



2010 University of Arkansas Rice Research Verification Program

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And County Governments Cooperating



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RICE RESEARCH VERIFICATION PROGRAM, 2010

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INTRODUCTION

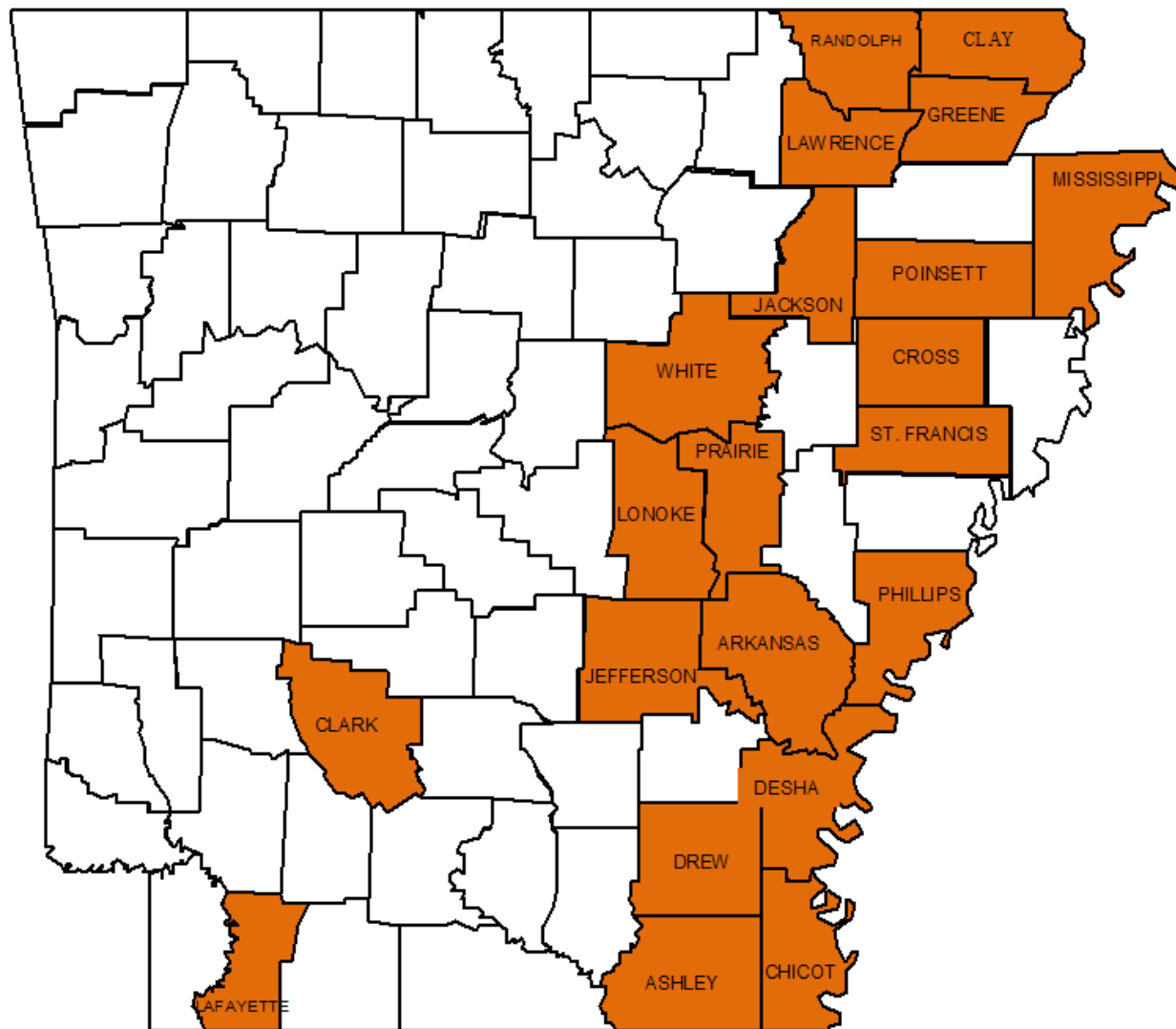
The 2010 growing season was the 28th year for the Rice Research Verification Program (RRVP). The RRVP is an interdisciplinary effort between growers, county extension agents, extension specialists and researchers. The RRVP is an on-farm demonstration of all the research-based recommendations required 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. Twenty-two growers were enrolled in the RRVP in 2010. The fields were located on commercial farms ranging in size from 30 to 139 acres. The average field size was 66 acres.

The 2010 RRVP fields were conducted in Arkansas, Ashley, Chicot, Clark, Clay, Cross, Desha, Drew, Greene, Jackson, Jefferson, Lafayette, Lawrence, Lonoke, Mississippi, Phillips, Poinsett (two fields), Prairie, Randolph, White, and St. Francis Counties; seven different varieties (CI XL 745, CL XL 729, CL 151, CL 142 AR, Wells, Cheniere and Jupiter) 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 2010 Rice Research Verification Fields



FIELD REVIEWS

Northern Fields – Stewart Runsick

Clay County

The Clay County field was located just north of Pollard. The field was 127 acres and the previous crop was soybeans. The soil type was Jackport silty clay and seems to be excellent for rice production. Fields in Clay County typically have very good yields and this field was no exception. Half of the field tested a little low in potassium, and potash was applied in that area. The field was planted April 29 with CL XL 745 hybrid. Conditions were dry then and soil crusted. It took over two weeks to get a stand, but the rice emerged uniformly with 8 plants/ft². Weed control was pretty standard in this field with two applications of Newpath and Strada added for control of hemp sesbania. Urea was applied at 270 lbs/acre with Agrotain. The higher nitrogen rate was used because of the clay soil. It took two weeks to completely flood the field. It was very hot and dry during this period. The rice looked excellent all year. The stink bug numbers exceeded treatment level late in the season and the field was treated. The field yielded 215 bu/acre.

Cross County

The Cross County field was located west of the L'Anguille River in northern Cross County. The field has been in rice production for many years; however last year it was fallow and some dirt work was done. A pre-plant fertilizer of 0-50-90 was applied as a result of the soil test analysis. The producer informed me that the field had a heavy infestation of grass weeds and red rice. Weed control would be the biggest challenge. The decision was made to plant Clearfield rice and the variety chosen was CL 142 AR. The seed was treated with CruiserMaxx, zinc and Release. The field was one of the first planted on April 2. In an effort to stay ahead of the weeds and control everything out there, glyphosate, Command and Facet was applied behind the drill. Newpath, followed by Newpath, more Facet and Permit did the job and the field was weed-free. Leaf blast was present in the field and Stratego was applied late boot to prevent the disease from infecting the panicle. This was my first experience with this variety in a verification field. I was impressed with how the crop looked. I expected this to be a very high-yielding field. The field yielded 173 bu/acre, which was a little disappointing.

Greene County

The Greene County field was located near the community of Fontaine. The field was planted in CL 151 on April 12 at 90 lbs/acre. It took a long time to get a stand. It appeared that some of the seed was planted in the moisture and some was not. When it all came up, the stand was 19 plants/ft². The soil test results were received after emergence and called for both phosphorus and potassium. DAP (18-46-00) and Potash were flown on at 100 lbs/acre of each. Urea was applied pre flood at 230 lbs/acre followed by 100 lbs at green ring for a total of 150 units. Command and glyphosate were applied behind the drill, followed by two post-emergence applications of Newpath for weed control. Sheath blight exceeded treatment level in the field and Stratego was applied during boot stage for control. Rice stink bugs never exceeded treatment level in this field. The yield was about average with 151 bu/acre.

Jackson County

The Jackson County field was located south of Beedeville. It was a 62-acre, precision-leveled field and the previous crop was soybeans. The field was planted in CL XL 745 on April 12. The rice came up very uniformly in 12 days with a stand of 10 plants/ft². DAP and Potash were applied pre-plant according to soil test results, with a rate of 12-30-60. The herbicide plan

was to apply Newpath and Command at one-leaf rice, followed by Newpath and Facet. The scheduled application went out in the adjacent field. Several days later, we realized no herbicide had been applied so we switched the first application to Newpath and Facet. The herbicide did an excellent job and killed some big grass. Urea was applied at 260 lbs/acre pre-flood followed by 70 lbs/acre at boot for a total of 150 units of nitrogen. Stink bugs reached treatment level after heading and were treated. Sheath blight was present in the field and was aggressive coming out the top in some spots. The canopy was thick and lush, and the field received a lot of rainfall, more than any other verification field. We decided not to apply a fungicide on the hybrid variety. The field yielded 188 bu/acre and was one of the highest yielding fields on the farm.

Lawrence County

The Lawrence County field was located South of Sedgwick. The field was 36 acres and the previous crop was soybeans. The soil type was a Foley silt loam. The field had been precision-leveled. The field had also been grid soil sampled and variable rate fertilizer was applied for a total rate of 0-50-90. The soil test zinc level was extremely low, so zinc was applied to the seed and also mixed with the first herbicide application. The seed was also treated with Cruiser. The rice was planted on April 15 at a rate of 80 lbs/acre. It emerged in 13 days with a stand of 19 plants/ft². This was the other field of CL 142 AR. Two applications of Newpath controlled the weeds. Grandstand was added in the second Newpath application to control pigweed mainly on the levees. One hundred and fifty units of nitrogen were applied in the form of urea. The rice appeared to be a little then early, but filled in and looked excellent all year. It maintained good color and height. No diseases or insects reached treatment level. The flood on the field was deep all year, evident by the amount of water used. I was disappointed in the yield of 144 bu/acre. I really do not have an answer for the low yield except for the heat.

Lonoke County

Lonoke County was the first field planted on March 26. It was 30 acres on a hillside located north of Lonoke. The previous crop was corn. The field was seeded in Cheniere treated with CruiserMaxx at a rate of 110 lbs/acre. This area has a history of soil insect injury, herbicide injury, hail damage, etc. Even with the high seeding rate, stand counts only indicated 16 plants/ft². Command was applied behind the drill, and RicePro herbicide (Propanil and Facet) and Permit were applied post-emergence. The rice looked good until the flood was applied. The plants began to die. The symptoms observed in the field indicated an herbicide was to blame, but which one? It could have been glyphosate drift, Newpath, Resolve carry-over or something else. Regardless, the field was drained. The rice slowly recovered over a period of four to five weeks. Some areas of the field never recovered. Facet was applied to control the grass and 100 lbs/acre of Urea was applied. The flood was established again. Sheath blight was present in the field but never reached treatment level. The field did have to be sprayed for stink bugs. With all the trouble, the field still yielded 150 bu/acre.

Mississippi

The Mississippi County field was located near Luxora. It was 57 acres and the previous crop was rice. This is the second year for this field to be in the verification program. The field was planted April 15 in CL XL 745 at a rate of 25 lbs/acre. The stand density was 6 plants/ft². Weed control was the biggest challenge in this field, specifically sprangletop. A 12.8 oz/acre application of Command with glyphosate was applied behind the drill. Just before emergence, a lot of volunteer rice and grass was present, so another application of glyphosate was applied in order to start off clean. Another 12.8 oz/acre of Command was applied with the first Newpath application, followed by the second Newpath application. Before the flood could be established, a flush of sprangletop emerged. Rice Star was applied. Urea was applied pre-flood at a rate of 300 lbs/acre followed by 100 lbs/acre in the boot stage. The higher nitrogen rate was

recommended because the soil was clay and the previous crops were rice. It's probably no surprise that the sheath blight in this field was very aggressive and exceeded treatment level. The field was treated with a fungicide. The rice also lodged before harvest. The field also had to be treated with an insecticide for control of stink bugs. The field yielded 180 bu/acre which was about 20 bu/acre less than the previous year's yield, but was about the same as other fields in the same area.

Poinsett County (Harrisburg)

This field was located just east of Harrisburg. The field was 100 acres and was adjacent to the field that was in the program last year. The field was planted on April 17 in CL 151 at a rate of 72 lbs/acre. Heavy rains caused flooding in the area and washed out levees. Seed was moved around in the field, resulting in some thin and thick areas. The overall stand density was 12 plants/ft², which was a little thin, but manageable. Pre-plant fertilizer was applied according to the soil test at a rate of 0-50-75. Two applications of Newpath provided excellent weed control. An old slough that ran through the field had to be treated later for hemp sesbania. Urea was applied pre-flood at a rate of 230 lbs/acre followed by 100 lbs/acre at midseason. Late in the season, the field had a yellow appearance; upon closer examination, there was second leaf tip discoloration. The plants appeared healthy with good color on the older leaves, and the new leaf was green. Tissue samples analyzed did not indicate any nutrient deficiencies. Other fields of CL 151 in the same area also exhibited these symptoms. No foliar diseases ever reached treatment level. Bacterial panicle blight was present after heading. The panicles were small and the lower portion blanked. The field only yielded 113 bu/acre. A shallow flood was maintained on the field because the damaged/repared levees would not support deep water. The field was never dry, however. The combination of shallow, warm water and extreme heat contributed to the low yield.

Poinsett County (Truman)

The other Poinsett County field was located near Truman. The field was 36 acres and the previous crop was soybeans. The soil is classified as a silt loam, but was very sandy. Pre-plant fertilizer was applied at a rate of 28-46-60 with zinc and sulfur. The field was planted on in Wells at a rate of 95 lb/acre. The stand density was 23 plants/ft². Command and Facet were applied early in an attempt to control a broad spectrum of weeds. Post-emergence applications are difficult to make and herbicide options are limited in this area with cotton and soybeans planted on adjacent fields. Barnyardgrass, sprangletop and nutsedge were present prior to flood. Rice Star and Permit were applied and provided excellent control. Urea was applied pre-flood at a rate of 250 lbs/acre followed by 125 lbs at midseason. Leaf blast was present in the field as with many other fields in the area. An effort to hold a deep flood on the field was made, indicated by the irrigation amount of 74 acre inches. Stratego was also applied at boot split for prevention. The rice grew rapidly in this field and looked excellent all year. The field yielded 160 bushels/acre which was a good yield this year in that environment.

Prairie County

The Prairie County field was located near the Sand Hill community east of Des Arc. The field was 139 acres and the previous crop was soybeans. The field was planted early, March 31, in Jupiter at a rate of 90 lbs/acre. The rice emerged in 13 days and the stand density was 20 plants/ft². Command and RicePro were applied when the rice was two-leaf stage. The herbicides provided excellent control and held down the weeds for a long period of time. The field stayed wet from frequent rains, causing the urea application and flood to be delayed. This allowed enough time for the herbicide to play out, allowing a flush of barnyardgrass and hemp sesbania. Regiment was applied pre-flood for control. Urea was applied pre-flood at the rate of 250 lbs/acre, followed by 100 lbs/acre at midseason. Leaf blast and sheath blight were present

in the field. Stratego was applied at boot split. The field also reached treatment level for stink bugs and was treated. The field yielded 182 bu/acre.

Randolph County

The Randolph County field was located east of the Current River in eastern Randolph County. The field was 70 acres and the previous crop was soybean. Chicken litter was applied pre-plant. Additional potash was applied to ensure the potassium level was adequate for the crop. The field was seeded in Wells mainly because the producer had some seed in cold storage that needed to be used. An effort had been made to control the red rice in the field in past years, but the weed was still present in this year's crop. The field was planted early and was the first field in the area to be fertilized and flooded. Command was applied behind the drill and Propanil, Facet and Permit ahead of the flood. All the weeds were controlled with the exception of the red rice. The field was irrigated out of the river, and a deep flood was maintained the entire season. No diseases were present at treatment level. The field did reach treatment level for rice stink bug and was treated. The field yielded 154 bu/acre. This was a good yield for this field and was achieved in part by early planting and timeliness of management practices.

White County

The White County field was located southeast of Griffithville. The field was 50 acres and the previous crop was soybean. Chicken litter was applied at a rate of 3 ton/acre. The field was planted on April 20 in CL XL 745 at a rate of 25 lbs/acre. The rice emerged in 11 days with a stand density of 5 plants/ft². Newpath (4 oz/acre) and Clearpath (.5 lb/acre) were applied in one application by mistake. The intended application was to be just Clearpath or Newpath plus Facet. The herbicide caused some yellowing of the plants, but the rice quickly grew out of it. No additional herbicides were needed pre-flood. An application of 2,4-D was applied at mid-season for control of northern jointvetch. Urea was applied pre-flood at the rate of 250 lbs/acre, followed by 70 lbs/acre at boot. The field did reach treatment level for rice stink bugs and was treated. The field yielded an excellent 192 bu/acre. The producer stated that this was the highest yield ever made on his farm. This is an excellent example of how implementing extension recommendations and being timely can result in increased yield.

Southern Fields – Ralph Mazzanti

Arkansas County

The Arkansas County field was located just south of Almyra. The field was 75 acres and the previous crop was soybeans. The soil type was Stuttgart silt loam. The field was planted on April 2 in CL XL 745, seeded at 24 lbs/acre. The rice emerged on April 15 with a stand density of 10 plants/ft². A pre-plant fertilizer rate of 0-30-60 was applied according to the soil sample. Command and Rice Beaux herbicides were applied early post. The first Newpath herbicide application was delayed approximately five weeks due to the wind. Clearpath and Permit herbicide were finally applied and were the only imazethapyr applications. The field had good weed control except on some levees. Urea with Agrotain was applied at 260 lbs/acre pre-flood, followed by 60 lbs/acre at late boot. The field yielded 187 bu/acre with a milling yield of 58/70, which was a pleasant surprise for a record hot year.

Ashley County

The Ashley County field was 100 acres and the previous crop was soybeans. The soil type was Calloway silt loam. The variety was CL XL 745 seeded at 19 lbs/acre. The low seeding rate was due to a calibration error. The final stand counts indicated 7 plants/ft². Weed control

was difficult because the field was located near the city limits of Hamburg. Pre-plant fertilizer (0-60-75) was applied according to soil test results. A 30-acre load of Prowl was applied only to the north side of the field. High winds prevented any other pre-emergence herbicide applications. Neither Facet nor Command herbicide was an option due to commercial tomato farms and local gardens close by. Dayflower was a continuous problem and was field-wide. Newpath, Permit and Aim herbicides were applied in a single application. Ammonium sulfate was applied to help with the thin stand. Urea plus Agrotain was applied at the rate of 270 lbs/acre pre-flood, followed by 70 lbs/acre at late boot stage. The field was clean and looked good all year. There were some weed escapes close to the power lines and next to some homes, but that is to be expected. Rice stink bugs reached treatment levels late in the season and the field was treated with Mustang Max insecticide. The yield was a disappointing 144 bu/acre. The milling yield was 57/68. We believe that the extreme long-term nighttime temperature was a major factor as with many fields.

Chicot County

The Chicot County field was 32 acres and the soil type was Perry clay. The variety of was CL XL 729 treated with CruiserMaxx and seeded at a rate of 27 lbs/acre. The seeding date was 15 April. The previous crop was soybeans. Plant stand was 16 plants/ft². The plant stand was excellent and two applications of Newpath and Aim herbicides kept the field clean. The field was uniform and looked excellent all year. Urea was applied at 240 lbs/acre pre-flood, followed by 70 lbs/acre at late boot. Rice stink bugs reached treatment level and were sprayed with Mustang Max. Harvest was delayed for four weeks after 20 percent moisture due to the extreme long lines at the elevator. The field lodged and shattering was extreme. Harvest moisture was at 13 percent. A grain bin was eventually loaned for harvest and storage. This was another hybrid field with excellent potential that yielded a disappointing 148 bu/acre. The milling yield was 42/69.

Clark County

Clark County was one of the earlier planted fields in the Rice Research Verification Program. The field was located northwest of Arkadelphia on the Ouachita River. The field was seeded on 1 April in CL 151 at a rate of 90 lbs/acre. The previous crop was soybeans. Stand counts were 19 plants ft². Chicken litter was applied at 1.5 tons per acre. The zero grade field was 37 acres and the soil type was Gurdon silt loam. The herbicides Clearpath and Propanil followed by Newpath and Propanil gave excellent weed control. The emergence was good and very uniform. The field looked excellent all year with no watering issues. Urea fertilizer was applied pre-flood at 200 lbs/acre followed by 100 lbs/acre at midseason. Blast started moving in late season, as well as stink bugs. Quadris fungicide was applied for blast and sheath blight control, and bacterial panicle blight was present throughout the field. Karate insecticide was applied for stink bugs. White tips started showing up, and we could not determine anything except a variety characteristic coupled with long term extreme heat. The yield was a very disappointing 130 lbs/acre and the milling was 55/70.

Desha County

The Desha County field was 80 acres and the soil was clay. The field was located between Dumas and the Backgate community. The variety chosen was CL 151 treated with Apron and zinc. The previous crop was soybeans. The seeding rate was 90 lbs/acre. The seeding date was 12 April. Emergence was good, with stand counts indicating 15 plants/ft². Two herbicide applications of Newpath and Aim did a good job of keeping the field clean. The herbicide burn was excessive, but the rice soon recovered. Urea fertilizer was applied at 200 lbs/acre pre-flood with 50 lbs/acre DAP. Midseason urea nitrogen was applied at 100 lbs/acre. The field was treated with Quilt XL fungicide for sheath blight control. There were some watering

issues on the south part of the field but not severe. The field yielded 165 bu/acre and the milling was 58/70.

Drew County

The Drew County field was a 40-acre clay field. The previous crop was corn. Jupiter treated with CruiserMaxx was the variety. Seeding rate was 70 lbs/acre. Seeding date was 14 April, with stand counts were 16 plants/ft². Pre-emergence herbicides Facet and Command were applied. Aim herbicide was applied for morning glory control, with emerged cotton adjacent to the field and high wind issues; it was difficult applying the needed post-emergence herbicides. Some paddies had watering issues, but multiple inlet irrigation with poly pipe corrected the issues. Herbicide applications were delayed for five weeks. Urea nitrogen with Agrotain was applied pre-flood at 250 lbs/acre. Midseason urea was applied at 100 lbs/acre. Clincher herbicide was applied late for grass suppression. Quadris fungicide was applied for scattered leaf blast. Stink bugs reached treatment levels and Karate insecticide was applied. The field yielded 163 bu/acre and the milling was 46/65.

Jefferson County

The Jefferson County field was 80 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 applied at 1.5 ton/acre. The variety was CL XL 745 and seeded at 25 lbs/acre. Seeding date was 17 April, but the emergence date was 7 May and depended on rainfall. Ammonium sulfate was applied at 100 lbs/acre to get the crop growing. Newpath and Command were applied post-emergence followed by Clearpath and Permit. Grandstand and Aim were applied in a single application. Grandstand was applied for pigweed control. The field remained clean the rest of the year. Urea was applied pre-flood at 300 lbs/acre followed by 70 lbs/acre at late boot stage. Stink bugs were persistent, and the field was sprayed with Karate insecticide twice. The second application was made as the field was being drained. Nevertheless, the field yielded 197 bu/acre and the milling was 61/70.

Lafayette County

The Lafayette County field was the most disappointing of all the southern fields. The field was a 60-acre, zero grade, with rice being the previous crop. The soil type was Perry clay and irrigated from a reservoir. The variety was CL XL 745, with a seeding rate of 24 lbs/acre and a seeding date of 12 April. Newpath and Aim herbicides followed by Clearpath and Aim kept the field clean. The field had to be flushed to get the field up but the field grew off well and looked absolutely great all year. The field received only 3.3 inches of rainfall during the entire growing season, yet a good flood was maintained on the field. Stink bugs were persistent and the field was treated twice with Karate insecticide. Prior to harvest, the field was 85 percent lodged. The field yielded a disappointing 129 bu/acre and the milling was 49/66.

Phillips County

The Phillips County field was 74 acres and the previous crop was rice. The field was located a few miles south of Barton. The soil type was Amagon silt loam soil. The field was leveled to zero grade. Rice was the previous crop. The variety was CL XL 729 with CruiserMaxx. The seeding rate was 25 lbs/acre. The seeding date was 12 April. Stand counts averaged 10 plants/ft². Roundup and Clearpath herbicides were applied as pre-emerge. Post-emergence herbicides were Clearpath followed by Newpath and Facet. The field was clean of weeds, except for a small area on north corner that was eventually spot-sprayed. DAP and ammonium sulfate was applied early to according to the needs indicated by the soil samples. Urea fertilizer was applied pre-flood at 225 lbs/acre, followed by 70 lbs/acre at late boot stage.

No fungicide or insecticide treatments were applied. The field yielded 175 bu/acre and the milling was 53/70.

St. Francis County

The St. Francis County field was located just west of Colt. The field was 32 acres and the soil type was Calhoun silt loam. Soybeans were the previous crop. Wells was the planted variety with CruiserMaxx insecticide seed treatment. Pre-plant fertilizer was applied at 0-50-60 according to the soil sample. The seeding rate was 100 lbs/acre. The planting date was 12 April. Plant stand counts were 18 plants/ft². Command and Superwham were applied as pre-emergence herbicides. Superwham and Aim were applied as the post-emergence herbicides. Permit and Aim herbicides were sprayed and severely burned a few acres. Rice Star herbicide was sprayed as a levee treatment. Clincher herbicide was applied overall as a late grass control option. Multiple-inlet irrigation was utilized to help keep up with watering in a long, hot, dry year on a silt-loam soil. Despite our best efforts, we still had a couple of dry paddies. Urea fertilizer with Agrotain was applied pre-flood at 230 lbs/acre, followed by 100 lbs/acre for midseason. Blast lesions were present and Quadris fungicide was applied. Stink bugs reached treatment levels and Karate insecticide was applied. The field yielded 167 bu/acre, and the milling was 65/71.

Table 1. Agronomic information for the 2010 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	CL XL 745	75	Soybean	24	10	2 April	15 April	7 Oct	187	58/70	19
Ashley	CL XL 745	100	Soybean	19	4	9 April	18 April	6 Sept	144	57/68	17
Chicot	CL XL 729	32	Soybean	27	16	15 April	1 May	25 Sept	148	42/69	13
Clark	CL 151	37	Soybean	90	19	1 April	12 April	25 Sept	130	55/70	14
Clay	CL XL 745	127	Soybean	26	8	20 April	5 May	21 Sept	215	55/70	15
Cross	CL 142 AR	110	Fallow	72	19	2 April	15 April	4 Sept	173	57/70	17
Desha	CL 151	80	Soybean	90	15	12 April	1 May	20 Sept	165	58/70	16
Drew	Jupiter	40	Corn	70	16	14 April	1 May	20 Sept	163	46/65	15
Greene	CL 151	36	Rice	90	19	12 April	26 April	31 Aug	151	57/68	17
Jackson	CL XL 745	62	Soybean	25	10	12 April	24 April	26 Aug	188	57/68	17
Jefferson	CL XL 745	72	Fallow	25	11	17 April	7 May	25 Sept	197	61/70	18
Lafayette	CL XL 745	60	Rice	24	4	12 April	4 May	27 Aug	129	49/66	15
Lawrence	CL 142 AR	36	Soybean	80	19	15 April	28 April	5 Sept	144	55/65	13
Lonoke	Cheniere	30	Corn	110	16	26 March	11 April	5 Sept	150	59/70	17
Mississippi	CL XL 745	57	Rice	25	6	15 April	29 April	25 Aug	170	60/69	17
Phillips	CL XL 729	74	Rice	25	10	12 April	27 April	28 Aug	175	53/70	17
Poinsett H	CL 151	100	Soybean	72	12	19 April	3 May	6 Sept	113	57/71	17
Poinsett T	Wells	37	Soybean	95	23	15 April	27 April	26 Aug	160	56/72	17
Prairie	Jupiter	139	Soybean	90	20	31 March	12 April	21 Sept	182	59/70	14
Randolph	Wells	70	Soybean	85	19	9 April	20 April	29 Aug	154	60/71	15
St. Francis	Wells	32	Soybean	100	18	12 April	24 April	23 Aug	167	65/71	17
White	CL XL 745	50	Soybean	25	5	20 April	1 May	1 Sept	192	64/71	19
Average	-----	66	-----	58.5	13.6	10 April	25 April	8 Sept	167	56/69	16

² Head rice / total white rice.

Table 2. Soil test results, applied fertilize, total fertilize and soil classification for the 2010 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	6.0	80	276	10	0-0-60-.25-0	260-0-60	144	Stuttgart silt loam
Ashley	7.1	46	118	29	21-60-75-.25-24	270-0-70	153	Calloway silt loam
Chicot	6.4	58	630	10	21-0-0-.25-24	240-0-70	148	Perry clay
Clark	5.4	40	120	6.3	0-0-0-.25-0	200-100-0	135	Gurdon silt loam
Clay	6.0	99	274	14	60-60-70-.25-0	270-0-70	153	Jackport silty clay
Cross	7.0	34	132	5.2	0-50-90-.5-0	250-100-0	179	Henry silt loam
Desha	8.0	52	362	13	18-46-0-0-0	200-100-0	135	Desha clay
Drew	6.8	169	382	19	18-46-0-0-0	250-100-0	157	Portland clay
Greene	7.4	55	133	14	18-46-60-0-0	230-100-0	149	Askew silt loam
Jackson	6.4	36	194	6.4	12-30-60-.25-0	260-0-70	149	Dundee silt loam
Jefferson	7.5	76	828	9.2	56-60-60-.25-24	300-0-70	166	Perry clay
Lafayette	7.8	40	860	6.6	21-46-0-.25-24	275-0-70	155	Perry clay
Lawrence	7.6	40	190	2.0	0-50-90-1.5-0	230-100-0	149	Lafe-Foley complex
Lonoke	6.2	40	128	4.4	60-80-100-0-0	250-100-0	158	Loring silt loam
Mississippi	6.6	64	234	6.2	0-0-0-.25-0	300-0-100	180	Sharkey-Steele
Phillips	7.6	28	264	7.4	57-69-0-.25-36	225-0-70	133	Amagon silt loam
Poinsett H	7.3	59	183	17.9	0-50-75-0-0	230-100-0	149	Henry silt loam
Poinsett T	7.1	74	200	11.8	28-46-60-3-27	250-125-0	169	Mhoon silt loam
Prairie	6.2	32	260	10.2	0-40-60-0-0	250-100-0	158	Kobel silty clay
Randolph	5.7	34	149	16.2	65-75-160-0-0	230-100-0	149	Amagon silt loam
St. Francis	6.6	62	234	8.8	0-50-60-.5-0	230-100-0	149	Calhoun silt loam
White	6.4	82	232	4.8	150-150-150-.25-0	250-0-70	144	Calloway silt loam

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

N-P₂O₅-K₂O-Zn-S includes seed treatments.

^xPreflood-midseason-boot.

Table 3. Herbicide rates and timings for 2010 Rice Research Verification Program fields by county.

County	Herbicide	
	Pre-emergence	Post-emergence
Arkansas	-----	Command (12.8 oz) RiceBeaux (4 qt) fb Clearpath (.5 lb) Permit (.75 oz)
Ashley	Prowl (2.1 pt)	Newpath (4 oz) Permit (.5 oz) Aim (.33 oz)
Chicot	Glyphosate (1.5 qt) Newpath (2 oz)	Newpath (4 oz) Aim (.5 oz) fb Newpath (4 oz) Aim (.5 oz)
Clark	-----	Propanil (4 qt) Clearpath (.5 lb) fb Propanil (4 qt) Newpath (4 oz)
Clay	Command (12.8 oz)	Newpath (4 oz) fb Newpath (4 oz) Strada (2 oz)
Cross	Glyphosate (1 qt) Command (6 oz) Facet (.33 lb)	Newpath (4 oz) fb Clear Path (.5 lb) Newpath (2 oz) Permit (.75 oz)
Desha	-----	Newpath (4 oz) Aim (.5 oz) fb Newpath (4 oz) Aim (.5 oz)
Drew	Facet(.33 lb) Command(16 oz)	Aim (1 oz) fb Clincher (15 oz)
Greene	Command (16 oz) Glyphosate (24 oz)	Newpath (4 oz) fb Newpath (4 oz)
Jackson	-----	Newpath (4 oz) Facet (.5 lb) fb Newpath (4 oz) fb 2,4-D (1 pt)
Jefferson	-----	Command (1 pt) Newpath (6 oz) fb Clearpath (.6 lb) Grandstand (.5 pt) Permit (.5 oz) Aim (1 oz)
Lafayette	Command (25.6 oz)	Newpath (4 oz) Aim (.5 oz) fb Clearpath (.5 lb) Aim (.75oz)
Lawrence	Command (12.8 oz)	Newpath (4 oz) fb Newpath (4 oz) Grandstand (8 oz) Propanil (1 qt)
Lonoke	Glyphosate (18 oz) Command (12.8 oz)	RicePro (4 qt) Permit (.5 oz) fb Facet (.5 lb)
Mississippi	Command (12.8 oz) Glyphosate (22 oz) fb Glyphosate (32 oz)	Newpath (4 oz) Command (12.8) fb Newpath (4 oz) fb Ricestar (17 oz)
Phillips	Glyphosate (1 qt) Clearpath (.5 lb) Command (25.6 oz)	Newpath (4 oz) Facet (.33 lb)
Poinsett H	Command (12.8 oz)	Newpath (4 oz) fb Newpath (4 oz)
Poinsett T	Command (12.8 oz) Facet (.5 lb)	Ricestar (20 oz) Permit (.5 oz)
Prairie	-----	RicePro (3.5 qt) Command (12.8 oz) fb Regiment (.5 oz)
Randolph	Command (12 oz)	Propanil (4 qt) Facet (.5 lb) Permit (.5 lb)
St. Francis	-----	Command (12.8 oz) SuperWham (4 qt) fb SuperWham (4 qt) Aim (.5 oz) POST-FLOOD: Clincher (15 oz)
White	Command (10 oz)	Newpath (4 oz) Clearpath (.5 lb) fb 2,4-D (1.5 pt)

**Table 4. Fungicide and insecticides applications in 2010
Rice Research Verification fields by county.**

County	Sheath Blight	Blast	Grape Colaspis/ Rice Water Weevil	Rice Stink Bug
Arkansas	-----	-----	-----	-----
Ashley	-----	-----	-----	Mustang Max (3.6 oz)
Chicot	-----	-----	CruiserMaxx	Mustang Max (4.0 oz)
Clark	-----	Quadris (12.5 oz)	-----	Karate (2.5 oz)
Clay	-----	-----	-----	Karate (1.6 oz)
Cross	-----	Stratego (19 oz)	CruiserMaxx	-----
Desha	Quilt Xcel (20 oz)	-----	-----	-----
Drew	-----	Quadris (12.5 oz)	CruiserMaxx	Karate (2.5 oz)
Greene	Stratego (16 oz)	-----	-----	-----
Jackson	-----	-----	-----	Methyl (1 pt)
Jefferson	-----	-----	-----	Karate (1.7 oz) fb Karate (1.7 oz)
Lafayette	-----	-----	-----	Karate (2.1 oz) fb Karate (2.1 oz)
Lawrence	-----	-----	Cruiser	-----
Lonoke	-----	-----	CruiserMaxx	Mustang Max (3.2 oz)
Mississippi	Quilt (14 oz) Quadris (4 oz)	-----	-----	Karate (1.6 oz)
Phillips	-----	-----	CruiserMaxx	-----
Poinsett H	-----	-----	-----	-----
Poinsett T	-----	Stratego (19 oz)	-----	-----
Prairie	-----	Stratego (18.4 oz)	-----	Mustang Max (3.2 oz)
Randolph	-----	-----	-----	Karate (1.6 oz)
St. Francis	-----	Quadris (12.5 oz)	CruiserMaxx	Karate (2.5 oz)
White	-----	-----	-----	Karate (2.5 oz)

**Table 5. Irrigation information and rainfall for the 2010
Rice Research Verification fields by county.**

County	Rainfall (inches)	Irrigation ² (acre inches)	Rainfall + Irrigation (inches)
Arkansas	8.75	33	41.75
Ashley	14.55	33	47.55
Chicot	9	19.7	28.7
Clark	12.5	33	45.5
Clay	13.94	21.5	35.44
Cross	18.87	33	51.87
Desha	8.75	33	41.75
Drew	4.2	30.3	34.5
Greene	12.75	28.6	41.35
Jackson	24.81	33	57.81
Jefferson	7.3	33	40.3
Lafayette	3.3	33	36.3
Lawrence	12.75	57.8	70.55
Lonoke	15.51	33	48.51
Mississippi	16.66	25	41.66
Phillips	11	33	44
Poinsett H	21.35	33	54.35
Poinsett T	15.9	74	89.9
Prairie	12.8	33	45.8
Randolph	14.5	33	47.5
St. Francis	8.9	49.5	58.4
White	14.79	32	46.79
Average	12.9	34.8	44.3

²The average of 33 acre-inches was used for fields not utilizing flow meters.

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2010 RRVP. Records of field operations on each field provided the basis for estimating production costs. The field records were compiled by the RRVP coordinator, county extension agents, and cooperators. Production data from the 22 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, 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. Averages in the final row of Table 6 are weighted by the number of acres in each RRVP field. Operating costs range from \$469.72/acre for Desha County to \$703.43/acre for Jefferson County, while operating costs per bushel range from \$2.73/bu for Clay County to \$4.95/bu for Poinsett-H County. Total costs per acre (operating plus fixed) range from \$540.32/acre for Desha County to \$773.34/acre for White County, and total costs per bushel range from \$3.08/bu for Clay County to \$5.67/bu for Poinsett-H County. Returns above operating costs range from -\$64.46/acre for Lawrence County to \$729.85/acre for Prairie County, and returns above total costs range from -\$142.46 for Poinsett-H County to \$659.98/acre for Prairie County.

A summary of yield, rice price, revenues, and expenses by expenses type for each RRVP field is presented in Table 7. Averages in final column of Table 7 are weighted by the number of acres in each RRVP field. The average rice yield for the 2010 RRVP was 164 bushels, but ranged from a 113 bushels/acre for Poinsett-H County to 215 bushels/acre Clay County (the two counties with the highest and lowest costs per bushel, respectively, in Table 6). The Arkansas average long grain cash price for the 2010 RRVP was estimated from August through October 15 daily price quotes to be \$4.32/bu. The verification program had two fields planted in medium grain varieties (Drew and Prairie). The average medium grain price contracted in Arkansas was estimated to be \$6.99/bu for the August - October 15 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 \$4.32/bu for long grain and \$6.99/bu for medium grain. Broken rice is assumed to have 70% 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 \$4.02/bu in Chicot

and Lafayette Counties to \$4.57/bu in St. Francis County. Medium grain prices adjusted for milling yield varied from \$6.33/bu in Drew County to \$7.12/bu in Prairie County (Table 7).

The average operating expense for the 22 RRVP fields was \$583.33/acre (Table 7). Fertilizers & nutrients accounted for the largest share of operating expenses on average (21.8 percent) followed by seed (17.2 percent), chemicals (13.3 percent) and irrigation energy costs (13.2 percent). Although seed's share of operating expenses was 17.2 percent across the 22 fields, its average cost and share of operating expenses varied depending on whether a Clearfield hybrid variety was used (\$139.88/acre; 23.5 percent of operating expenses), a Clearfield non-hybrid variety was used (\$81.37/acre; 14.6 percent of operating expenses), or a non-Clearfield, non-hybrid variety was used (\$41.84/acre; 7.1 percent of operating expenses). The average return above operating expenses for the 22 fields was \$200.41/acre and ranged from -\$64.46/acre for Lawrence County to \$729.85/acre for Prairie County. The average return above total specified expenses for the 22 fields was \$126.04/acre, and ranged from \$142.46/acre for Poinsett-H County to \$659.98/acre for Prairie County.

Table 6. Operating Costs, Total Costs, and Returns for Rice Research Verification Program, 2010

County	Operating Costs (\$/acre)	Operating Costs (\$/bushel)	Returns to Operating (\$/acre)	Fixed Costs (\$/bushel)	Total Costs (\$/acre)	Returns to Total Costs (\$/acre)	Total Costs per Bushel (\$/bushel)
Arkansas	577.73	3.09	241.52	75.05	652.78	166.47	3.49
Ashley	562.87	3.91	51.84	86.82	649.69	-34.98	4.51
Chicot	532.22	3.60	62.46	70.37	602.59	-7.90	4.07
Clark	562.43	4.33	-0.62	73.46	635.89	-74.08	4.89
Clay	586.41	2.73	342.74	75.85	662.25	266.89	3.08
Cross	595.84	3.44	158.65	68.91	664.75	89.74	3.84
Desha	469.72	2.85	253.15	70.60	540.32	182.55	3.27
Drew	519.45	3.19	512.53	77.33	596.79	435.20	3.66
Greene	548.65	3.63	95.94	87.54	636.19	8.41	4.21
Jackson	597.58	3.18	204.96	81.10	678.68	123.86	3.61
Jefferson	703.43	3.57	171.33	62.46	765.89	108.86	3.89
Lafayette	542.87	4.21	-24.53	62.64	605.51	-87.17	4.69
Lawrence	653.52	4.54	-64.46	67.27	720.79	-131.73	5.01
Lonoke	540.49	3.60	119.63	66.45	606.93	53.18	4.05
Mississippi	612.77	3.60	130.87	74.10	686.87	56.78	4.04
Phillips	558.22	3.19	191.13	76.93	635.15	114.20	3.63
Poinsett-H	559.41	4.95	-61.38	81.08	640.50	-142.46	5.67
Poinsett T	684.41	4.28	25.00	75.45	759.86	-50.45	4.75
Prairie	566.23	3.11	729.85	69.87	636.09	659.98	3.50
Randolph	582.28	3.78	105.61	73.02	655.30	32.59	4.26
St. Francis	688.78	4.12	73.69	81.96	770.74	-8.26	4.62
White	694.76	3.62	178.06	78.59	773.34	99.48	4.03
Weighted Average	583.33	3.57	200.41	74.37	657.70	126.04	4.02

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

Receipts	Arkansas	Ashley	Chicot	Clark	Clay	Cross	Desha	Drew	Greene	Jackson	Jefferson	Lafayette
Yield (bu.)	187	144	148	130	215	173	165	163	151	188	197	129
Price	4.38	4.27	4.02	4.32	4.32	4.36	4.38	6.33	4.27	4.27	4.44	4.02
Total Crop Revenue	819.25	614.71	594.68	561.81	929.15	754.49	722.86	1031.99	644.59	802.54	874.75	518.34
Operating Expenses												
Seed	137.46	121.62	130.15	80.10	150.80	87.12	86.58	39.41	80.10	142.16	145.00	145.75
Fertilizers & Nutrients	98.28	147.36	94.32	123.60	89.76	135.15	77.19	108.63	124.29	116.25	147.54	111.05
Chemicals	88.87	34.07	56.59	87.69	56.55	115.06	68.58	107.24	68.31	58.30	98.65	86.53
Custom Applications	26.00	44.50	45.50	32.50	31.50	45.50	32.50	52.00	26.00	44.50	45.50	26.00
Fuel & Lube	23.20	32.94	18.82	19.42	20.64	18.45	18.83	23.04	27.53	25.48	17.51	15.34
Repairs & Maintenance	15.93	18.81	16.86	19.84	18.42	15.69	15.45	16.65	21.48	16.75	17.26	14.08
Irrigation Energy Costs	52.16	52.16	58.17	97.44	63.49	52.16	52.16	47.89	84.45	52.16	97.44	52.16
Labor, Field Activities	8.39	8.82	7.66	8.71	7.62	6.84	7.50	8.15	11.71	9.48	5.92	5.84
Other Inputs & Fees, Pre-harvest	18.32	18.56	17.79	17.27	22.17	18.93	14.64	21.32	16.66	22.80	13.65	10.85
Post-harvest Expenses	109.11	84.02	86.36	75.86	125.45	100.95	96.28	95.11	88.11	109.70	114.95	75.27
Total Operating Expenses	577.73	562.87	532.22	562.43	586.41	595.84	469.72	519.45	548.65	597.58	703.43	542.87
Returns to Operating Expenses	241.52	51.84	62.46	-0.62	342.74	158.65	253.15	512.53	95.94	204.96	171.33	-24.53
Capital Recovery & Fixed Costs	75.05	86.82	70.37	73.46	75.85	68.91	70.60	77.33	87.54	81.10	62.46	62.64
Total Specified Expenses²	652.78	649.69	602.59	635.89	662.25	664.75	540.32	596.79	636.19	678.68	765.89	605.51
Returns to Specified Expenses	166.47	-34.98	-7.90	-74.08	266.89	89.74	182.55	435.20	8.41	123.86	108.86	-87.17
Operating Expenses/Yield Unit	3.09	3.91	3.60	4.33	2.73	3.44	2.85	3.19	3.63	3.18	3.57	4.21
Total Expenses/Yield Unit	3.49	4.51	4.07	4.89	3.08	3.84	3.27	3.66	4.21	3.61	3.89	4.69

²Does not include land costs, management, or other expenses and fees not associated with production.

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

Receipts	Lawrence	Lonoke	Mississippi	Phillips	Poinsett-H	Poinsett T	Prairie	Randolph	St. Francis	White	Weighted Average
Yield (bu.)	144	150	170	175	113	160	182	154	167	192	167
Price	4.09	4.40	4.37	4.28	4.41	4.43	7.12	4.47	4.57	4.55	4.66
Total Crop Revenue	589.06	660.12	743.65	749.35	498.03	709.40	1296.07	687.88	762.48	872.82	783.74
Operating Expenses											
Seed	102.80	59.73	145.00	135.58	64.08	30.06	41.13	37.15	55.10	141.76	100.41
Fertilizers & Nutrients	134.83	150.45	82.80	120.51	171.21	148.86	123.00	164.86	123.63	220.44	126.85
Chemicals	53.61	80.56	111.22	72.24	49.17	91.79	89.43	75.55	135.24	60.72	77.29
Custom Applications	36.00	44.50	32.50	18.50	38.00	25.00	44.50	49.00	44.50	39.00	37.67
Fuel & Lube	17.75	20.08	19.33	22.01	22.99	23.50	19.58	20.77	27.59	23.87	21.69
Repairs & Maintenance	22.29	14.69	18.92	16.73	21.63	26.09	19.16	19.71	23.45	17.07	18.24
Irrigation Energy Costs	170.67	52.16	73.82	52.16	97.44	218.51	97.44	97.44	146.16	50.58	76.98
Labor, Field Activities	6.86	7.34	6.60	7.80	10.06	7.55	7.65	9.07	9.00	9.78	8.03
Other Inputs & Fees, Pre-harvest	24.69	23.46	23.39	10.58	18.90	19.69	18.12	18.87	26.67	19.50	18.55
Post-harvest Expenses	84.02	87.53	99.20	102.11	65.94	93.36	106.20	89.86	97.44	112.03	97.63
Total Operating Expenses	653.52	540.49	612.77	558.22	559.41	684.41	566.23	582.28	688.78	694.76	583.33
Returns to Operating Expenses	-64.46	119.63	130.87	191.13	-61.38	25.00	729.85	105.61	73.69	178.06	200.41
Capital Recovery & Fixed Costs	67.27	66.45	74.10	76.93	81.08	75.45	69.87	73.02	81.96	78.59	74.37
Total Specified Expenses²	720.79	606.93	686.87	635.15	640.50	759.86	636.09	655.30	770.74	773.34	657.70
Returns to Specified Expenses	-131.73	53.18	56.78	114.20	-142.46	-50.45	659.98	32.59	-8.26	99.48	126.04
Operating Expenses/Yield Unit	4.54	3.60	3.60	3.19	4.95	4.28	3.11	3.78	4.12	3.62	3.57
Total Expenses/Yield Unit	5.01	4.05	4.04	3.63	5.67	4.75	3.50	4.26	4.62	4.03	4.02

²Does not include land costs, management, or other expenses and fees not associated with production.