15, 2024	Remaining Disbursements from 2024-2025 Funding
Developing an Arkansas Rice and Meat Bratwurst	\$ 13,980.00		\$ 13,980.00
Incorporating Genetic Tolerance to Reduced Irrigation into the Arkansas Rice Breeding Program (New, Year 1 of 3)	\$ 50,000.00	\$ (50,000)	-
Revising the Prevalence and Stability of host resistance of Rice Blast Races in Arkansas (New, Year 1 of 3)	\$ 97,156.00	\$ (97,156)	\$ -
Integrating Host Resistance and Fungicides to Control Cercospora in Rice (New, Year 1 of 3)	\$ 48,000.00	\$ (48,000)	\$ -
Developing Blast-Resistant, Water-Smart Rice Varieties Through Genomic Prediction and Marker-Assisted Selection (New, Year 1 of 3)	\$ 78,000.00	\$ (78,000)	\$ -
Improving Grain Chalkiness and Grain Yield Traits of Elite Rice Through Targeted Mutagenesis (New, Year 1 of 3)	\$ 39,000.00	\$ (39,000)	\$ -
Validation of In-Season Tissue Sampling for Rice Nutrient Management (New, Year 1 of 3). All ecosystems.	\$ 55,664.00	\$ (55,664)	\$ -
Nitrogen Management Tools for Arkansas Rice Producers (Year 3 of 3). All ecosystems.	\$ 115,000.00	\$ (115,000)	\$ -
Rice Insect Management (Year 3 of 3). All ecosystems	\$ 135,000.00	\$ (135,000)	\$ -
A Team Approach to Improved Weed Management in Rice (Year 3 of 3). All ecosystems.	\$ 255,000.00	\$ (255,000)	\$ -
Nitrogen Recommendations for New Rice Cultivars (Year 3 of 3). All ecosystems.	\$ 64,000.00	\$ (64,000)	\$ -
DD50 Thermal Unit Thresholds and Seeding Date Effects for New Rice Cultivars (Year 3 of 3). All ecosystems.	\$ 65,000.00	\$ (65,000)	\$ -
Agronomic Production Practices for Rice (Year 3 of 3). All Ecosystems.	\$ 103,000.00	\$ (103,000)	\$ -
Economic Analysis of Arkansas Rice Farms (Year 3 of 3). Grand Prairie Ecosystem.	\$ 55,000.00	\$ (55,000)	\$ -
Rice Breeding and Pathology Tech Support (Year 3 of 3)	\$ 160,000.00	\$ (160,000)	\$ -
Breeding and Development of Improved Long Grain and Aromatic Rice Varieties (Year 3 of 3).	\$ 310,000.00	\$ (310,000)	\$ -
Arkansas Rice Variety Advancement Trials (Year 3 of 3).	\$ 102,000.00	\$ (102,000)	\$ -
Arkansas Rice Performance Trials (Year 3 of 3).	\$ 96,000.00	\$ (96,000)	\$ -
Breeding Hybrid Rice Varieties for Arkansas and Southern US (Year 3 of 3).	\$ 195,000.00	\$ (172,180)	\$ 22,820.00
Development of Superior Medium-Grain and Long-Grain Rice Varieties for Arkansas and the Mid-South (Year 3 of 3).	\$ 315,000.00		\$ 315,000.00
Quality Analysis for Rice Breeding and Genetics (Year 3 of 3).	\$ 118,202.00		\$ 118,202.00
Puerto Rico Winter Nursery (Year 2 of 3)	\$ 73,500.00		\$ 73,500.00
Monitoring and Management of Fungicide Resistance of Sheath Blight in Arkansas (Year 2 of 3).	\$ 35,500.00		\$ 35,500.00
Rice Research Verification Program (Year 3 of 3).	\$ 116,639.00		\$ 116,639.00
Study of Cultivar Attributes and Their Measurements to Improve Rice Milling and Functional Characteristics (Year 3 of 3)	\$ 61,000.00		\$ 61,000.00
Analysis of Farm Policy Programs and Competitiveness of Arkansas and U.S. Rice (Year 2 of 3).	\$ 20,000.00		\$ 20,000.00
Rice Enterprise Budgets and Production Economic Analysis (Year 3 of 3).	\$ 7,500.00		\$ 7,500.00
Climate Smart 300 Bushel Row Rice on 12 inches of Automated Irrigation (Year 3 of 3).	\$ 85,000.00		\$ 85,000.00
Rice Fertilization- Developing Novel Methods to Assess Nutrient Availability to Arkansas Rice (Year 3 of 3). All ecosystems.	\$ 58,000.00		\$ 58,000.00
Less UofA Carryover			\$ (66,395.29)
Grand Total:	\$ 2,927,141.00	\$ (2,000,000)	\$ 860,745.71

Attachment 2

UADA Rice Breeding Program Strategic Plan – 2025-2035

University of Arkansas Division of Agriculture's Rice Breeding Program is an amalgamation of projects including long-grain breeding, medium-grain breeding, aromatic breeding, hybrid-rice breeding, Puerto Rico winter nursery, Arkansas rice variety advancement trials, rice breeding pathology support, quality analysis for rice breeding and genetics, high nighttime temperature, and Foundation Seed. The program has a storied history of developing high-yielding, good-quality, and blast-resistant varieties that meet the demands of the Arkansas rice industry.

In January 2024, an external review was conducted to evaluate the Rice Breeding Program with the program being rated favorably for its productivity and overall impact. The main recommendation from the review team was for the Rice Breeding Program leadership to develop a comprehensive strategic plan that ties the numerous individual projects into a comprehensive program. In response, a strategic plan has been developed after incorporating feedback and input from collaborators and stakeholders, and it builds on the program's legacy and the strength to deliver significant outcomes and opportunities. The plan adopts a 10-year timeline, recognizing that this duration is necessary for developing and introducing a promising pure line cultivar. However, it also acknowledges that breeding program goals can vary, with some being foundational and others needing flexibility to adapt to market or production challenges.

Rice growers in Arkansas and other southern states are facing challenges such as high input costs, volatile commodity prices, labor shortages, water quality and quantity issues, regulation and limited supply of crop protection products, and climate change that includes extreme heat, drought, and excessive rainfall (e.g., flooding). Developing superior rice varieties with high and stable yields, resistance or tolerance to disease and environmental extremes, and enhanced water and input-use efficiencies will help rice growers increase productivity, reduce costs, and meet conservation goals.

The overarching challenge for all breeding programs is to develop varieties that have excellent and stable grain yield potential with exceptional grain quality and milling yields. Data from the milling industry suggests that there has been a steady decline in rice head rice yields across the mid-South USA for the last two decades. The interaction among climate change, production systems, and rice genetics have led to the production of low-quality rice grain, eroding export markets and demand for long-grain rice grown in the mid-South USA. Climate change adds to the challenge of producing high-quality and milling rice. Regardless of the reasons, breeding for lines with grain quality attributes that include grain dimension, shape, uniformity, translucency, and low chalkiness can help restore foreign market demand for mid-South rice.

Providing growers with high-yielding cultivars with stable yield and tolerance to stressors that include sheath blight and blast, the two most important rice diseases in Arkansas and the mid-South USA, are of paramount importance to the resiliency of mid-South rice production systems. With only partial resistance and a lack of major genes for resistance, Arkansas rice growers rely on fungicides to control sheath blight. Meanwhile, major resistance genes such as *Pi-ta* alone or in combination provide effective control of blast. With the changing climate, traditional minor diseases such as bacterial panicle blight and narrow brown leaf spot have increasingly become problems in Arkansas.

This strategic plan summarizes the vision, mission, and major goals of the UADA Rice Breeding Program and communicates that the Program's collective components and projects are collaborative, dynamic, and forward-thinking.

Vision:

The UADA Rice Breeding Program strives to be a pioneering force in the US rice industry, fostering productivity, profitability, and sustainability. Through continuous innovation, collaborative efforts, and cutting-edge research, we aim to elevate rice cultivation in Arkansas and the mid-South, ensuring a prosperous future for farmers and consumers alike.

Mission: The UADA Rice Breeding Program's mission is to provide rice growers in Arkansas and the mid-South USA with cutting-edge, competitive rice varieties. Competitive varieties offer high and stable grain yields, excellent milling and grain quality, excellent disease resistance, and the latest traits for effective weed control. The development and release of such cultivars will advance the productivity, sustainability, profitability, and long-term growth prospects for both farmers and the rice industry.

Roadmap of the Rice Breeding Program

Project	Cross	Progeny	Preliminary trial	Advanced trial	Statewide/regional trial (ARVAT, PC, URRN)	BHR/Breeder/Foundation seed	Release
	Yr 1	Yr 2-4	Yr 3-5	Yr 4-6	Yr 5-7	Yr 6-8	Yr 7-9
Breeding	1,500/yr	90,000/yr	2,800 new lines, 2 reps	280 lines, 3 reps and 5 loc/dates	70 lines/yr	5-10/yr	1-2/yr
Puerto Rico winter nursery		13,500 rows/yr			20-30 lines/yr purification/inc	1-2/yr as needed	
Molecular marker ¹	2,000 BC/F1 plants		Characterize/MAS 2,500 lines			Fingerprint/quality control 600 plants	
Genomic selection		5,000/yr ²					
Pathology support			Screening ~500 LG&Aro lines	Screening ~100 LG&Aro lines	Screening ~120 UA lines&cks		
ARVAT					~80 UA lines&cks, 4 reps and 6 loc		
Quality analysis					~100 lines/cks (1,500 samples from ARVAT&ARPT)		
HNT	Pre-breeding line ²				Screening for HNT tolerance ²		
USDA-Dale Bumpers	Pre-breeding line ²	Contribute to genomic selection ²			14 UA lines&cks for blast and quality		

¹ Molecular marker project has been discontinued since 2022, however, molecular marker work has since been integrated into breeding projects and dramatically expanded.
² Activity/output is planned.

Goals:

1. Develop high-yielding pure line cultivars (long grain and medium grain) that yield 20% more than current pure line cultivars and 95% of commercialized hybrids over the next 10 years.
2. Develop pure line cultivars with high and stable whole grain (head) and total rice milling yields, and high grain quality (low chalk), compared to the current appropriate commercial standard cultivars/hybrids in ARVAT

3. Develop pure line cultivars with stable yield across environments by simultaneously improving disease resistance, stress tolerance, straw strength, high nighttime temperature tolerance, water use efficiency
4. Develop aromatic rice cultivars with desirable marketable grain qualities that are better than the current aromatic cultivar such as ARoma 22 and CLJ01 based on aroma (2-AP and/or other volatile chemical profiles) and sensory panel assessment
5. Incorporate different herbicide traits/technologies, novel blast resistance genes (*Pi-9*), and traits for niche varieties (extra high amylose content) into conventional Arkansas elite lines through high-throughput marker-assisted backcrossing.
6. Develop male sterile and restorer/pollinator lines for hybrid breeding that have smooth leaves, high grain quality, blast resistance, and efficient seed production (e.g., good combining ability/seed production potential).
7. Maintain breeding efforts that facilitate niche traits that may have market interest in the future

Strategies for Achieving Goals

1. Adopt best breeding practices and new technologies such as data automation, and imaging capture and mechanization to accelerate the delivery of improved rice varieties through best breeding practices with a focus on increasing yield potential of both long- and medium-grain rice while maintaining or improving grain quality. (Goals 1-5)
2. Breeding Program resources will be allocated as 50% for long-grain breeding, 25% for hybrid breeding, 15% medium-grain breeding, 5% for aromatic breeding, and 5% for niche trait breeding. Breeding Program resource allocation among herbicide traits will be 55% conventional, 20% Clearfield, 20% Provisia, and 5% on other herbicide traits. (Goals 1-7)
3. Implement high-throughput marker-assisted selection (MAS), for marker-assisted backcross conversions of herbicide traits, new broad-spectrum blast resistance genes, grain quality traits, and traits for niche varieties. (Goals 5-7)
4. Employ real-time data sharing such as using Breedbase software among breeding and breeding support projects (ARVAT, Rice breeding and pathology technical support, and Rice quality analysis) for faster and easier data access and pre-breeding parental lines. (Goals 1-7)
5. Implement genomic selection or prediction strategies for higher yield and other important traits. (Goals 1-4)
6. Incorporate field-based, high-throughput phenotyping that uses modern imaging systems, such as unmanned aerial vehicles (UAVs). (Goals 1 and 3)
7. Improve the rate of genetic gain for yield through increasing selection intensity and accuracy, and decreasing breeding cycle time using multiple generations in the Puerto Rico winter nursery and single seed descent in the greenhouse for rapid generation advancement. (Goals 1, 2, and 6)
8. Implement high throughput phenotyping of grain quality attributes by using the latest grain imaging technologies (Seedcount and Vibe QMi3) at early- to mid-generation (F3-F5). (Goals 1-7)
9. Accelerate the development of pre-breeding lines with new broad-spectrum blast resistance gene *Pi-9* for forward breeding and continuously incorporate other known blast resistance genes into the breeding populations. (Goals 3,5,6)
10. Develop protocols, identify QTLs, and DNA markers for marker-assisted selection, and conduct routine phenotypic and genotypic screening of potential releases for high-nighttime temperature tolerance of elite breeding lines. (Goals 1,2,3,8)
11. Support research on gene or genome editing such as CRISPR technology to expand useful genetic diversity and variation. The adoption of this powerful technology is dependent on government regulations as well as acceptance by the general public. (Goals 3,7)

Measurement of Success:

- Increase grain yield a minimum of 20% accumulative yield increase in 10 years over 2025 commercial check cultivars
- Increase head rice yield by 2% from current 55% to 57% over current commercial cultivars/hybrids
- Reduce chalk by 2% over current commercial cultivars/hybrids
- Release 1-2 new rice varieties per year
- Reduce development cycle time (initial cross to release) for releasing new varieties from the current 10-12 years to 7-9 years

**Memorandum of Agreement
between
the Arkansas Rice Research and Promotion Board and
the Board of Trustees of the University of Arkansas,
acting for and on behalf of the
University of Arkansas System Division of Agriculture
regarding Hybrid Rice Discoveries**

This Agreement (“Agreement”) is made by and between the Arkansas Rice Research and Promotion Board (“Board”), having its principal office at 10720 Kanis Road, Little Rock, Arkansas 72211, and the Board of Trustees of the University of Arkansas acting for and on behalf of the University of Arkansas System Division of Agriculture (“Division of Agriculture”), having its principal office at 2404 North University Avenue, Little Rock, Arkansas 72207, effective as of May xx, 2024 (“Effective Date”).

WHEREAS, the Board is organized as a state government entity under the Arkansas Rice Research and Promotion Act of 1999, Ark. Code Ann. §2-20-501 et seq., to promote the growth and development of the rice industry in Arkansas by research, extension, promotion and market development; and

WHEREAS, the Division of Agriculture is the state-supported institution of higher education, with the mission to provide research and extension on all aspects of agriculture, food, youth, families, and communities as recognized in Ark. Code Ann. §6-64-701 et seq., and was formally established in 1959 to assume institutional responsibilities for the Agricultural Experiment Station, created in 1888 (7 USC §361a et seq.), and the Cooperative Extension Service, created in 1914 (7 USC § 341 et seq.); and

WHEREAS, the Division of Agriculture is the principal rice research and extension institution in Arkansas through a combination of private, state, federal, local, and producer funding; and

WHEREAS, the Board and the Division of Agriculture have previously entered into a December 10, 2019 Memorandum of Agreement regarding Conventional Pure Line Discoveries (“2019 Agreement”), and now desire to enter into a Memorandum of Agreement regarding Hybrid Rice Discoveries; and

WHEREAS, each party acknowledges that the other is dedicated to working in the best interest of the rice producers of Arkansas.

NOW, THEREFORE, the parties agree as follows:

I. PURPOSE

The purpose of this Agreement is to define the copyright, patents, and licensing agreements relationship between the Board and the Division of Agriculture on work undertaken in support of and directly funded by the Board under the authority of the Arkansas Rice Research and Promotion Act, Ark. Code Ann. §2-20-510 et seq. with regard to Hybrid Rice Discoveries. Hybrid Rice Discoveries are defined as Discoveries of rice hybrids, as well as parental lines,

breeding lines and breeding populations developed in the effort to develop a rice hybrid, which lack herbicide tolerance traits, and which lack quality or agronomic traits developed using advanced breeding techniques.

II. COPYRIGHT, PATENTS, AND LICENSING AGREEMENTS

- a. The parties agree that the Board may fund research or investigations under this Agreement which may from time to time result in information, processes, or inventions which may be protectable as intellectual property, such as patents or copyrights or otherwise (“Discovery” or “Discoveries”).
- b. The Division of Agriculture owns any Hybrid Rice Discoveries and any resulting intellectual property, including patents or copyrights, subject to the following:
 - i. The Division of Agriculture shall disclose in writing to the Board each subject Discovery within three (3) months of the identification of such Hybrid Rice Discovery to the Division of Agriculture personnel responsible for the administration of patent matters. The parties agree to address such intellectual property protection and commercialization of any Discoveries which are neither Hybrid Rice Discoveries nor Conventional Pure Line Discoveries (the subject of the 2019 Agreement) to the mutual satisfaction of the parties.
 - ii. Regarding Hybrid Rice Discoveries which are proposed for release, the Division of Agriculture shall seek the input of the Board's chairman or his/her designee including attendance and participating as an ex officio member in the Plant Materials Release Committee (PMRC) meetings for such proposals.
 - iii. Regarding Hybrid Rice Discoveries which are proposed to be exclusively licensed to third parties, the Division of Agriculture shall make reasonable efforts to ensure that such Hybrid Rice Discoveries are used by parties who demonstrate the capability to commercialize them, through royalty-bearing licenses restricted to the United States, with any international licensing agreement(s) subject to the consultation with the Board.
 - iv. Regarding Hybrid Rice Discoveries which the Division of Agriculture may provide to third parties for further developing rice lines, the Division of Agriculture shall share with the Board any revenue received from such third parties as a result of commercializing products of these Hybrid Rice Discoveries.
 - v. In the event the Division of Agriculture generates revenue from a Hybrid Rice Discovery, the Division of Agriculture shall credit the Board an amount equal to twenty percent (20%) of the Net Revenues, as defined by the University of Arkansas Board of Trustees Policy 210.1 (“Board Share of Conventional Pure Line Discovery Net Revenues”). The Board has requested the Division, and the Division agrees, to retain the Board Share of Hybrid Rice Discovery Net Revenues to be used, in consultation with the Board, for research purposes to advance the growth and development of the Arkansas rice industry.

c. The Division of Agriculture shall provide an annual report to the Board at the summer meeting on all commercialized Hybrid Rice Discoveries and on all Hybrid Rice Discoveries being considered for commercialization.

d. The Division of Agriculture shall be responsible, in its sole discretion, for all financial costs involved in drafting, filing, prosecuting, and maintaining intellectual property protection for any Hybrid Rice Discovery.

e. The Division of Agriculture may convey to the Board, upon the Board's written request, title to any subject Hybrid Rice Discovery if the Division of Agriculture elects not to retain title. Notwithstanding, the Division of Agriculture reserves the right to practice any Hybrid Rice Discovery for research and education purposes.

III. ACKNOWLEDGEMENTS

a. This is the entire agreement between the parties. It supersedes any and all oral and written agreements between the parties.

b. Modifications and amendments to this Agreement, including any exhibit or appendix, shall be enforceable only if they are in writing and are signed by authorized representatives of both parties.

c. All notices required by this Agreement shall be in writing and deemed sufficient if sent by facsimile, overnight mail, registered mail, or certified mail to the principal office of the other party.

d. The failure of any party at any time to require performance of any provision or to resort to any remedy provided under this Agreement shall in no way affect the right of that party to require performance or to resort to a remedy at any time thereafter, nor shall the waiver by any party of a breach be deemed to be a waiver of any subsequent breach. A waiver shall not be effective unless it is in writing and signed by the party granting the waiver.

e. A party to this Agreement shall not be liable for any failure of or delay in the performance of this Agreement for the period that such failure or delay is due to causes beyond its reasonable control, including but not limited to acts of God, war, strikes or labor disputes, embargoes, government orders, or any other force majeure event.

This Agreement is effective only upon agreement and proper execution thereof by the Chairman of the Arkansas Rice Research and Promotion Board and the University of Arkansas System Vice President for Agriculture. Signatories to this agreement understand that the allocated funds shall be managed by the Division of Agriculture under the terms described herein, and that disbursement is to be administered by the University of Arkansas System Vice President for Agriculture.

Agreed to by the Arkansas Rice Research and Promotion Board:

Chairman of the Board

Date

Agreed to by the University of Arkansas System Division of Agriculture:

Deacue Fields III
Vice President for Agriculture

Date