



2011 University of Arkansas Rice Research Verification Program

The Rice Research Verification Program is funded by Arkansas rice producers through check-off monies administered by the Arkansas Rice Research and Promotion Board.

University of Arkansas
Cooperative Extension Service
Agriculture Experiment Station
U.S. Department of Agriculture
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RICE RESEARCH VERIFICATION PROGRAM, 2011

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INTRODUCTION

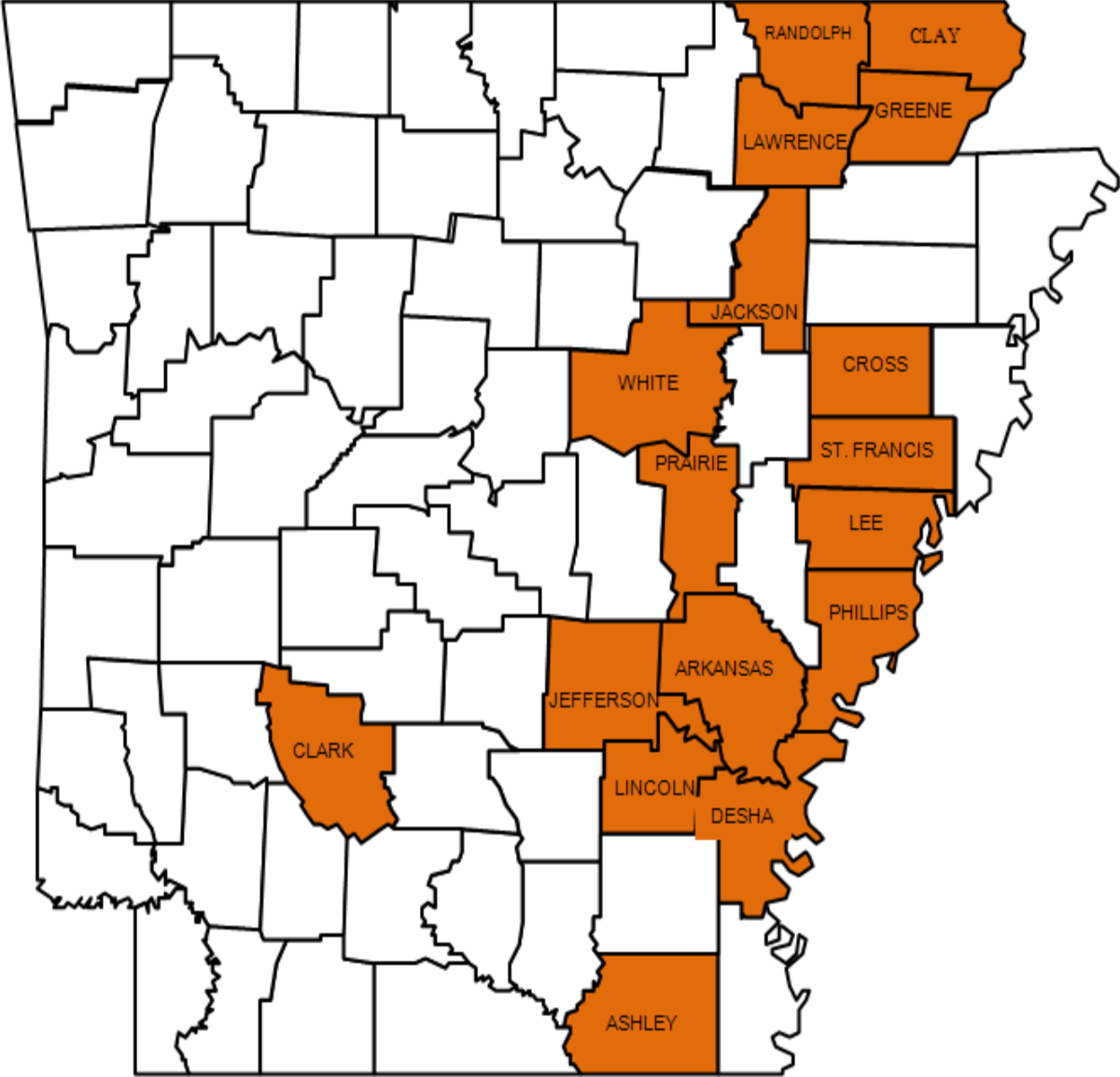
The 2011 growing season was the 29th year for the Rice Research Verification Program (RRVP). The RRVP is an interdisciplinary effort between growers, county extension agents, extension specialists and researchers. The RRVP is an on-farm demonstration of all the research-based recommendations required to grow rice profitably in Arkansas. The specific objectives of the program are:

1. To verify research-based recommendations for profitable rice production in all rice producing areas of Arkansas.
2. To develop a database for economic analysis of all aspects of rice production.
3. To demonstrate that consistently high yields of rice can be produced economically with the use of available technology and inputs.
4. To identify specific problems and opportunities in Arkansas rice for further investigation.
5. To promote timely implementation of cultural and management practices among rice growers.
6. To provide training and assistance to county agents 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. Seventeen growers were enrolled in the RRVP in 2011. The fields were located on commercial farms ranging in size from 25 to 136 acres. The average field size was 55 acres.

The 2011 RRVP fields were conducted in Arkansas, Clark, Clay, Cross, Desha (2 fields), Greene, Independence, Jackson, Jefferson, Lawrence, Lee, Lincoln, Prairie, Randolph, St. Francis and White Counties; seven different varieties (Jupiter, CL XL 745, CL 142 AR, CL XL 729, CL 151, Roy J, and Taggart) were planted. Management decisions were based on field history, soil test results, variety and data collected from each individual field during the growing season.

Figure 1. Location of the 2011 Rice Research Verification Fields



FIELD REVIEWS

Northern Fields – Stewart Runsick

Clay County

The Clay County field was located west of Corning. The field was 35 acres and the previous crop was soybean. The soil type was Kobel silty clay. A pre-plant fertilizer of 0-10-60 was applied as a result of the soil test analysis. The field was supposed to be drill-seeded with Jupiter; however, frequent rains and flooding delayed planting in the spring. On June 7, the field was seeded by mistake by an airplane that was planting other fields in the area. Jupiter was flown on dry, unprepared soil at a rate of 90 lbs/acre. Levees were pulled and the field was flooded. A shallow flood was held on the field for seven days and then drained for peg down. An adequate stand was not achieved, as some areas of the field got too dry. Another 45 lbs of seed/acre was flown on the field on June 20 and the field was flushed. A stand of more than 20 plants/ft² was finally achieved on July 1. No herbicides had been applied at that point. The field had a heavy aquatic weed population, mainly duck salad and some scattered large barnyardgrass. Duet and Command was applied and the field was flushed again. The plan was to follow this with Regiment prior to flooding; however, the applicator would not apply the herbicide because of adjacent soybean fields. Another application of Propanil with Storm was applied. Some of the barnyardgrass was missed, and Clincher was used to treat about 15 acres. Urea was applied at 265 lbs/acre. The higher nitrogen rate was used because of the clay soil. The rice grew rapidly during the hot days and nights in July and August, but slowed way down in late September and early October as the temperatures dropped. The stink bug numbers exceeded treatment level late in the season and the field was treated. The field was finally harvested on November 1 and yielded 168 bu/acre.

Cross County

The Cross County field was located in the southeast part of the county, near the community of Coldwater. The field was 136 acres and the previous crop was rice. The soil was Alligator clay, the kind of soil that sticks to your boots and you come out of the field 6 inches taller than you were when you went in. It was seeded in Jupiter, May 11, with a grain drill set on 10 inch rows, at a rate of 85 lbs/acre. Command was applied. Adequate rainfall was received to activate the herbicide and sprout the seed. The rice emerged to a stand of 11 plants/ft² on May 24. The rain stopped falling and the wind started blowing. The field dried rapidly. Shallow rooted plants began to die. The field needed flushing immediately. The water was started one week later after the electricity was turned on and poly pipe laid out. While flushing the field, a rainfall event of over three inches occurred and washed out several levees. It took two weeks to get the water on and off the field, and some stand loss occurred. The much-needed herbicide, fertilizer and permanent flood was delayed as a result of the flooding and levees being washed out. The field was finally sprayed with Ricestar and Facet, fertilized and flooded. The barnyardgrass turned yellow and appeared to be dying. Turns out the 10-inch drill rows allowed for maximum sunlight to penetrate the canopy and a lot of the grass greened back up. Clincher was applied and did a good job finishing it off. The wide rows also allowed for a lot of red rice to emerge late. Many areas of the field were taken down by the red rice. The combination of thin stand, red rice competition and lodging resulted in a low yield of 114 bu/acre.

Greene County

The Greene County field was located near the community of Fontaine. This was the second year on this farm. Last year's verification field was just down the road and was planted in CL 151. Last year's verification field yield of 151 bu/acre was similar to this year's yield. This year's verification field had a previous crop of CL 151. The verification field was planted the first

time March 20 in an attempt to increase the yield with earlier planting. It was the only field in the area seeded, and the blackbirds ate the majority of the seed. The field was planted again on April 14 in CL 142 AR at 90 lbs/acre. The lower part of the field was underwater for a week or so due to flooding in the area. When the water went down, the stand counts indicated 18 plants/ft². Weed control was fairly straightforward in this field. Command and Glyphosate were applied behind the drill, followed by two post-emergence applications of Newpath. Strada was added on part of the field for control of northern jointvetch. Sheath blight exceeded treatment level in the field, and Quilt Xcel was used for control. Rice stink bugs never exceeded treatment level in this field. The yield was about average, with 148 bu/acre. The rice appeared to be better than that. Fields nearby on the same farm also yielded around 150 bu/acre.

Independence

The Independence County field was located near Oil Trough. The field was 40 acres and precision-leveled. The soil is classified as a silt loam, but it is actually very heavy, more like clay. The field was seeded in Jupiter on May 12 at a rate of 72 lbs/acre. The rice came up to a very uniform stand, with an average of 16 plants/ft². Command was applied behind the drill, followed by Propanil and Facet pre-flood. The soil dried out rapidly in this field, as it did in the Cross County field. Plants began to die. The field was flushed the same day as requested, and the majority of the rice survived. There was some stand loss, and a few coffee bean plants came up in the holes. 200 lbs/acre of urea plus 50 lbs/acre of ammonium sulfate were applied pre-flood. The nitrogen rate was a little low, as I had recommended 265 lbs or urea alone. The rice began to yellow up two weeks after the application, about one week before panicle initiation. An additional 100 lbs/acre of urea was applied at that time. A couple of weeks later, the rice was still short and the canopy was not closing in like it should. The rice appeared to still be deficient, so another 100 lbs/acre of urea was applied. The rice finally took off and started growing like it was supposed to. Sheath blight never was an issue in this field; however it was treated with Stratego at boot split for prevention of blast and smut. The seed was intended to be sold as seed rice to a local seed company. The field yielded 176 bu/acre, which was around 20 bu/acre better than the other fields of Cheniere planted on the same farm. It was also the highest-yielding field on the farm. I think the potential is better than this and hope to beat this yield next year with a little more pre-flood nitrogen. I will be interested to see what the N-Star test recommends.

Jackson County

The Jackson County field was located on Hwy 18 between Newport and Grubbs. It was 40 acres and the previous crop was rice. The field was planted in CL XL 745 on April 9 at a rate of 28 lbs/acre. The rice came up very uniformly, with a stand of 8 plants/ft². Pre-plant fertilizer was applied according to soil test results, with a rate of 0-50-60. Command and Glyphosate were applied behind the planter, followed by Newpath at 2-leaf rice. A lot of the barnyardgrass did not die following the first Newpath application. Frequent rainfall delayed the second herbicide application until pre-flood or 5-leaf stage. Newpath, combined with Facet, was applied along with 260 lbs of Urea, and the field was flooded. The grass turned yellow and began to die. No additional herbicides were required. I must say I was very nervous, thinking the barnyardgrass may be resistant to Newpath; however, the county extension agent assured me the Facet ahead of the flood would take it out, and it did. The rice looked excellent all season. When it came time for the boot nitrogen application, the rice was dark green, growing rapidly and did not appear to need any additional nitrogen. Stink bugs reached treatment level after heading and were treated. Sheath blight was present in the field, but the disease never reached treatment level. The field yielded 191 bu/acre and was one of the highest yields in the program this year.

Lawrence County

The Lawrence County field was located South of Sedgwick. The field was 25 acres and had been recently leveled. Prior to leveling, the field had been fallow for some time. The soil type was a Crowley silt loam. The heaviest cut area required additional P and K fertilizer than the rest of the field. We had hoped that chicken litter could have been applied, but it did not work out. The field was seeded in Jupiter at a rate of 75 lbs/acre on May 10. The rice emerged to an excellent stand of 20 plants/ft². Command was not used on this field because of the recent leveling. Propanil and Facet were applied shortly after emergence. Rainfall was not received following the application, so the field was flushed. Complete grass control was not achieved, so Ricestar was applied pre-flood and cleaned up the field. 150 total units of nitrogen was applied in the form of urea (240 lbs/acre followed by 100 lbs/acre). The rice was extremely thick, lush and dark green all year. The rice lodged right out in the middle where the top soil had been piled when leveling. No diseases or insects reached treatment level. The field yield was an impressive 184 bu/acre.

Prairie County

The Prairie County field was located just west of Des Arc. The field was 64 acres and the previous crop was soybean. Part of the field was a hillside with a lot of levees. The field was intended to be planted in Roy J; however, Hybrid seed was used because it was already purchased and had to be planted. The field was planted May 9 in CL XL 729 at a rate of 25 lbs/acre. The bottom couple of acres were replanted due to flooding. The rice emerged in eight days, and the stand density was 12 plants/ft². Command and Newpath were applied when the rice was 1-2 leaf stage. The second Newpath application was applied pre-flood. The field was very clean, with the exception of scattered coffeebean and indigo and a few pigweed on the levees. 2,4-D was applied mid-season. Stinkbug pressure was heavy at beginning heading, and the field was sprayed. All the other fields in the area were sprayed as well. The rice yielded very well in the paddies; however, due to the large number of levees and poor stand in the barrow ditches, the whole field average was 166 bu/acre. The yield was similar to other fields in the area.

Randolph County

The Randolph County field was located in O'kean. The field was actually in the city limits, making it a challenge to get sprayed. The field was planted in CL 151 the previous year. The field was 72 acres and the soil type was clay. About 1/3 of the field was seeded in CL 142 AR with the other 2/3 in CL 151. The field was planted very late on May 20, due to heavy rain and flooding in the area. Command was applied by air after the levees were pulled. Glyphosate was supposed to be added to clean up some scattered big barnyardgrass and start off clean. Due to windy conditions, the Glyphosate was left out of the mix. Facet was added in the first Newpath application to help out on the big grass, and it did a fair job. The field was flushed following the herbicide applications. The stand was a little thin, and there were a few wet holes that were real thin, so urea (50 lbs/acre) and ammonium sulfate (50 lbs/acre) were applied ahead of the flush in an effort to get the rice to grow and tiller rapidly. The second application of Newpath was applied pre-flood, along with 250 lbs/acre of urea. Grandstand and Propanil were used to clean up northern jointvetch mid-season. The rice looked good post-flood and was disease-free through heading. After heading, there was a lot of false smut present. This was one of only three verification fields (Randolph, Greene and Lawrence Counties) that did not reach treatment level for rice stinkbug. The CL 142 AR yield was slightly better than the CL 151 yield; however, both were close to 150 bu/acre. I think that the yield would have been 30% better if planted early, as the rice yields on this field are generally very good.

White County

The White County field was located near Bald Knob in northern White County. The field was 30 acres and the previous crop was soybean. The soil type was a Calloway silt loam. Pre-plant fertilizer was applied at a rate of 0-45-90. The field was planted on May 10 in Taggart at a rate of 80 lbs/acre. The rice emerged in nine days with a stand density of 24 plants/ft². Command was applied by air after the levees were pulled. Only one application of Propanil was needed post-emergence for weed control. Urea was applied pre-flood at the rate of 235 lbs/acre, followed by 100 lbs/acre at mid-season. There were a few isolated areas of sheath blight in the field, but never reached treatment level. The field did reach treatment level for rice stink bugs and was treated. The field yielded 160 bu/acre, which was an excellent yield for this field.

Southern Fields – Ralph Mazzanti

Arkansas County

The Arkansas County field was located just south of Almyra. The field was 74 acres and the previous crop was soybean. The soil type was Dewitt silt loam. The field was planted on April 6 in Jupiter, seeded at 72 lbs/acre. The seed treatments used were zinc, release and Nipsit Inside. The rice emerged on April 14 with a stand density of 17 plants/ft². A pre-plant fertilizer rate of 21-54-108-0-24 was applied according to the soil sample. Command and Facet were applied as pre-emergence herbicides. Dayflower was the persistent weed for this field. Permit, Superwham and Londax were applied as post-emergence herbicides. The herbicides gave good weed control. Urea was applied at 230 lbs/acre pre-flood followed by 100 lbs/acre at mid-season. Quilt XL was applied for control of sheath blight. Mustang Max, followed by Mustang Max, was applied for stink bug control. The field yielded 185 bu/acre. The average harvest moisture was 19%. The milling yield was 67/74.

Clark County

Clark County was one of the later planted fields in the Rice Research Verification Program. The field was located northwest of Arkadelphia on the Ouachita River. Chicken litter was applied last fall at 1.5 tons per acre. The field was zero grade, no-till, with a previous crop of soybean. The field was 81 acres and the soil type was Gurdon silt loam. The field was seeded on May 13 in CL XL 745 at a rate of 25 lbs/acre. Cruiser Maxx was used as the seed treatment. Emergence and plant growth was extremely slow, and the rice was thin in some places. The final stand counts indicated 9 plants/ft². Ammonium sulfate was applied at a rate of 100 lbs/acre. The herbicides Newpath and Strata, followed by Clearpath, gave excellent weed control. Urea fertilizer was applied pre-flood at 270 lbs/acre, followed by 100 lbs/acre at late boot. A fungicide treatment for disease control was not necessary, yet Karate insecticide was applied twice for stink bug control. The yield was a surprising 193 bu/acre, with an excellent milling yield of 68/76. The verification field was the highest-yielding field on the grower's farm.

Desha County 1

The Desha County 1 field was located between Dumas and Backgate. The field was 46 acres and the soil type was Sharkey clay. The previous crop was soybean. The field was seeded April 1 in Jupiter at a rate of 90 lb/acre. The seed was treated with CruiserMaxx. The rice emerged to a near picture-perfect, uniform stand of 20 plants/ft². Command herbicide was applied pre-emergence. Facet and Permit, followed by Propanil, Facet and Permit herbicides, were used post-emergence. Pre-plant fertilizer was applied at a rate of 18-46-0. Urea was applied pre-flood at 225 lbs/acre, followed by mid-season urea at 100 lbs/acre. No fungicide was necessary for disease control. Mustang Max insecticide was applied twice for stink bug control. The field yielded 199 bu/acre, with a milling yield of 50/72. This was the highest-yielding of all the Jupiter fields on the grower's farm.

Desha County 2

The Desha County 2 field was located between McGehee and Rohwer. The field was 49 acres, and the soil type was Cahaba Fine Sandy. The soil was heavy, similar to clay. The field was seeded April 31 in CL XL 745 and treated with Cruiser Maxx at a rate of 24 lbs/acre. The previous crop was rice. The field was precision leveled three years ago. Command was used pre-emergence, and the rate was higher than recommended for the particular soil type. Emergence was slow, with stand counts indicating 5 plants/ft². Since the stand was thin, ammonium sulfate was applied at a rate of 100 lbs/acre. DAP and urea were applied three weeks later to quicken growth and satisfy the phosphorus needs indicated by the soil test results. The high Command rate seemed to effect the rice growth, but the field was clean for several weeks. Newpath, followed by Newpath and Permit, were used post-emergence. Urea fertilizer was applied at 180 lbs/acre pre-flood, with 75 lbs/acre at the late boot stage. The field was treated with Karate insecticide for stink bugs. The yield in this field was 183 bu/acre, and the milling was 47/73.

Jefferson County

The Jefferson County field was located just off the Arkansas River, between Pastoria and Altheimer. The field was 43 acres, and the soil type was Perry Clay. The previous year, the field was fallow. The field had been leveled last fall, finished this spring and was zero grade. Chicken litter was scheduled to be applied, but the early season flooding prevented application. The field was flooded for 3 weeks due to 23 inches of rainfall. The rice was seeded with an airplane. The variety was CL 142 AR treated with Cruiser Maxx. The rice was seeded at a rate of 90 lbs/acre on April 9. After the water receded, the stand density was 10 plants/ft². There were some areas of the field where the rice was thin. Newpath and Permit, followed by Newpath and Permit, were the herbicides used for weed control. DAP was applied at 150 lbs/acre and supplied the phosphorus need indicated by the soil test. Urea was applied pre-flood at 300 lbs/acre, followed by 100 lbs/acre at mid-season. Quilt XL fungicide was applied for sheath blight control. Karate insecticide was applied for stink bug control. The field yielded 173 bu/acre, and the milling was 47/73.

Lee County

The Lee County field was located just south of Moro. The field was 49 acres with rice being the previous crop. The soil type was Henry Silt Loam. The variety was CL 142 AR treated with Cruiser Maxx insecticide. The seeding rate was 72 lbs/acre, and a seeding date was April 3. Command herbicide was used pre-emergence. The field received 19.5" rainfall, and 15 acres on the north end was lost due to flooding. This portion of the field was replanted. Numerous levees were washed out and had to be repaired. Newpath and Facet herbicides, followed by Newpath, were applied post-emergence. The pre-plant fertilizer applied was 0-90-90. Urea nitrogen was applied at 240 lbs/acre and 100 lbs/acre at mid-season. Quilt XL fungicide was applied for sheath blight. Bacterial panicle blight was prevalent on the south end of the field. Stink bugs were persistent, and the field was treated twice: once with Karate and once with Mustang Max insecticide. The yield was 145 bu/acre, and the milling yield was 57/76.

Lincoln County

The Lincoln County field was located between Star City and Gould. The field was 38 acres, and the previous crop was soybean. The soil type was Perry clay. The variety was CL XL 745 treated with Apron Maxx fungicide. The field was seeded on April 2 at a rate of 25 lbs/acre. Roundup and Command herbicides were applied pre-emergence. The early season flooding had this field submerged for 3 weeks. The stand counts averaged 6 plants/ft², but some areas of

the field were thin. DAP was applied because of the thin stand. Post-emergence herbicides were Clearpath and Permit. Adverse weather conditions hindered the herbicide applications. Only one application of imazethapyr could be applied before the permanent flood. Beyond was not used post-flood because there was no red rice present. Urea fertilizer was applied pre-flood at 225 lbs/acre, followed by 70 lbs/acre at late boot stage. No fungicide treatment for disease was necessary. The stink bugs were persistent and were treated with Mustang Max, followed by another application of Mustang Max. The field yielded 182 bu/acre with a milling yield of 60/74.

St. Francis County

The St. Francis County field was located just west of Colt. The field was 58 acres and the soil type was Jackport silty clay loam. Soybean was the previous crop. The field was seeded in Roy J and treated with CruiserMaxx and zinc. Pre-plant fertilizer was applied according to the soil test results at a rate of 0-50-90, plus 10 lbs/acre of zinc. The field was planted May 2 at a rate of 75 lbs/acre. The stand density was 18 plants/ft². Ammonium sulfate was applied at a rate of 100 lbs/acre in order to speed growth. Red rice was prevalent throughout the field and was more pronounced as the crop matured. Command and Superwham, followed by Propanil and Permit, were applied as post-emergence herbicides. Urea fertilizer was applied pre-flood at 200 lbs/acre, followed by 100 lbs/acre for mid-season. Karate insecticide was applied for stink bug control. The field yielded a disappointing 137 bu/acre, and the milling was 53/74. There was severe blanking throughout the field and heavy competition from the red rice.

Table 1. Agronomic information for the 2011 Rice Research Verification fields by county.

County	Variety	Field size (ac)	Previous crop	Seeding rate (lb/acre)	Stand density (plants/ft ²)	Planting date	Emergence date	Harvest date	Yield (bu/ac)	Milling yield ²	Harvest Moisture (%)
Arkansas	Jupiter	72	Soybean	72	17	6 April	14 April	8 Sept	185	67/74	19
Clark	CL XL 745	81	Soybean	25	9	13 May	25 May	10 Oct	193	68/76	15
Clay	Jupiter	35	Soybean	90	25	7 June	1 July	1 Nov	168	61/72	18
Cross	Jupiter	136	Rice	85	11	11 May	24 May	7 Oct	114	60/66	18
Desha 1	Jupiter	46	Soybean	90	20	1 April	18 April	15 Sept	199	50/72	13
Desha 2	CL XL 745	49	Rice	24	5	3 April	21 April	20 Sept	183	47/73	19
Greene	CL 142 AR	50	Rice	90	18	14 April	26 April	13 Sept	148	54/70	17
Independence	Jupiter	40	Soybean	72	16	12 May	24 May	17 Oct	176	64/77	18
Jackson	CL XL 745	40	Rice	28	8	9 April	22 April	9 Sept	191	66/72	18
Jefferson	CL 142 AR	43	Fallow	90	10	9 April	28 April	10 Sept	173	47/73	18
Lawrence	Jupiter	25	Fallow	75	20	10 May	21 May	8 Oct	184	66/73	16
Lee	CL 142 AR	49	Rice	72	13	3 April	12 April	28 Sept	145	57/76	18
Lincoln	CL XL 745	38	Soybean	25	6	2 April	17 April	15 Sept	182	60/74	18
Prairie	CL XL 729	64	Soybean	25	12	9 May	16 May	6 Sept	166	51/73	18
Randolph	CL 151	72	Rice	80	17	20 May	29 May	10 Oct	150	55/73	17
St. Francis	Roy J	58	Soybean	75	18	18 April	2 May	13 Sept	136	53/74	17
White	Taggart	30	Soybean	80	24	10 May	19 May	29 Sept	160	57/73	18
Average	-----	54.6	-----	64.6	15	25 April	8 May	25 Sept	168	58/73	17

²Head rice / total white rice.

Table 2. Soil test results, applied fertilizer, total fertilizer and soil classification for the 2011 Rice Research Verification fields by county.

County	Soil Test (lb/acre)				Applied Fertilize N-P-K-Zn-S ^z (lb/acre)			Soil Classification
	pH	P	K	Zn	Pre-flood ^y	Split application rates of urea (45%) ^x	Total nitrogen rate	
Arkansas	6.5	32	174	6.6	21-54-108-0-24	230-100-0	170	Dewitt silt loam
Clark	5.5	26	100	4.0	21-60-60-0-24	270-0-100	188	Gurdon silt loam
Clay	6.7	77	261	10.1	0-10-60-0-0	265-100-0	164	Kobel silty clay
Cross	6.9	54	642	7.6	18-46-0-0-0	300-100-0	198	Alligator clay
Desha 1	6.5	50	362	5.4	18-46-60-0-0	225-100-0	164	Sharkey and Desha Clays
Desha 2	7.4	56	864	9.0	84-46-0-0-24	180-0-75	199	Cahaba Fine Sandy
Greene	6.3	43	174	3.6	0-54-78-10-0	250-100-0	158	Foley-Bonn complex
Independence	6.7	78	318	15.2	10-0-0-0-12	200-100-70	177	Egam silt loam
Jackson	5.5	25	243	3.4	0-50-60-0-0	260-0-70	149	Amagon silt loam
Jefferson	7.0	46	808	10	18-46-0-0-0	300-100-0	198	Perry clay
Lawrence	5.3	55	197	13.5	0-17-31-2-3	240-100-0	153	Crowley silt loam
Lee	7.8	22	152	4.4	21-90-90-10-24	240-100-0	174	Henry Silt Loam
Lincoln	7.0	88	568	7.4	18-46-0-0-0	300-0-75	187	Perry Clay
Prairie	7.4	87	221	7	0-0-60-0-0	200-0-70	122	Loring silt lam
Randolph	7.1	48	447	3.9	51-46-0-6-12	250-100-0	209	Jackport silty clay loam
St. Francis	7.5	82	196	6.4	21-50-90-10-24	200-100-0	159	Calhoun silt loam
White	5.8	50	194	3.4	0-45-90-0-0	235-100-0	150	Calloway silt loam

^zN=nitrogen, P= phosphorus, K=potassium, Zn=zinc and S=Sulfur.

^lN-P₂O₅-K₂O-Zn-S.

^xPreflood-midseason-boot.

Table 3. Herbicide rates and timings for 2011 Rice Research Verification Program fields by county.

County	Herbicide ^z	
	Pre-emergence	Post-emergence
Arkansas	Command (8 oz) Facet (0.25 lb)	Permit (.5 oz) Facet (0.33 lb) fb Propanil (4 qt) Londax (1 oz) Permit (0.75 oz)
Clark	Glyphosate (32 oz)	Newpath (4 oz) Strada (2 oz) fb Clearpath (0.5 lb)
Clay	-----	Duet (3 qt) Command (10 oz) fb Propanil (3 qt) Storm (24 oz)
Cross	Command (16 oz)	Ricestar HT (21 oz) Facet (0.5 lb) fb Clincher (15 oz)
Desha 1	Command (16 oz)	Facet (0.33 lb) Permit (0.5 oz) fb Propanil (3 qt) Facet (.25 lb) Permit (.75 oz)
Desha 2	Command (21 oz)	Newpath (4 oz) fb Newpath (4 oz) Permit (.75 oz)
Greene	Command (16 oz) Glyphosate (32 oz)	Newpath (4 oz) fb Newpath (4 oz)
Independence	Command (12.8 oz) Glyphosate (24 oz)	Propanil (3 qt) Facet (0.375 lb)
Jackson	Command (14 oz) Glyphosate (32 oz)	Newpath (4 oz) fb Newpath (4 oz) Facet (0.5 lb)
Jefferson	-----	Newpath (4 oz) Permit (1 oz) fb Newpath (4 oz)
Lawrence	-----	Propanil (3 qt) Facet (0.5 lb) fb Ricestar (19 oz)
Lee	Command (11 oz)	Newpath (4 oz) Facet (0.33 lb) fb Newpath (5 oz)
Lincoln	Command (19 oz) Glyphosate (26 oz)	Clearpath (0.5 lb) Permit (0.67 oz)
Prairie	-----	Command (8.25 oz) Newpath (4 oz) fb Newpath (4 oz) fb 2,4-D (2 pts/acre)
Randolph	Command (12 oz)	Newpath (4 oz) Facet (0.5 lb) fb Newpath (4 oz) fb Grandstand (8 oz) Propanil (32 oz)
St. Francis	-----	Command (12.8 oz) Propanil (4 qt) fb Propanil (4 qt) Permit (1 oz)
White	Command (10 oz)	Propanil (4 qt)

^zSee field reviews for explanation.

**Table 4. Fungicide and insecticide applications in 2011
Rice Research Verification fields by county.**

County	Sheath Blight	Blast	Grape Colaspis/ Rice Water Weevil	Rice Stink Bug
Arkansas	Quilt Xcel (20 oz)	-----	Nipsit INSIDE	Mustang Max (4 oz) fb Mustang Max (4 oz)
Clark	-----	-----	Cruiser Maxx	Karate (1.8 oz) fb Karate (1.8 oz)
Clay	-----	-----	-----	Karate (1.8 oz)
Cross	-----	-----	-----	Karate (1.8 oz)
Desha 1	-----	-----	CruiserMaxx	Mustang Max (4 oz) fb Mustang Max(4 oz)
Desha 2	-----	-----	CruiserMaxx	Karate (1.6 oz)
Greene	Quilt Xcel (15 oz)	-----	CruiserMaxx	-----
Independence	-----	Stratego (16 oz)	CruiserMaxx	Karate (1.8 oz)
Jackson	-----	-----	-----	Karate (1.8 oz)
Jefferson	Quilt Xcel (16 oz)	-----	CruiserMaxx	Karate (1.8 oz)
Lawrence	-----	-----	CruiserMaxx	-----
Lee	Quilt Xcel (20 oz)	-----	CruiserMaxx	Karate (1.6 oz)
Lincoln	-----	-----	-----	Mustang Max (4 oz) fb Mustang Max (4 oz)
Prairie	-----	-----	-----	Karate (1.8 oz)
Randolph	-----	-----	-----	-----
St. Francis	-----	-----	CruiserMaxx	Karate (1.8 oz)
White	-----	-----	-----	Karate (1.8 oz)

**Table 5. Irrigation information and rainfall for the 2011
Rice Research Verification fields by county.**

County	Rainfall (inches)	Irrigation ^z (acre inches)	Rainfall + Irrigation (inches)
Arkansas	19.0	33	52
Clark	7.5	30	37.5
Clay	8.6	30	38.6
Cross	12.2	28.8	41
Desha 1	22.4	24	46.4
Desha 2	11.3	28	39.3
Greene	23.6	27	50.6
Independence	12.5	20	32.5
Jackson	21.0	27	48
Jefferson	22.8	20	42.8
Lawrence	9.2	20	29.2
Lee	25.8	36	61.8
Lincoln	18.4	24	42.4
Prairie	9.4	30	39.4
Randolph	14.2	30	44.2
St. Francis	18.4	38	56.4
White	13.7	27	40.7
Average	16	28	43.7

^zThe average of 30 acre-inches was used for fields not utilizing flow meters.

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2011 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 17 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 costs 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 2010 Crop Enterprise Budgets, published by the Cooperative Extension Service, and information provided by the producer cooperators. 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 that 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 range from \$480.43/acre for Independence County to \$738.28/acre for Greene County, while operating costs per bushel range from \$2.73/bu for Independence County to \$4.99/bu for Greene County. Total costs per acre (operating plus fixed) range from \$552.20/acre for Independence County to \$811.87/acre for Greene County, and total costs per bushel range from \$3.14/bu for Independence County to \$5.49/bu for Greene County. Returns above operating costs range from \$139.36/acre for Greene County to \$834.29/acre for Independence County, and returns above total costs range from \$65.77/acre for Greene County to \$762.52/acre for Independence County.

A summary of yield, rice price, revenues and expenses by expenses type for each RRVP field is presented in Table 7. The average rice yield for the 2011 RRVP was 168 bushels but ranged from a 114 bushels/acre for Cross County to 199 bushels/acre Desha#1 County. The Arkansas average long-grain cash price for the 2011 RRVP was estimated from August through October 17 daily price quotes to be \$5.95/bu. The verification program had six fields planted in medium grain varieties (Arkansas, Clay, Cross, Desha#1, Independence and Lawrence). The average medium-grain price contracted in Arkansas was estimated to be \$6.70/bu for the August – October 17 period. A premium or discount was given to each farm based upon the milling yield observed for each field. A standard milling of 55/70 would generate \$5.95/bu for long grain and \$6.70/bu for medium grain. Broken rice is assumed to have 70 percent of whole price value. If milling yield was higher than the standard, a premium was made, while a discount was given for milling less than standard. Estimated long grain prices adjusted for milling yield varied from \$5.93/bu in Desha#2, Greene and Jefferson to \$6.69/bu in Clark County. Medium-grain prices adjusted for milling yield varied from \$6.56/bu in Cross County to \$7.47/bu in Independence County (Table 7).

The average operating expense for the 17 RRVP fields was \$616.56/acre (Table 7). Fertilizers and nutrients accounted for the largest share of operating expenses on average (23.5%), followed by seed (14.2%), chemicals (13.6%) and irrigation energy costs (12.3%). Although seed's share of operating expenses was 14.2% across the 17 fields, its average cost and share of operating expenses varied depending on whether a Clearfield hybrid variety was used (\$141.33/acre; 22.1% of operating expenses), a Clearfield non-hybrid variety was used (\$116.04/acre; 17.3% of operating expenses), or a non-Clearfield, non-hybrid variety was used (\$39.13/acre; 6.8% of operating expenses). Greene County however, was seeded twice. Fifty percent of the seed was donated in the second application, but Greene County's seed costs (and operating expenses) were still highest due to this second seeding. Excluding Greene County from consideration would result in \$88.12/acre cost, 13.6% of operating expenses) for fields with Clearfield varieties. The average return above operating expenses for the 17 fields was \$477.80/acre, and ranged from \$139.36/acre for Greene County to \$834.29/acre for Independence County. The average return above total specified expenses for the 17 fields was \$408.05/acre, and ranged from \$65.77/acre for Greene County to \$762.52/acre for Independence County. Table 8 provides select variable input costs for each field and includes a further breakdown of chemical costs in Table 7 into herbicides, insecticides and fungicides. Table 8 also lists the specific rice varieties grown on each RRVP field.

Table 6. Operating Costs, Total Costs and Returns for Rice Research Verification Program, 2011

Rice							
	Operating Costs	Operating Costs	Returns to Operating Costs	Fixed Costs	Total Costs	Returns to Total Costs	Total Costs
County	(\$/acre)	(\$/bushel)	(\$/acre)	(\$/acre)	(\$/acre)	(\$/acre)	(\$/bushel)
Arkansas	645.22	3.49	714.53	73.74	718.96	640.79	3.89
Clark	615.21	3.19	675.96	60.00	675.21	615.96	3.50
Clay	601.55	3.58	577.81	83.34	684.89	494.47	4.08
Cross	528.90	4.64	218.94	67.79	596.70	151.14	5.23
Desha#1	604.43	3.04	726.88	71.34	675.77	655.54	3.40
Desha#2	671.37	3.67	413.82	58.24	729.61	355.58	3.99
Greene	738.28	4.99	139.36	73.60	811.87	65.77	5.49
Independence	480.43	2.73	834.29	71.77	552.20	762.52	3.14
Jackson	732.03	3.83	486.55	77.07	809.10	409.48	4.24
Jefferson	646.53	3.74	379.36	46.40	692.93	332.96	4.01
Lawrence	552.94	3.01	781.06	64.59	617.53	716.47	3.36
Lee	667.78	4.61	258.77	65.71	733.49	193.06	5.06
Lincoln	657.43	3.61	496.45	71.11	728.53	425.35	4.00
Prairie	519.73	3.13	482.91	69.58	589.31	413.33	3.55
Randolph	633.96	4.23	287.04	67.05	701.01	219.99	4.67
St. Francis	645.21	4.71	197.34	77.03	722.24	120.31	5.27
White	540.45	3.38	451.55	87.49	627.94	364.06	3.92
Average	616.56	3.74	477.80	69.76	686.31	408.05	4.16

Table 7. Summary of Revenue and Expenses per Acre, Rice Research Verification Program, 2010 2011

	County								
Receipts	Arkansas	Clark	Clay	Cross	Desha#1	Desha#2	Greene	Independence	Jackson
Yield (bu.)	185	193	168	114	199	183	148	176	191
Price	7.35	6.69	7.02	6.56	6.69	5.93	5.93	7.47	6.38
Total Crop Revenue	1,359.75	1,291.17	1,179.36	747.84	1,331.31	1,085.19	877.64	1,314.72	1,218.58
Operating Expenses									
Seed (and treatment, if applicable)	30.74	146.83	39.15	38.85	47.43	141.27	199.80	40.54	155.84
Fertilizers and Nutrients	179.65	105.90	120.41	140.30	157.16	137.58	162.16	93.96	142.68
Chemicals ^w	135.34	73.96	85.90	105.16	110.77	70.21	78.64	71.44	87.39
Custom Applications	72.10	74.90	72.05	70.00	70.50	68.60	45.50	39.50	65.95
Fuel and Lube	25.24	16.50	27.63	22.41	24.77	16.08	21.12	24.16	27.18
Repairs and Maintenance	15.71	13.74	22.96	14.59	14.67	16.79	21.69	17.78	19.21
Irrigation Energy Costs	52.16	47.42	103.11	45.52	37.94	96.24	92.80	68.74	92.80
Labor, Field Activities	7.89	6.19	9.15	7.38	7.77	4.72	9.09	6.86	7.68
Other Inputs and Fees, Pre-harvest	18.44	17.16	23.16	18.18	17.31	13.10	21.10	14.74	21.85
Post-harvest Expenses	107.95	112.62	98.03	66.52	116.12	106.78	86.36	102.70	111.45
Total Operating Expenses	645.22	615.21	601.55	528.90	604.43	671.37	738.28	480.43	732.03
Returns to Operating Expenses	714.53	675.96	577.81	218.94	726.88	413.82	139.36	834.29	486.55
Capital Recovery and Fixed Costs	73.74	60.00	83.34	67.79	71.34	58.24	73.60	71.77	77.07
Total Specified Expenses ^z	718.96	675.21	684.89	596.70	675.77	729.61	811.87	552.20	809.10
Returns to Specified Expenses	640.79	615.96	494.47	151.14	655.54	355.58	65.77	762.52	409.48
Operating Expenses/Yield Unit	3.49	3.19	3.58	4.64	3.04	3.67	4.99	2.73	3.83
Total Expenses/Yield Unit	3.89	3.50	4.08	5.23	3.40	3.99	5.49	3.14	4.24

^w A breakdown of the chemical costs (Herbicide, Fungicide and Insecticide) is presented in Table 8.

^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, Rice Research Verification Program, 2010 2011

	County								
Receipts	Jefferson	Lawrence	Lee	Lincoln	Prairie	Randolph	St.Francis	White	Average
Yield (bu.)	173	184	145	182	166	150	137	160	168
Price	5.93	7.25	6.39	6.34	6.04	6.14	6.15	6.20	6.50
Total Crop Revenue	1,025.89	1,334.00	926.55	1,153.88	1,002.64	921.00	842.55	992.00	1,094.36
Operating Expenses									
Seed (and treatment, if applicable)	104.67	45.15	83.74	143.20	119.52	75.95	41.33	29.84	87.28
Fertilizers and Nutrients	159.01	159.19	198.61	134.32	96.38	153.95	163.68	153.72	144.63
Chemicals ^w	87.20	75.58	101.22	74.39	48.82	83.82	95.59	38.66	83.77
Custom Applications	80.50	32.50	78.55	49.00	47.75	65.25	54.75	50.20	61.04
Fuel and Lube	11.57	19.67	23.29	23.61	22.62	19.71	29.88	29.87	22.67
Repairs and Maintenance	11.35	16.38	14.27	18.39	15.13	18.75	20.70	22.75	17.35
Irrigation Energy Costs	68.74	68.74	56.90	82.49	47.42	103.11	130.61	92.80	75.74
Labor, Field Activities	2.44	6.54	7.08	7.06	7.96	7.23	8.18	11.42	7.33
Other Inputs and Fees, Pre-harvest	20.11	21.82	19.51	18.77	17.26	18.66	20.56	17.82	18.80
Post-harvest Expenses	100.95	107.36	84.61	106.20	96.86	87.53	79.94	93.36	97.96
Total Operating Expenses	646.53	552.94	667.78	657.43	519.73	633.96	645.21	540.45	616.56
Returns to Operating Expenses	379.36	781.06	258.77	496.45	482.91	287.04	197.34	451.55	477.80
Capital Recovery and Fixed Costs	46.40	64.59	65.71	71.11	69.58	67.05	77.03	87.49	69.76
Total Specified Expenses^z	692.93	617.53	733.49	728.53	589.31	701.01	722.24	627.94	686.31
Returns to Specified Expenses	332.96	716.47	193.06	425.35	413.33	219.99	120.31	364.06	408.05
Operating Expenses/Yield Unit	3.74	3.01	4.61	3.61	3.13	4.23	4.71	3.38	3.74
Total Expenses/Yield Unit	4.01	3.36	5.06	4.00	3.55	4.67	5.27	3.92	4.16

^w A breakdown of the chemical costs (Herbicide, Fungicide and Insecticide) is presented in Table 8.

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

Table 8. Selected Variable input costs from the 2011 RRVF fields

County	Rice Type	Seed ^x	Fertilizers &Nutrients ^y	Rice			Machinery Fuel& Lube	Irrigation Energy Costs
				Herbicides	Insecticides	Fungicides		
Arkansas	Jupiter	30.74	179.65	99.62	10.40	25.31	25.24	52.16
Clark	CL XL 745	146.83	105.90	61.95	10.33		16.50	47.42
Clay	Jupiter	39.15	120.41	77.39	5.17		27.63	103.11
Cross	Jupiter	38.85	140.30	97.20	5.17		22.41	45.52
Desha#1	Jupiter	47.43	157.16	100.37	10.40		24.77	37.94
Desha#2	CL XL 745	141.27	137.58	65.61	4.59		16.08	96.24
Greene	CL 142 AR	199.80	162.16	59.66		18.98	21.12	92.80
Independence	Jupiter	40.54	93.96	50.80	2.87	17.77	24.16	68.74
Jackson	CL XL 745	155.84	142.68	78.82	5.22		27.18	92.80
Jefferson	CL 142 AR	104.67	159.01	59.27	5.17	20.25	11.57	68.74
Lawrence	Jupiter	45.15	159.19	72.23			19.67	68.74
Lee	CL 142 AR	83.74	198.61	66.12	9.79	25.31	23.29	56.90
Lincoln	CL XL 745	143.20	134.32	63.99	10.40		23.61	82.49
Prairie	CL XL 729	119.52	96.38	43.57	5.25		22.62	47.42
Randolph	CL 142 AR/CL 151	75.95	153.95	80.47			19.71	103.11
St. Francis	Roy J	41.33	163.68	89.56	6.03		29.88	130.61
White	Taggart	29.84	153.72	33.50			29.87	92.80
Average		87.28	144.63	70.60	6.98	21.53	22.67	75.74

^x Includes seed cost and treatments (if applicable)

^y Includes material for each input