DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

2014
University of Arkansas
Rice Research Verification Program

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University of Arkansas
Cooperative Extension Service
Agriculture Experiment Station
U.S. Department of Agriculture
And County Governments Cooperating

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RICE RESEARCH VERIFICATION PROGRAM, 2014

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INTRODUCTION

The 2014 growing season was the thirty first year for the Rice Research Verification Program (RRVP). The RRVP is an interdisciplinary effort between growers, county extension agents, extension specialists, and researchers. The RRVP is an on-farm demonstration of all the research-based recommendations developed by the University of Arkansas Division Of Agriculture for the purpose of increasing the profitability of rice production in Arkansas. The specific objectives of the program are:

1. To demonstrate and verify research-based recommendations for profitable rice production throughout the rice-producing areas of Arkansas.

2. To develop a database for economic analysis of all aspects of rice production.

3. To demonstrate the benefits of available technology and inputs for the economic production of consistently high rice yields.

4. To identify specific problems and opportunities in Arkansas rice for further investigation.

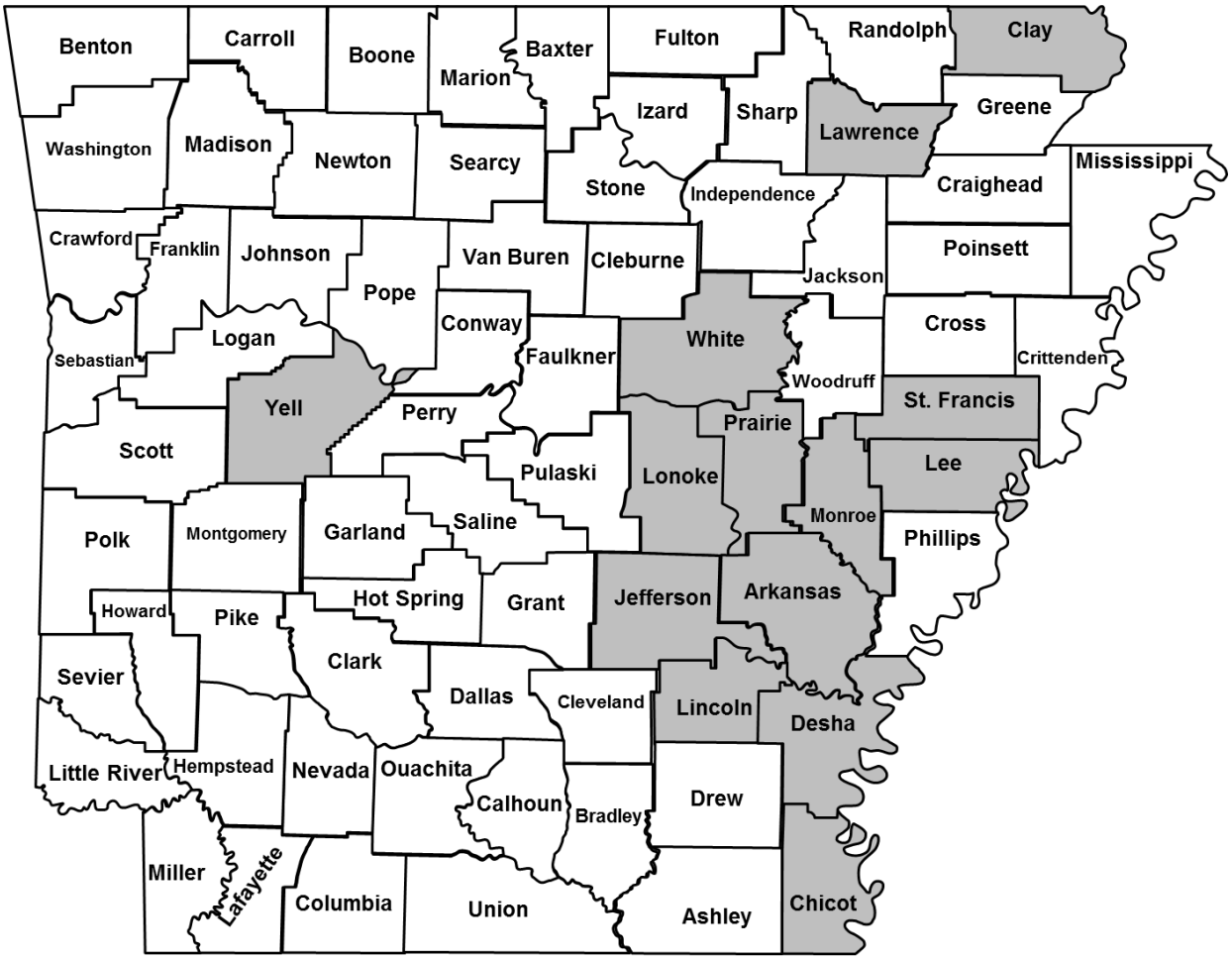
5. To promote timely implementation of management practices among rice growers.

6. To provide training and assistance to county agents and growers with limited expertise in rice production.

Each RRVP field and cooperator was selected prior to planting. Cooperators agreed to pay production expenses, provide crop expense data for economic analysis, and implement the recommended production practices in a timely manner from seedbed preparation to harvest. Fifteen fields were enrolled in the RRVP in 2014. The fields were located on commercial farms ranging in size from 29 to 78 acres. The average field size was 51 acres.

The 2014 RRVP fields were located in Arkansas, Chicot (2 fields), Clay, Desha, Jefferson, Lawrence, Lee, Lincoln, Lonoke, Monroe, Prairie, St. Francis, White, and Yell Counties. Seven different cultivars (Cheniere, CL151, LaKast, Mermentau, Roy J, RiceTec CL XL745, and RiceTec XL753) were planted. Management decisions were based on field history, soil test results, cultivar, and data collected from each individual field during the growing season.

Figure 1. County Locations (shaded) of 2014 Rice Research Verification Program Fields.



FIELD REVIEWS

Southern Coordinator – Ralph Mazzanti **Northern Coordinator** – Ron Baker

Arkansas County

The 78-acre Arkansas County field was located southeast of Stuttgart on a Dewitt silt loam soil. The previous crop was soybean. Conventional tillage practices were used for field preparation and a pre-plant fertilizer based on soil test recommendations was applied at a rate of 0-60-90-10 (N-P_2O_5-K_2O) lbs/acre. RiceTec CL XL745 was drill-seeded on April 4th at 19 lbs/acre. CruiserMaxx Rice insecticide seed treatment was used in addition to the company's standard seed treatment. The rice emerged on April 14th with a stand density of 5.4 plants/ft^2. Ammonium sulfate was used as a starter fertilizer at a rate of 100 lbs/acre applied May 2nd. Due to extended high wind issues the post-emergence herbicide application was delayed. Clearpath and Prowl were applied May 2nd as a pre-emergence herbicide and provided adequate weed control. Newpath and Permit Plus was applied May 23rd and provided sufficient control of barnyardgrass and dayflower. Using the N-STaR recommendation, pre-flood urea + NBPT was applied at a rate of 225 lbs/acre on May 24th. Multiple-inlet irrigation was utilized for the field ensuring a more efficient permanent flood. On July 12th urea was applied at late-boot stage at 70 lbs/acre. The field was clean throughout the year and a deep flood was maintained. Irrigation amount was 21 acre-inches with rainfall amount totaling 14.5 inches. No fungicides were needed for disease control, but rice stink bugs reached threshold levels and Karate insecticide was applied on July 25th. The field was harvested on August 29th and yielded 222 bu/acre. The average harvest moisture was 19%. The milling yield was 60/71. This was the second-highest yield this year in the RRVP.

Chicot County #1

The 74-acre precision-graded Chicot County #1 field was located northwest of Eudora on a Perry clay soil. The field was fallow last year due to land forming. On April 23rd, RiceTec XL753, treated with CruiserMaxx Rice insecticide in addition to the company's standard seed treatment, was drilled at 24 lbs/acre. DAP fertilizer (18-46-0) was applied according to soil test recommendations. Roundup, Command, and League were applied on April 24th for burndown and as preemergence herbicides. Continual rainfall on a weekly basis provided residual weed control for 28 days. Field emergence was recorded on May 3rd with a stand density of 6 plants/ft^2. On May 22nd Facet, Permit, and League were applied as post-emergence herbicides. Multiple-inlet irrigation was utilized and an adequate flood was maintained throughout the year. Based on N-STaR recommendations, nitrogen was applied as urea pre-flood at 270 lbs/acre on May 23rd. Mid-season fertilizer was applied on July 7th at 100 lbs/acre. Rice stink bugs reached treatment levels and Mustang Max insecticide was applied on July 20th. Rainfall amounts were 21.05 inches for the season. Irrigation amount was 10.4 acre-inches. The field was harvested August 28th with a yield of 188 bu/acre and milling yield of 58/70. The harvest moisture averaged 21%. The grower was well pleased with the yield considering the field was land formed in late 2013.

Chicot County #2

The zero-grade, 60-acre field was located south of Lake Village on Perry clay soil. The previous crop was soybean. Conventional tillage practices were utilized in the spring. RiceTec XL753 was drill-seeded at 26 lbs/acre on April 24th. The seed was treated with CruiserMaxx Rice insecticide and Rice Tec's standard seed treatment. Roundup, League, and Command

herbicides were applied on April 22nd as burndown and as a preemergence. Emergence was observed on May 1st with 7 plants/ft^2. Ammonium sulfate was applied on May 18th as a starter fertilizer at 100 lbs/acre. Continual rainfall gave lasting herbicide residual for over 26 days. On May 18th Facet and League herbicides were applied. The total herbicide cost for the field was $54/acre which is $30 below the RRVP average. A single pre-flood nitrogen application was made using urea with NBPT on May 26th at 330 lbs/acre. The field was harvested on September 4th with an all-time 31-year RRVP record of 252 bu/acre. The milling yield was 59/72. The average moisture was 19%. The rainfall amount for the growing season was 20.5 inches and irrigation averaged 30 acre-inches.

Clay County

The precision-graded Clay County field was located southwest of Corning on a Jackport silty clay loam soil. The field was 76 acres and the previous crop grown on the field was soybean. Conventional tillage practices were used for field preparation in the spring and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-40-60 (lbs/acre N-P_2O_5-K_2O). On April 2nd, CL151 with CruiserMaxx Rice insecticide seed treatment was drill-seeded at a rate of 70 lbs/acre. Rice emergence was observed on April 14th and consisted of 20 plants/ft^2. Command herbicide at a 12.8 oz/acre rate was applied pre-emergence followed by a post-emergence application of Clearpath at a 0.5 lb/acre rate providing excellent pre- and post-emergence control of weeds. On April 23rd, ammonium sulfate was applied at 50 lbs/acre to stimulate growth and recovery from a week of unusually cool, rainy days. Using the N-STaR recommendation, all remaining N for the season was applied in a single application pre-flood since the field met the required conditions for this method. Urea + NBPT was applied at a rate of 174 lbs/acre on May 26th. Once the permanent flood was established, flood levels were maintained well throughout the season. Stratego at 19 oz/acre was applied on June 26th as a preventative treatment for neck blast. No insecticide treatments were required for rice stink bug control. On September 16th, sodium chlorate at 1 gal/acre was applied as a harvest aid treatment. The rice was harvested on September 20th, yielding 205 dry bu/acre (13% moisture). The milling yield was 65/70. Total rainfall for the season was 22.36 inches.

Desha County

The zero-grade, 47-acre Desha County field was located just east of McGehee on a Sharkey/Desha clay soil. Conventional tillage practices were performed following the field being fallow in 2013 due to land forming. RiceTec XL753 was drill-seeded at a rate of 23 lbs/acre on May 6th. CruiserMaxx Rice insecticide seed treatment was applied to the seed in addition to the company's standard seed treatment. Roundup and Sharpen herbicides were tank-mixed for burndown and as pre-emergence herbicides. Rice emergence was observed on May 22nd with 6 plants/ft^2. A second pre-emergence application of Command and Facet herbicides was tank-mixed and applied on May 25th for grass weed control. Ammonium sulfate was applied as a starter fertilizer on May 26th. A post-emergence application of Permit Plus was made on June 13th. The flood was delayed approximately 3 weeks due to the installation of underground irrigation. Residual herbicide activity held weeds and grasses to a minimal. Nitrogen fertilizer in the form of urea and NBPT was applied at 200 lbs/acre according to N-STaR recommendations. The late-boot urea application of 70 lbs/acre was applied July 17th. The field was harvested September 15th and yielded 177 bu/acre with a milling yield of 57/68. The average harvest moisture was 17%. The irrigation amount averaged 30.0 inches and the rainfall amount for the growing season was 10.6 inches.

Jefferson County

The 50-acre, Jefferson County field was located just off the Arkansas River south of Altheimer on a Perry clay soil. Conventional tillage practices were used for field preparation. The field was drill-seeded with LaKast at 65 lbs/acre. Touchdown and Command herbicides were applied for burndown and as a premergence on May 25th. DAP (18-46-0) and Potash (K_2O) were applied according to soil test recommendations. Emergence was observed on June 4th with 16 plants/ft^2. Propanil and Sharpen were applied June 20th for pre- and post-emergence weed and grass control. Using the N-STaR recommendation a single pre-flood fertilizer application was made of urea plus NBPT at 250 lbs/acre. Irrigation amounts were 41 acre-inches and rainfall was 12.3 inches. The field maintained a good flood and looked good all year. High straight-line winds lodged 50% of the field in the late fall. The field was harvested late in the year on October 17th. The yield was a disappointing 157 bu/acre. The milling yield was 58/68 and average harvest moisture was 17%. The grower's comment was the yield was still 25-30 bushels better than the field's previous history.

Lawrence County

The precision-graded 65-acre Lawrence County field was located northeast of Walnut Ridge on a Dubbs silt loam soil. The previous crop grown on the field was soybean. Conventional tillage practices were used for field preparation in the fall. A pre-plant fertilizer based on soil test analysis was applied on March 28th at the recommended rate of 0-46-60 (lbs of N-P_2O_5-K_2O/acre). On April 13th, the conventional variety Mermentau was drill-seeded into a stale seedbed at 80 lbs/acre. Rice emergence was observed on April 25th and consisted of 24 plants/ft^2. Obey herbicide at 32 oz/acre was applied pre-emergence on April 17th followed on May 19th by a post-emergence application of RiceBeaux (4 qts/acre) and Permit Plus (0.75 oz/acre). Excellent pre- and post-emergence control of weeds was provided. Using the N-STaR recommendation, urea + NBPT at 261 lbs/A was applied pre-flood on May 21st. Once the permanent flood was established, flood levels were maintained sufficiently throughout the season but not without some difficulty due to the permeable nature of the field. A mid-season application of urea at 100 lbs/acre was made on June 23rd. Quadris at 10 oz/acre was applied on July 12th for control of sheath blight. No further fungicide applications were required. No insecticide treatments were required for rice stink bug control. Harvest began on September 4th and 40 acres of the field was harvested. On September 5th, sodium chlorate at 1 gal/acre was applied as a harvest aid treatment on the remaining 25 acres. Harvest resumed on September 8th. The yield average for the field was 186 bushels/acre. The milling yield was 61/71. Total rainfall for the season was 19.85 inches.

Lee County

The 29-acre Lee County field was located just east of Moro on a Calloway silt loam soil. Soybean was the previous crop grown on the field. Conventional tillage practices were used for field preparation in early spring. A pre-plant fertilizer blend of 0-60-60-10 (N-P_20_5-K_20-Zn) lbs/acre was applied in the spring according to soil test recommendations. Command was applied on April 18th as a pre-emergence herbicide. On April 18th Roy J treated with CruiserMaxx Rice insecticide seed treatment was drill-seeded at 65 lbs/acre. Emergence was observed on April 29th with 16 plants/ft^2. Facet, Propanil, and Permit were applied as pre-

emergence and post-emergence herbicides on May 14th. Based on N-STaR recommendations, pre-flood urea + NBPT was applied at 170 lbs/acre on June 28th. Using multiple-inlet irrigation a minimal flood was maintained throughout the growing season. Midseason urea fertilizer was applied on June 24th at 100 lbs/acre. The field was harvested on September 19th yielding 184 bu/acre with a milling yield of 63/71. The average harvest moisture was 20%. The season-long rainfall total was 14.8 inches and irrigation amounts averaged 30 acre-inches.

Lincoln County

The precision-graded, 67-acre Lincoln County field was located near Fresno on a Portland/Perry clay soil. Conventional tillage practices were performed following the previous crop of soybean. On May 7th, RiceTec XL753 (treated with CruiserMaxx Rice and RiceTec's standard seed treatment) was drill-seeded at a rate of 28 lbs/acre. Rice emergence was observed on May 21st and consisted of 7 plants/ft^2. Due to wind and weather conditions herbicide applications were delayed 21 days. Facet, Command, and SuperWham herbicides were applied on May 28th to control heavy pressure from barnyardgrass, broadleaf signalgrass, and dayflower. On June 5th, ammonium sulfate and DAP (18-46-0) fertilizers were applied as a starter and according to soil test recommendations. Nitrogen in the form of urea + NBPT was applied at 240 lbs/acre on June 6th according to the N-STaR recommendation. An adequate flood level was maintained throughout the season. Clincher herbicide was applied on the north 25 acres to suppress barnyardgrass escapes. The late-boot nitrogen application was applied as urea on August 1st at 70 lbs/acre. Sheath blight was observed at threshold levels on August 1st and Quilt Xcel fungicide was applied. The field was harvested on September 9th and yielded 193 bu/acre. The milling yield was 65/73 and the average harvest moisture was 19%. Rainfall total for the growing season was 9.85 inches. Irrigation amounts totaled 14.3 acre-inches. Even though there was weather delayed herbicide application and some escaped barnyardgrass the grower was pleased with the yield.

Lonoke County

The 35-acre zero-grade Lonoke County field was located south of England on a Perry silty clay soil. No tillage practices were performed on the field from the previous rice crop. The variety CL151 treated with CruiserMaxx Rice and zinc was drilled-seeded at 65 lbs/acre. Roundup and Command herbicides were applied May 6th. Rice emergence was observed on May 19th with 16 plants/ft^2. On May 27th Newpath, RiceBeaux, and Command were applied as post-emergence herbicides. DAP (18-46-0) fertilizer was applied May 28th according to soil test recommendations. Clearpath and Propanil herbicides were applied June 10th. Nitrogen in the form of urea with NBPT was applied July 17th according to the N-STaR recommendation. An adequate flood was maintained throughout the growing season. The midseason urea fertilizer application was made July 28th. Sheath blight was at threshold levels and Stratego fungicide was applied on July 28th. The field was harvested on October 1st with a yield of 188 bu/acre. The milling yield was 65/72. The rainfall for the growing season totaled 14.45 inches. Irrigation amounts totaled 25.5 inches.

Monroe County

The precision-graded 30-acre Monroe County field was located just south of Monroe on a Grenada silt loam soil. Conventional tillage practices were used for field preparation in the spring and rice was the previous crop. The variety Roy J treated with Apron XL and Maxim was broadcast-seeded at 90 lbs/acre. Emergence was observed on May 18th at 17 plants/ft^2. DAP

(18-46-0) fertilizer was applied at 100 lbs/acre on May 8th according to soil test recommendations. SuperWham and League herbicides were applied on May 23rd. Facet and the sequential application of League herbicides were applied May 10th. Nitrogen in the form of urea fertilizer and NBPT were applied May 12th at 190 lbs/acre according to the N-STaR recommendation. The midseason urea application was made on July 9th at 100 lbs/acre. An adequate permanent flood was maintained throughout the growing season. The field was harvested September 29th and yielded 150 bu/acre. The grower stated that's about his average yield for this particular farm. Rainfall amounts totaled 14.8 inches and irrigation averaged 30 acre-inches.

Prairie County

The 33-acre, zero-grade Prairie County field was located southeast of Biscoe on a Sharkey Clay soil. The previous crop grown on the field was rice. No tillage practices were performed on the field following the previous rice crop. Non-treated Roy J seed was water-seeded into a 1-inch flood on April 17th at 115 lbs/acre. After the water dropped Roundup PowerMax and Sharpen herbicides were applied for cattails, broadleaves, and aquatics. Emergence was observed April 29th when the rice pegged down and consisted of 30 plants/ft^2. Urea fertilizer was applied at 100 lbs/acre on May 27th. After the rice pegged, a very shallow flood was established and the water level was brought up as the rice height increased. Flooding from the adjacent Cache River complicated flood maintenance and fertilization during the early rice growth. Nitrogen in the form of urea and DAP (18-46-0) was applied on June 3rd. DAP was added because the soil test recommended phosphorus fertilization. On June 18th Rebel EX herbicide was applied. Another 100 lbs/acre of urea was applied June 19th to complete the nitrogen fertility program on the field. Blast was observed in the field and a Stratego fungicide application was made on July 23rd. The rainfall total for the growing season was 14.2 inches. The field was harvested September 9th yielding 193 bu/acre and milling 56/70. The producer was expecting 160-170 bu/acre. He was very happy with the performance.

St. Francis County

The 77-acre St. Francis County field was located just south of Pine Tree on a Henry silt loam soil. Conventional tillage practices were utilized and the previous crop was soybean. Pre-plant fertilizer was applied at 18-46-90-10 (N-P_2O_5-K_2O-Zn) lbs/acre according to soil test recommendations on April 10th. The variety was Mermentau treated with CruiserMaxx Rice insecticide seed treatment and drill-seeded at 78 lbs/acre. Rice emergence was observed April 29th at a stand count of 27 plants/ft^2. Roundup, Command, and League were applied as burndown and pre-emergence herbicides on April 12th. With continual rains residual herbicide activity was observed for 45 days. Facet and a sequential application of League were applied on May 28th. Pre-flood urea fertilizer and NBPT at 270 lbs/acre was applied on May 29th. An adequate flood was maintained throughout the growing season and multiple-inlet irrigation was utilized with polypipe. Midseason urea fertilizer was applied at 100 lbs/acre on June 15th. The field was harvested September 10th yielding 164 bu/acre. The milling yield was 67/71 and the average harvest moisture was 19%. Rainfall amount for the season was 12.5 inches while the irrigation amount totaled 19.5 acre-inches.

White County

The precision-graded 45-acre White County field was located southeast of Bald Knob on a DeWitt silt loam soil. The previous crop grown on the field was soybean.

Conventional tillage practices were used for field preparation on April 19th. A pre-plant fertilizer based on soil test recommendations was applied on May 5th at the rate of 0-36-72 (N-P_2O_5-K_2O) lbs/acre. On April 13th, Cheniere, treated with NipsIt INSIDE and Release, was drill-seeded at 72 lbs/acre. Command at 16 oz/acre plus glyphosate at 1 qt/acre were applied as burndown and pre-emergence herbicides on May 10th followed by an application of 2,4-D at 1.5 pt/acre on July 10th. Excellent pre- and post-emergence control of weeds was provided and no additional herbicide treatment was needed. Using the N-STaR recommendation, Urea + NBPT at 145 lbs/acre was applied pre-flood on June 22nd. Once the permanent flood was established, flood levels were well maintained throughout the season. Surface water from a reservoir was the only water source. A midseason application of urea at 100 lb/acre was made on July 15th. No fungicide or insecticide applications were required for control of disease or insects. On September 24th, sodium chlorate at 1 gal/acre was applied as a harvest aid treatment. Harvest began on September 27th. The yield average was 168 bu/acre. The milling yield was 58/67. Total rainfall for the season was 14.38 inches.

Yell County

The conventionally-leveled 37-acre Yell County field was located south of the Arkansas River and west of Petit Jean State Park on a Roellen silty clay soil. The previous crop grown on the field was soybean. Following a period of spring flooding, Mermentau at 90 lbs/acre treated with CruiserMaxx Rice was no-till drill-seeded on May 12th. Based on soil test recommendations, no pre-plant fertilizer was applied. A pre-emergence application of Obey at 52 oz/acre was made at planting. Sharpen herbicide at 1 oz/acre was applied post-emergence on May 27th followed by an application of 2,4-D at 1 qt/acre on June 24th. Excellent pre- and post-emergence control of weeds was provided and no additional herbicide treatment was needed. Using the N-STaR recommendation, urea + NBPT at 250* lbs/acre was applied pre-flood on June 10th. Once the permanent flood was established, flood levels were maintained sufficiently throughout the season. A midseason application of urea at 100 lb/acre was made on June 5th. A preventative treatment was made for false smut using Tilt at 6 oz/acre on July 31st. No insecticide treatments were required. Harvest began on October 25th. The yield average was 183 bu/acre. The milling yield was 56/68. Total rainfall for the season was 19.1 inches.

*N-STaR recommended pre-flood urea at the rate of 270 lbs/acre but it was discovered late in the season that an error was made during application that reduced the rate to 250 lbs/A.

Table 1. Agronomic information for fields enrolled in the 2014 Rice Research Verification Program.

Field Location by County	Cultivar	Field size (acres)	Previous crop	Seeding rate (lbs/acre)	Stand density (plants/ft^2)	Planting date	Emergence date	Harvest date	Yield (bu/A)	Milling yield[z]	Harvest Moisture (%)
Arkansas	RT CL XL745	78	Soybean	19	6	4-April	14-April	29-Aug	222	60/71	19
Chicot #1	RT XL753	74	Fallow	24	6	23-April	3-May	28-Aug	188	58/70	21
Chicot #2	RT XL753	60	Soybean	26	7	21-April	1-May	4-Sept	252	59/72	19
Clay	CL151	76	Soybean	70	20	3-May	13-May	20-Sept	205	65/70	20
Desha	RT XL753	47	Fallow	23	6	6-May	22-May	9-Sept	177	57/68	17
Jefferson	LaKast	50	Soybean	65	16	25-May	4-June	17-Oct	157	58/68	16
Lawrence	Mermentau	65	Soybean	80	24	13-April	25-April	5-Sept	186	61/71	18
Lee	Roy J	29	Soybean	65	7	7-May	21-May	19-Sept	184	63/71	20
Lincoln	RT XL753	31	Soybean	28	8	30-April	11-May	9-Sept	193	65/73	19
Lonoke	CL151	35	Rice	65	16	6-May	19-May	1-Oct	188	65/72	18
Monroe	Roy J	30	Rice	90	17	8-May	18-May	29-Sept	150	56/70	15
Prairie	Roy J	33	Rice	115	30	17-April	29-April	9-Sept	193	56/70	19
St. Francis	Mermentau	77	Soybean	78	27	11-April	29-April	10-Sept	164	67/71	19
White	Cheniere	44	Soybean	72	18	5-May	15-May	27-Sept	168	58/67	12
Yell	Mermentau	37	Soybean	90	20	12-May	22-May	25-Oct	183	56/68	13
Average	**-----**	**51**	**-----**	[y]	[x]				**187**	**59/70**	**17**

[z] Head rice milling yield (%) / Total rice milling yield (%).
[y] Seeding rates averaged 79 lbs/acre for conventional cultivars and 24 lbs/acre for hybrid cultivars.
[x] Stand density averaged 20 plants/ft^2 for conventional cultivars and 7 plants/ft^2 for hybrid cultivars.

Table 2. Soil test results, fertilization program, and soil classification for fields enrolled in the 2014 Rice Research Verification Program.

Field Location by County	Soil Test				Applied Fertilizer (lbs/acre)			Soil Classification
	pH	lbs/acre			Early[y] N-P-K-Zn-S[z]	Urea (46% N) rates applied by timing[x,w]	Total N rate (lbs N/acre)[v]	
		P[z]	K[z]	Zn[z]				
Arkansas	6.6	27	124	7.6	24-50-60-10-21	225*-0-70	147†	Dewitt/Arkansas Silt Loam
Chicot #1	6.8	40	610	8.4	18-46-0-0-0	288*-0-0	140†	Perry Clay
Chicot #2	6.7	39	590	6.9	24-0-0-0-21	354*-0-0	174	Perry Clay
Clay	6.2	28	188	8	12-40-60-0-10	174*-0-0	86†	Jackport Silty Clay Loam
Desha	6.4	22	940	5.5	70-0-0-0-21	200*-0-70	156†	Sharkey/Desha Clay
Jefferson	5.6	85	258	6.6	18-46-130-0-0	260*-0-0	128†	Perry Clay
Lawrence	6.8	108	236	10	0-46-60-0-0	261*-100-0	166†	Dewitt Silt Loam
Lee	7.1	44	192	6.0	0-60-60-10-0	170*-100-0	124†	Calloway Silt Loam
Lincoln	6.7	26	738	5.2	24-0-0-0-21	240*-0-70	154†	Portland/Perry Clay
Lonoke	6.7	47	713	4.7	18-46-0-0-0	200*-100-0	146†	Perry Silty Clay
Monroe	7.8	91	301	5.9	18-46-0-0-0	190*-0-100	142†	Grenada Silt Loam
Prairie	6.1	26	276	4.2	18-46-0-0-0	100-100-100	146	Sharkey Soils
St. Francis	7.2	80	162	4.3	18-46-60-0-0	270*-100-0	178	Henry Silt Loam
White	5.6	48	332	3.2	0-36-72-0-0	145*-100-0	113†	Dubbs Silt Loam
Yell	6.0	40	350	9	0-0-0-0-0	250*-100-0	161†	Roellen Silty Clay

[z] N=nitrogen, P=phosphorus, K=potassium, Zn=zinc, and S=sulfur.
[y] N-P_2O_5-K_2O-Zn-S (includes seed treatments and pre-plant applications).
[x] Timing: preflood – midseason – boot.
[w] Values with an (†) indicate fields fertilized according to N-star recommendations.
[v] Values with an (*) indicate urea was treated with a product containing NBPT to minimize nitrogen loss due to ammonia volatilization.

Table 3. Herbicide rates and timings for fields enrolled in the 2014 Rice Research Verification Program.

Field Location by County	**Pre-emergence Herbicide Applications** Trade name (product rate/acre)[z]	**Post-emergence Herbicide Applications** Trade name (product rate/acre)[z]
Arkansas	Clearpath (0.5 lb) + Prowl (2.1 pts)	Newpath (4 oz) + Permit Plus (0.75) + COC (1 pt)
Chicot #1	Roundup (1 qt) + League (3.2 oz) + Command (0.66 pt)	Facet (0.5 lb) + Permit (1 oz) + League (3.2 oz)
Chicot #2	Roundup (1 qt) + League (3.2 oz) + Command (1.25 pt)	Facet (0.33 lb) + League (3.2 oz)
Clay	Command (12.8 oz)	Clearpath (0.5 lb) + COC (1 pt)
Desha	Roundup PowerMax (26 oz) + Sharpen (1 oz) + MSO (1 pt) fb Command (1 pt) + Facet (0.5 lb)	Permit Plus (0.75) + COC (1 pt)
Jefferson	Touchdown (30 oz) + Command (1.2 pts)	Propanil (4 qts) + Sharpen (1 oz)
Lawrence	Obey (32 oz)	Rice beaux (4 qts) + Permit Plus (0.75 oz)
Lee	Command (10.66 oz)	Propanil (4 qts) + Facet (0.66 lb) + Permit (1 oz)
Lincoln	Facet (0.5 lb) + Command (12.8 oz) + Super Wham (3 qt)	Permit Plus (0.75 oz) fb Clincher (15 oz) + COC (1 pt)
Lonoke	Roundup (1 qt) + Command (1 pt)	Newpath (4 oz) + RiceBeaux (2.5 qts) + Command (1 pt) fb Clearpath (0.5 lb) + Propanil (2 qts)
Prairie	Roundup Power Max (3 qts) + Sharpen (1 oz) + MSO (1 pt)	Rebel EX (20 oz) + COC (1 pt)
Monroe	Superwham (3 qts) + League (3.2 oz) + COC (1 pt)	Facet (0.33 lb) + League (3.2 oz) + COC (1 pt)
St. Francis	Roundup (1 qt) + Command (12.8 oz) + League (3.2 oz)	Facet (0.33 lb) + League (3.2 oz)
White	Glyphosate (1 qt) + Command (1 pt)	2,4-D Amine (1.5 pt)
Yell	Obey (52 oz)	Sharpen (1 oz) fb 2,4-D Amine (1 qt)

[z] The abbreviation 'fb' stands for 'followed by' and is used to separate herbicide application events.

Table 4. Seed treatments used and foliar fungicide and insecticide applications made on fields enrolled in the 2014 Rice Research Verification Program.

Field Location by County [z]	Seed treatments (trade name and product rate/cwt seed)	Foliar fungicide and insecticide applications (trade name and product rate/acre)			
	Fungicide and/or Insecticide Seed Treatment for Control of Diseases and Insects Attacking Seedling Rice	Fungicide Applications for Control of Sheath Blight/Kernel Smut/False Smut	Fungicide Applications for Control of Rice Blast	Insecticide Applications for Control of Rice Water Weevil	Insecticide Applications for Control of Rice Stink Bug/Chinch Bug
Arkansas	RTST	------	------	-------	Lambda cy (4 oz)
Chicot #1	RTST	------	------	------	Mustang Max (4 oz)
Chicot # 2	RTST	------	------	------	------
Clay	CruiserMaxx Rice (7 fl oz)	-----	Stratego (19 oz)	------	------
Desha	RTST	------	------	------	------
Jefferson	CruiserMaxx Rice (7 fl oz)	------	------	------	------
Lawrence	CruiserMaxx Rice (7fl oz)	Quadris (10 oz)	------	------	------
Lee	CruiserMaxx Rice (7 fl oz)	------	------	------	------
Lincoln	RTST	Quilt Xcel (18 oz)	------	------	------
Lonoke	CruiserMaxx Rice (7 fl oz) + Zinc (8 fl oz)	Stratego (19 oz)	------	------	------
Prairie	------	Stratego (19 oz)	------	------	------
St. Francis	CruiserMaxx Rice (7 fl oz)	------	------	------	------
Monroe	Apron XL (0.64 fl oz) + Maxim 4 FS (0.12 fl oz)	------	------	------	------
White	Nipsit Inside + Release LC (2 oz)	------	------	------	------
Yell	CruiserMaxx (7 fl oz)	Tilt (6 oz)	------	------	------

[z] RTST refers to 'RiceTec Seed Treatment' and is used to define those fields whose seed was treated by RiceTec, Inc. prior to seed purchase. Seed was treated with compounds intended to enhance germination and early-season plant growth.

Table 5. Rainfall and irrigation information for fields enrolled in the 2014 Rice Research Verification Program.

Field Location by County	Rainfall (inches)	Irrigation[z] (acre-inches)	Rainfall + Irrigation (inches)
Arkansas	14.5	21.0	35.5
Chicot #1	21.5	10.5	32.0
Chicot #2	20.5	10.0	30.5
Clay	22.4	30.0*	52.4*
Desha	10.6	30.0	40.6
Jefferson	12.3	41.1	53.6
Lawrence	19.9	30.0*	49.9*
Lee	14.8	30.0	44.8
Lincoln	9.9	14.3	24.2
Lonoke	14.5	25.5	40.0
Monroe	14.8	30.0	44.8
Prairie	14.2	30.0	44.2
St. Francis	12.5	19.5	32.0
White	14.4	30.0*	44.4*
Yell	19.1	30.0*	49.1*
Average	**15.7**	**23.8**	**38.4**

[z] Not all fields were equipped with flow meters to monitor water use for irrigation. For those fields the five-year RRVP average of 30 acre-inches was used, and irrigation amounts using this average are followed by an asterisk (*).

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2014 Rice Research Verification Program (RRVP). Records of field operations on each field provided the basis for estimating production costs. The field records were compiled by the RRVP coordinators, county Extension agents, and cooperators. Production data from the 15 fields were applied to determine costs and returns above operating costs, as well as total specified costs. Operating costs and total costs per bushel indicate the commodity price needed to meet each cost type.

Operating costs are those expenditures that would generally require annual cash outlays and would be included on an annual operating loan application. Actual quantities of all operating inputs as reported by the cooperators are used in this analysis. Input prices are determined by data from the 2014 Crop Enterprise Budgets published by the Cooperative Extension Service and information provided by the cooperating producers. Fuel and repair costs for machinery are calculated using a budget calculator based on parameters and standards established by the American Society of Agricultural and Biological Engineers. Machinery repair costs should be regarded as estimated values for full-service repairs, and actual cash outlays could differ as producers provide unpaid labor for equipment maintenance.

Fixed costs of machinery are determined by a capital recovery method which determines the amount of money that should be set aside each year to replace the value of equipment used in production. Machinery costs are estimated by applying engineering formulas to representative prices of new equipment. This measure differs from typical depreciation methods, as well as actual annual cash expenses for machinery.

Operating costs, fixed costs, costs per bushel, and returns above operating and total specified costs are presented in Table 6. Costs in this report do not include land costs, management, or other expenses and fees not associated with production. Operating costs ranged from $417.67/acre for White County to $682.64 and $682.03/acre for Lincoln and Arkansas Counties, respectively, while operating costs per bushel range from $2.38/bu for Chicot County #2 to $3.81/bu for Monroe County. Total costs per acre (operating plus fixed) ranged from $538.06/acre for White County to $820.35/acre for Lawrence County, and total costs per bushel ranged from $2.66/bu for Chicot County #2 to $4.64/bu for Monroe County. Returns above operating costs ranged from $241.87/acre for Monroe County to $814.15/acre for Chicot County #2, and returns above total costs ranged from 116.35/acre for Monroe County to $743.96/acre for Chicot County #2.

A summary of yield, rice price, revenues, and expenses by expense type for each RRVP field is presented in Table 7. The average rice yield for the 2014 RRVP was 187 bushels/acre but ranged from 150 bushels/acre for Monroe County to 252 bushels/acre for Chicot County #2. The Arkansas average long-grain cash price for the 2014 RRVP was estimated from August 1 through October 31 daily price quotes to be $5.40/bu. A premium or discount was given to each field based on the milling yield observed for each field and a standard milling yield of 55/70 for long-grain rice. If milling yield was higher than the standard, a premium was made while a discount was given for milling less than the standard. Estimated long-grain prices adjusted for milling yield varied from $5.30/bu in White and Yell Counties to $5.82/bu in Lincoln County (Table 7).

The average operating expense for the 15 RRVP fields was $553.37/acre (Table 7). Post-harvest expenses accounted for the largest share of operating expenses on average

(19.8%) followed by fertilizers & nutrients (17.8%), seed (15.5%), and chemicals (13.8%). Although seed's share of operating expenses was 15.5% across the 15 fields, it's average cost and share of operating expenses varied depending on whether a Clearfield hybrid was used ($140.28/acre; 20.6% of operating expenses), a non-Clearfield hybrid was used ($152.33/acre; 26.1% of operating expenses), a Clearfield non-hybrid (pureline) variety was used ($79.33/acre; 13.5% of operating expenses) or a non-Clearfield non-hybrid (pureline) variety was used ($46.81/acre; 9.1% of operating expenses).

The average return above operating expenses for the 15 fields was $484.37/acre and ranged from $241.87/acre for Monroe County to $814.15/acre for Chicot County #2. The average return above total specified expenses for the 15 fields was $386.00/acre and ranged from $116.35/acre for Monroe County to $743.96/acre for Chicot County #2. Table 8 provides select variable input costs for each field and includes a further breakdown of chemical costs into herbicides, insecticides, and "fungicides and other" chemicals . Table 8 also lists the specific rice cultivars grown on each RRVP field.

Table 6. Operating Costs, Total Costs, and Returns for fields enrolled in the 2014 Rice Research Verification Program.

County	Operating Costs ($/acre)	Operating Costs ($/bushel)	Returns to Operating Costs ($/acre)	Fixed Costs ($/acre)	Total Costs ($/acre)	Returns to Total Costs ($/acre)	Total Costs ($/bushel)
Arkansas	682.03	3.07	555.97	92.34	774.37	463.63	3.49
Chicot #1	532.44	2.83	495.82	62.13	594.57	433.69	3.16
Chicot #2	599.44	2.38	814.15	70.18	669.63	743.96	2.66
Clay	611.94	2.99	543.24	98.71	710.65	444.53	3.47
Desha	517.58	2.92	425.73	85.25	602.82	340.49	3.41
Jefferson	457.24	2.91	383.36	142.74	599.98	240.62	3.82
Lawrence	675.15	3.62	368.76	145.20	820.35	223.56	4.40
Lee	545.54	2.96	494.18	102.45	648.00	391.73	3.52
Lincoln	682.64	3.54	439.74	78.51	761.15	361.23	3.94
Lonoke	567.74	3.02	514.72	83.24	650.98	431.48	3.46
Monroe	571.13	3.81	241.87	125.52	696.65	116.35	4.64
Prairie	492.14	2.55	553.92	86.76	578.90	467.16	3.00
St. Francis	501.61	3.06	441.31	76.12	577.74	365.19	3.52
White	417.67	2.49	470.45	120.39	538.06	350.06	3.21
Yell	446.26	2.44	522.38	105.98	552.25	416.40	3.02
Average	**553.37**	**2.97**	**484.37**	**98.37**	**651.74**	**386.00**	**3.52**

Table 7. Summary of Revenue and Expenses per Acre for fields enrolled in the 2014 Rice Research Verification Program.

Receipts	Arkansas	Chicot #1	Chicot #2	Clay	Desha	Jefferson	Lawrence	Lee
Yield (bu.)	222	188	252	205	177	157	186	184
Price Received	5.58	5.47	5.61	5.64	5.33	5.35	5.60	5.65
Total Crop Revenue	**1237.99**	**1028.26**	**1413.59**	**1155.18**	**943.31**	**840.60**	**1043.91**	**1039.72**
Operating Expenses								
Seed	140.28	144.79	156.86	72.80	138.76	48.30	37.60	48.30
Fertilizers & Nutrients	143.01	79.82	86.85	84.87	67.58	114.06	105.89	101.18
Chemicals	84.62	72.52	54.42	72.13	59.38	39.51	123.59	63.30
Custom Applications	50.75	39.90	44.10	54.18	56.00	24.50	53.27	32.90
Diesel Fuel	35.67	22.80	21.53	28.32	24.32	35.87	36.83	27.89
Repairs & Maintenance	34.54	23.38	26.82	31.42	29.39	44.71	52.36	32.38
Irrigation Energy Costs	36.53	16.44	37.44	116.07	14.42	30.40	116.07	103.53
Labor, Field Activities	14.27	7.80	8.41	10.28	9.34	13.35	16.68	12.09
Other Inputs & Fees, Pre-harvest	12.82	15.29	15.98	22.41	15.09	14.93	24.12	16.62
Post-harvest Expenses	129.54	109.70	147.04	119.46	103.28	91.61	108.75	107.36
Total Operating Expenses	**682.03**	**532.44**	**599.44**	**611.94**	**517.58**	**457.24**	**675.15**	**545.54**
Returns to Operating Expenses	**555.97**	**495.82**	**814.15**	**543.24**	**425.73**	**383.36**	**368.76**	**494.18**
Capital Recovery & Fixed Costs	92.34	62.13	70.18	98.71	85.25	142.74	145.20	102.45
Total Specified Expenses [z]	**774.37**	**594.57**	**669.63**	**710.65**	**602.82**	**599.98**	**820.35**	**648.00**
Returns to Specified Expenses	**463.63**	**433.69**	**743.96**	**444.53**	**340.49**	**240.62**	**223.56**	**391.73**
Operating Expenses/Yield Unit	3.07	2.83	2.38	2.99	2.92	2.91	3.62	2.96
Total Expenses/Yield Unit	3.49	3.16	2.66	3.47	3.41	3.82	4.40	3.52

[z] Does not include land costs, management, or other expenses and fees not associated with production.

Table 7. Summary of Revenue and Expenses per Acre for fields enrolled in the 2014 Rice Research Verification Program (Cont.).

Receipts	Lincoln	Lonoke	Monroe	Prairie	St. Francis	White	Yell	Average
Yield (bu.)	193	188	150	193	164	168	183	187
Price Received	5.82	5.76	5.42	5.42	5.75	5.30	5.30	5.53
Total Crop Revenue	**1122.38**	**1082.46**	**813.01**	**1046.07**	**942.92**	**888.11**	**968.64**	**1,037.74**
Operating Expenses								
Seed	168.92	85.87	48.06	48.82	57.95	43.13	42.30	85.52
Fertilizers & Nutrients	105.34	99.63	97.29	94.12	139.50	89.25	68.83	98.48
Chemicals	121.10	136.23	61.78	99.84	56.44	26.69	72.00	76.24
Custom Applications	65.80	56.00	41.30	56.00	39.90	44.40	52.50	47.43
Diesel Fuel	27.84	22.86	35.42	16.03	27.13	26.91	21.82	27.41
Repairs & Maintenance	29.50	30.83	38.05	27.92	28.01	40.84	35.07	33.68
Irrigation Energy Costs	22.60	7.96	131.99	22.19	30.82	22.93	22.93	48.82
Labor, Field Activities	10.20	8.04	13.03	5.81	10.30	11.81	9.93	10.76
Other Inputs & Fees, Pre-harvest	18.70	10.63	16.70	8.80	15.87	13.87	14.33	15.74
Post-harvest Expenses	112.62	109.70	87.53	112.62	95.69	97.84	106.55	109.28
Total Operating Expenses	**682.64**	**567.74**	**571.13**	**492.14**	**501.61**	**417.67**	**446.26**	**553.37**
Returns to Operating Expenses	**439.74**	**514.72**	**241.87**	**553.92**	**441.31**	**470.45**	**522.38**	**484.37**
Capital Recovery & Fixed Costs	78.51	83.24	125.52	86.76	76.12	120.39	105.98	98.37
Total Specified Expenses [z]	**761.15**	**650.98**	**696.65**	**578.90**	**577.74**	**538.06**	**552.25**	**651.74**
Returns to Specified Expenses	**361.23**	**431.48**	**116.35**	**467.16**	**365.19**	**350.06**	**416.40**	**386.00**
Operating Expenses/Yield Unit	3.54	3.02	3.81	2.55	3.06	2.49	2.44	2.97
Total Expenses/Yield Unit	3.94	3.46	4.64	3.00	3.52	3.21	3.02	3.52

[z] Does not include land costs, management, or other expenses and fees not associated with production.

Table 8. Selected Variable Input Costs per Acre for fields enrolled in the 2014 Rice Research Verification Program.

County	Rice Type	Seed	Fertilizers & Nutrients	Herbicides	Insecticides	Fungicides and Other	Diesel Fuel	Irrigation Energy Costs
Arkansas	RT CL XL745	140.28	143.01	73.70	10.92	---	35.67	36.53
Chicot #1	RT XL753	144.79	79.82	66.12	6.40	---	22.80	16.44
Chicot #2	RT XL753	156.86	86.85	54.42	---	---	21.53	37.44
Clay	CL151	72.80	84.87	41.96	---	30.17	28.32	116.07
Desha	RT XL753	138.76	67.58	55.93	---	3.45	24.32	14.42
Jefferson	LaKast	48.30	114.06	39.51	---	---	35.87	30.40
Lawrence	Mermentau	37.60	105.89	94.84	---	28.75	36.83	116.07
Lee	Roy J	48.30	101.18	63.30	---	---	27.89	103.53
Lincoln	RT XL753	168.92	105.34	91.67	---	29.43	27.84	22.60
Lonoke	CL151	85.87	99.63	109.51	---	26.72	22.86	7.96
Monroe	Roy J	48.06	97.29	61.78	---	---	35.42	131.99
Prairie	Roy J	48.82	94.12	73.12	---	26.72	16.03	22.19
St Francis	Mermentau	57.95	139.50	56.44	---	---	27.13	30.82
White	Cheniere	43.13	89.25	24.53	---	2.16	26.91	22.93
Yell	Mermentau	42.30	68.83	66.60	---	5.40	21.82	22.93
Average	**-----**	**85.52**	**98.48**	**64.89**	**8.66**	**19.10**	**27.41**	**48.82**