UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

2006
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

ARKANSAS Rice CHECK-OFF

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INTRODUCTION

In 1983, the Cooperative Extension Service established an interdisciplinary rice educational program that stresses management intensity and integrated pest management to maximize returns. The purpose of the Rice Research Verification Program (RRVP) was to verify the profitability of University of Arkansas recommendations in fields with less than optimum yields or returns.

The goals of the RRVP are to: (1) educate producers on the benefits of utilizing University of Arkansas recommendations to improve yields and/or net returns, (2) to conduct on-farm field trials to verify research based recommendations, (3) to aid researchers in identifying areas of production that require further study, (4) to improve or refine existing recommendations which contribute to more profitable production, (5) to incorporate data from RRVP into Extension educational programs at the county and state level. Since 1983, the RRVP has been conducted on 263 commercial rice fields in 33 rice-producing counties in Arkansas. The program has typically averaged about 20 bushels/acre better than the state average. This increase in yield over the state average can mainly be attributed to intensive cultural management and integrated pest management.

Rice was grown on 1.406 million acres in Arkansas in 2006. The distribution of varieties was: Wells (33%), Francis (11%), CL 131 (11%), Cheniere (10%), Bengal (8%), CL 161 (7%) and Rice Tec Hybrids (5%). The 2006 production year produced many challenges that were also reflected in the RRVP. Cold weather in April caused emergence problems and overall slow growth. Rainfall in April delayed planting in some areas of the state. The cool, wet weather aided in increased herbicide injury from both Command and Newpath. Herbicide drift from Glyphosate and Newpath applications are becoming more common each year and this year was no exception. High nighttime temperatures during flowering caused much blanking in certain fields especially fields planted in mid to late April. On the positive side, more normal rainfall amounts were received this year reducing the amount of irrigation water use in a year where fuel costs were high. Input costs were increased overall largely as a result of high fuel costs.

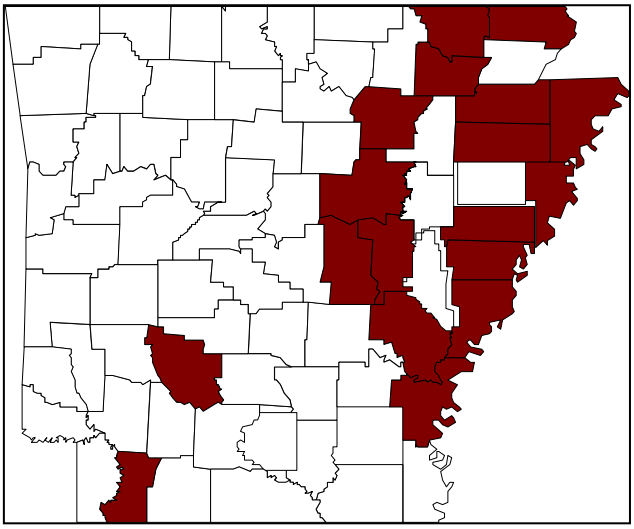
PROCEDURES

The RRVP fields and cooperators are selected prior to the beginning of the growing season. Cooperators agree to pay production expenses, provide expense data, and implement university recommendations in a timely manner from planting to harvest. A designated county agent from each county assists the RRVP coordinator in collecting data, scouting the field, and maintaining regular contact with the producer. Weekly visits by the coordinator and county agents were made to monitor the growth and development of the crop, determine what cultural practices needed to be implemented and to monitor type and level of weed, disease and insect infestation for possible pesticide applications.

An advisory committee consisting of Extension specialists and university researchers with rice responsibility assists in decision-making, development of recommendations and program direction. Field inspections by committee members were utilized to assist in fine tuning recommendations.

Counties participating in the program during 2006 included Arkansas, Clark, Clay, Craighead, Crittenden, Desha, Independence, Lafayette, Lawrence, Lee, Lonoke (2), Mississippi, Phillips, Poinsett (2), Prairie, Randolph, St. Francis, and White (figure 1). A total of 1103 acres enrolled in the program. Eight varieties were seeded ('Wells', 'Cocodrie', 'Francis', 'Cheniere', 'Cybonnet', 'XP 723', 'CL XL 730', and 'XP 710') in the 20 fields. University of Arkansas recommendations were used to manage the RRVP fields. Agronomic and pest management decisions were based on field history, soil test results, variety, and data collected from individual fields during the growing season. An integrated pest management philosophy is utilized based on University of Arkansas recommendations. Data collected included components such as stand density, weed populations, disease infestation levels, insect populations, plant dry matter accumulation, temperature, rainfall, irrigation amounts, dates for specific growth stages, grain yield, milling yield, and grain quality.

Figure 1. Location of the 2006 RRVP Fields



RESULTS

Yield

The average RRVP yield was 164 bu/acre with a range of 100 to 217 bu/acre (Table 1). The 2006 RRVP average was eight bushels less than the programs highest average yield of 172 bu/acre set in 2003 and fourteen bushels more than the estimated state average of 150 bu/acre. The highest yielding fields yielded 217 and 213 bu/acre were seeded with CL XL 730 in Lonoke and Craighead Counties, respectively. Three additional fields, Desha, Indepencence, and Phillips Counties, exceeded 190 bu/acre. The lowest yielding field yielded 100 bu/acre and was water seeded with Cheniere in White County.

Milling data was also recorded on all of the RRVP fields. The average milling yield for the 20 fields was 58/71 with the highest milling yield of 65/74 occurring in Arkansas County (Table 1). The average milling was greater than 55/70, which is considered the standard used by the rice milling industry. The lowest milling field was seeded with Cocodrie in Lafayette County and milled 48/71.

Table 1. Variety, soil series, previous crop, acreage, yield, and milling for 2006 RRVP

County	Variety	Soil Series	Previous Crop	Acres	Yield bu/acre	Milling Yield[z]
Arkansas	XP 723	Rilla silt loam	Soybean	51	155	65/74
Clark	Cybonnet	Tuscumbia silty clay	Rice	71	104	60/70
Clay	Wells	Jackport silty clay	Soybean	36	153	54/72
Craighead	CL XL 730	Hilleman silt loam	Soybean	85	213	60/70
Crittenden	Wells	Sharkey silty clay	Rice	24	124	54/70
Desha	XP 723	Perry clay	Rice	27	207	64/73
Independence	Wells	Egam silt loam	Soybean	60	199	60/73
Lafayette	Cocodrie	Billyhaw clay	Rice	60	135	48/71
Lawrence	XP 710	Dubbs silt loam	Rice	32	171	54/72
Lee	Cheniere	Calloway silt loam	Soybean	42	142	59/69
Lonoke 1	CL XL 730	Hebert silt loam	Soybean	48	217	51/71
Lonoke 2	Wells	Rilla silt loam	Soybean	35	176	67/73
Mississippi	Wells	Sharkey clay loam	Rice	80	154	60/70
Phillips	Francis	Dubbs silt loam	Soybean	48	197	53/69
Poinsett 1	Wells	Hilleman silt loam	Soybean	80	145	59/73
Poinsett 2	XP 723	Hilleman silt loan	Soybean	9	168	59/70
Prairie	Cheniere	Calloway silt loam	G.Sorghum	37	157	65/72
Randolph	Wells	Crowley silt loam	Rice	64	186	59/71
St. Francis	Francis	Crowley silt loam	Soybean	150	173	61/71
White	Cheniere	Jackport silty clay loam	Soybean	64	100	50/69
Average				**55**	**164**	**58/71**

[z]Head rice/total white rice

Planting and Emergence

All the fields were planted in the optimum time frame beginning with Lafayette County planted April 2nd and ending with Crittenden County planted May 22nd (Table 2). An average of 75 lbs./acre was seeded in the RRVP fields (Table 2). Seeding rates were determined with the Cooperative Extension Service RICESEED program for all fields. An average of 12 days was required for emergence. Stand density ranged from 5 to 28 plants/ft^2, with an average of 16 plants/ft^2. The seeding rates in several fields were higher than average due to planting method and soil texture. Broadcast seeding and clay soils require elevated seeding rate.

In 2006, the early planted fields required flushing in order to get a stand. In several fields, two or more emergences were observed.

Irrigation

Well water was used to irrigate seventeen of the twenty fields in the 2006 RRVP. Clark, Lafayette, and White Counties were irrigated with surface water. Arkansas and Lee Counties were row watered. Five of the twenty fields used multiple inlet (MI) irrigation (Clay, Lawrence, Lonoke 1, Phillips and St. Francis). Flow meters were used in fourteen of the fields to record water usage throughout the growing season, and compare MI to conventional flooding. In fields where flow meters were not utilized, an average of 30 acre-inches was used.

An average of 31.7 acre-inches of water was used across all irrigation methods (Table 2). The fields with MI irrigation averaged 34.9 acre-inches of water compared to 29.5 acre-inches for fields using conventional flooding. This difference in water used was due in part by field location in the state and rainfall amounts. Typically a 25% reduction in water used is seen when using MI irrigation. In 2005 and 2006 the fields using MI irrigation averaged about 10% less water used.

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Table 2. Stand density, irrigation, seeding rate, and important dates during the 2006 season.

County	Stand Density	Rainfall	Irrigation[z]	Total Acre-in	Seeding Rate	Planting Date	Emergence Date	Harvest Date
	Plants/ft^2	Inches	Acre inches	Rainfall + Irrigation	lb/acre			
Arkansas	7	10	31	41	29	4-13	4-24	9-22
Clark	26	8	14	22	120	5-20	5-30	10-11
Clay	16	24	30	54	80	4-11	4-25	9-25
Craighead	10	15	30	45	30	4-4	4-17	8-30
Crittenden	16	7	30	37	100	5-22	5-29	9-5
Desha	5	6	48	54	29	5-16	5-28	9-15
Independence	21	18	30	48	80	4-10	4-21	9-5
Lafayette	13	6	30	36	110	4-2	4-21	9-2
Lawrence	10	15	23	38	27	4-10	4-24	9-12
Lee	22	13	46	59	100	4-5	4-11	9-1
Lonoke 1	5	6	49	55	28	4-19	5-1	9-12
Lonoke 2	18	7	30	37	100	5-18	6-1	10-5
Mississippi	15	17	35	52	120	4-5	4-19	9-1
Phillips	15	11	48	59	55	4-9	4-26	9-20
Poinsett 1	25	18	26	44	105	4-14	4-23	9-15
Poinsett 2	7	18	30	48	24	4-10	4-20	8-30
Prairie	17	7	22	29	70	5-16	5-26	10-1
Randolph	22	17	35	52	84	4-10	4-20	9-18
St. Francis	28	13	30	43	90	4-8	4-21	9-7
White	18	16	30	46	120	4-21	5-2	10-10
Average	**15.8**	**12.6**	**31.6**	**44.2**	**75**			

[z]An average of 30 Acre-inches is used for fields not utilizing flow meters

Fertilization

Nitrogen recommendations were based on a combination of factors including soil texture, previous crop and variety requirements (Table 3). Nitrogen rates can appear high, in some fields where corn was the previous crop and the soil texture is a clay soil type. These factors increase the nitrogen requirements significantly compared to a silt loam soil where soybeans were the previous crop.

Ammonium Sulfate was applied at 100 lb/acre and flushed in at 2-3 leaf stage in Arkansas, Crittenden, Lawrence, Lonoke 1 and 2 and Poinsett 2 Counties as a management tool to speed development and shorten the time required to get the rice to flood stage (Table 3). Mid-season nitrogen was applied as urea at 100 lb/acre across all varieties in all the counties with the exception of Arkansas, Clark, Craighead, Crittenden, Desha, Lawrence, Lee, Phillips and Poinsett 2.

Phosphorus, Potassium, and Zinc were applied based on soil test results (Table 3). Phosphorus and or potassium and zinc were applied pre-plant in most of the fields. Phosphorus was applied to Desha, Lafayette and White counties in the form of Diammonium Phosphate (DAP; 18-46-0) and flushed in at the 2 to 3 leaf stage. The average cost of fertilizer across all fields was $88.61 (Table 6) which was less than the $99.89 spent in 2005.

Table 3. Soil test results from RRVP fields and fertility recommendations

County	Soil Test[z]				Split application rates of urea (45%)[y]	Total N Rate	Preplant fertility N-P-K-Zn[x]
	pH	P	K	Zn			
		----------lb/acre----------			lb/acre	lb/acre	lb/acre
Arkansas	5.9	64	175	6	100-100-60	138	21-0-0-.15-18 [w]
Clark	5.8	25	21	4.5	275-150	191	0-0-0
Clay	6.0	60	258	11	250-100	158	0-36-72-0
Craighead	6.1	19	178	9.5	195-70	119	0-60-80-10
Crittenden	7.3	110	566	10.2	300-0	155	20-23-0-0-9 [w]
Desha	6.6	26	718	7.2	250-60	157	18-46-0-.15
Independence	6.5	55	190	21	230-100	149	0-45-60
Lafayette	7.1	52	994	8.4	300-100	198	18-46-0-0
Lawrence	5.5	112	190	7	195-70	119	0-0-120-.15-18[w]
Lee	6.0	126	152	4.6	150-100-100	158	0-0-100-0
Lonoke 1	5.8	92	410	6	150-60	116	21-60-.15-18[w]
Lonoke 2	5.2	148	236	15.6	230-100	169	21-46-100-10-18[w]
Mississippi	6.5	45	590	8	300-100	180	0-25-50-0
Phillips	6.5	38	154	9	100-175-75-75	209	0-45-80-0
Poinsett 1	7.5	24	156	3.4	230-100	149	0-45-80-.15
Poinsett 2	7.6	30	130	16.6	170-70	129	21-45-80-.15-18[w]
Prairie	7.3	40	172	9	250-100	190	0-36-72-.5
Randolph	6.2	77	175	5	272-100	168	0-0-90-10
St. Francis	6.7	50	224	4	230-100	149	0-60-60-10
White	6.0	38	135	4	190-100	149	18-46-0-0

[z] P=phosphorus, K=potassium, and Zn=zinc

[y] preflood-midseason-boot

[x] N-P_2O_5-K_2O-Zn includes seed treatments

[w] A.S. flushed in 2-3 leaf rice

Weed Control

In 2006, the average herbicide cost was $58.23 (Table 6). Command was utilized in eighteen of the twenty fields for early-season grass control (Table 4). All but three of the fields required an additional herbicide application for grass weed control.

Three fields (Crittenden, Independence and St. Francis Counties) did not require a postemergence herbicide application for grass weed control resulting in inexpensive herbicide programs. Lee County had the most expensive weed control program at $122.11 an acre (Table 6). Independence County had the most inexpensive at $16.32 an acre.

Table 4. Herbicide rate and timings for 2006 RRVP fields.[z]

Arkansas	**PRE[y]:** Command (0.5 pt) Facet (0.25 lb) **POST:** Aim (1.5 oz) Prowl (2.4 pt) **LATE POST:** Duet (3 pt) Permit (0.5 oz) Facet (0.25 lb) **MID SEASON:** 2-4,D
Clark	**PRE:** Command (1.5 pt) **POST:** Propanil (4 qt) Facet (0.5 lb)
Clay	**PRE:** Command (0.66 pt) Glyphosate (0.75 qt) **POST:** Propanil (4 qt)
Craighead	**POST[x]:** Clearpath (0.5 lb) fb Newpath (4 oz)
Crittenden	**PRE:** Facet (0.5 lb) Prowl (2.4 pts)
Desha	**PRE:** Command (1.5 pt) **POST:** Propanil (4 qt) Facet (0.5 lb)
Independence	**PRE:** Glyphosate (0.75 qt) 2,4-D (1 pt) fb Command (1pt)
Lafayette	**PRE:** Command (1.5 pt) **POST:** Facet (0.4 lb) Permit (0.75 oz) Aim (0.66 oz)
Lawrence	**PRE:** Command (0.8 pt) **POST:** Facet (0.5 lb)
Lee	**PRE:** Glyphosate (0.75 qt) Command (0.8 pt) **POST:** Facet (0.5 lb) Regiment (0.4 oz) **LATE POST:** Ricestar (24 oz) Aim (1.5 oz)
Lonoke 1	**PRE:** Command (1.5 pt) fb Newpath (4 oz) **POST:** Newpath (4 oz) Grandstand (0.66) Propanil (1 qt)
Lonoke 2	**PRE:** Command (0.8 pt) **POST:** Facet (0.5 lb) **POSTFLOOD:** Clincher (15 oz)
Mississippi	**PRE:** Command (1.5 pt) **POST:** RiceStar HT (22 0z) On 50 acres fb Permit (1 oz) On 40 acres fb Ultra Blazer (0.5 pt)
Phillips	**PRE:** Command (0.8 pt) **POST:** Facet (0.5 lb) Duet (3 qt) Permit (0.5 oz) **LATE POST:** Clincher (15 oz)
Poinsett	**PRE:** Glyphosate (1 qt) 2,4-D (1.5 pt) fb Command (0.8 pt) Glyphosate (0.5 qt) fb RiceStar HT (17 oz) fb Grandstand (0.67 pt) Stam (1 qt) On 30 acres
Poinsett	**PRE:** Command (1 pt) Glyphosate (1 qt) **POST:** Aim (1.5 oz) Permit (.67 oz) fb RiceStar HT (17 oz)
Prairie	**PRE:** Command (0.8 pt) Glyphosate (1 qt) **POST:** RiceStar HT (17 oz)
Randolph	**PRE:** Command (1 pt) **POST:** Propanil (3 qts)
St. Francis	**PRE:** Command (0.8 pt) **POST:** Aim (1.5 oz) Permit (1 oz)
White	**PRE:** Glyphosate (1 qt) fb Glyphosate (1 qt) **POST:** Regiment (0.6 oz) Command (1 pt)

[z]All rates are on a per-acre basis

[y]PRE=preemergence

[x]POST=post emergence

Disease Control

Fungicides were applied to four of the fields in 2006 for control of sheath blight and/or blast (Table 5). The average cost for fungicide was $5.29 an acre (Table 6). Sheath blight pressure was not heavy in 2006. The disease appeared late in the season but appeared to hang on and continue development thought the season.

Insect control

Two of the RRVP fields were treated for rice water weevil in 2006 (Table 5). Weevil traps were placed in the RRVP in cooperation with Dr. John Bernhardt. The traps and thresholds are being developed as a more accurate way of scouting for weevils as compared to the leaf scaring method. Eight fields were treated for rice stinkbugs (Table 5). Stinkbug numbers were highest in the first and last fields to head. The average cost for insecticides was $5.66 per acre (Table 6).

Table 5. Fungicide and insecticides applications in 2006 RRVP fields.

County	Fungicide	Rice Water Weevil	Rice Stink Bug
Arkansas	------	------	Mustang Max (4 oz)
Clark	Quadris (8.5 oz)	------	------
Clay	------	------	------
Craighead	------	------	Karate (1.4 oz)
Crittenden	------	------	------
Desha	------	------	Karate (1.6 oz)
Independence	Quadris (8.5 oz)	------	Karate (2.13 oz)
Lafayette	------	Karate (1.6 oz)	Karate (1.6 oz)
Lawrence	------	------	Karate (1.4 oz) Mustang Max (0.7 oz)
Lee	------	------	------
Lonoke 1	------	------	------
Lonoke 2	Quadris (8.5 oz)	------	Karate (1.6 oz)
Mississippi	------	------	------
Phillips	------	------	------
Poinsett 1	------	------	------
Poinsett 2	------	Mustang Max (3.25 oz) fb Karate (2 oz)	------
Prairie	------	------	Karate (1.6 oz)
Randolph	Quadris (6.4 oz)	------	------
St. Francis	------	------	------
White	------	------	------

Economic Analysis

This section provides information on the development of estimated production costs for the 2006 RRVP. Records of operations on each field provided the basis for estimating these costs. The field records were compiled by participating county Extension faculty, the coordinator of the RRVP, and the producers for each field. Presented in this analysis are specified operating costs, specified ownership costs and total specified costs for each of the fields. Break-even prices for the various cost components and returns above specified expenses at the average 2006 price are also presented.

Specified operating costs are those expenditures that would generally require annual cash outlays and would be included on an annual operating loan application (Table 6). Actual quantities of all operating inputs were used in this analysis. The average of the actual prices paid by cooperating producers was used to calculate costs.

Table 6. Selected variable input expenses from 2006 RRVP fields[z]

County	*Variety*	*Seed*[y]	*Fertilizer*[x]	*Herbicides*[x]	*Fungicides*[x]	*Insecticides*[x]	*Fuel*[w]	*Irrigation*[v]
		----------*Input Cost /acre*----------						
Arkansas	XP723	92.10	81.95	101.12	0.00	5.50	13.43	88.53
Clark	Cybonnet	17.18	82.87	62.41	23.19	0.00	12.02	18.07
Clay	Wells	12.83	94.90	36.91	0.00	0.00	21.19	73.79
Craighead	CLXP730	96.10	72.50	51.06	0.00	10.11	22.78	73.82
Crittenden	Wells	15.00	61.39	30.69	0.00	0.00	16.25	53.60
Desha	XP723	86.64	81.72	67.91	0.00	11.59	11.08	117.63
Independence	Wells	12.68	84.24	16.32	23.19	12.52	19.14	73.79
Lafayette	Cocodrie	13.50	97.27	52.85	0.00	21.54	11.18	43.32
Lawrence	XP710	45.12	94.92	39.15	0.00	11.29	18.04	62.99
Lee	Cheniere	16.50	68.25	122.11	0.00	6.76	10.71	118.25
Lonoke (1)	CLXP730	92.97	59.95	69.70	0.00	0.00	13.44	126.32
Lonoke (2)	Wells	17.47	112.87	83.35	23.19	0.00	12.43	44.07
Mississippi	Wells	18.83	90.82	58.17	0.00	0.00	13.00	85.98
Phillips	Francis	8.92	122.35	102.58	0.00	0.00	14.32	123.88
Poinsett (1)	Wells	21.18	100.48	46.29	0.00	0.00	15.06	65.78
Poinsett (2)	XP723	74.36	96.07	60.99	0.00	23.08	13.32	54.35
Prairie	Cheniere	10.50	102.37	34.75	0.00	10.77	25.46	54.35
Randolph	Wells	17.46	102.09	32.85	18.82	0.00	17.84	85.99
St. Francis	Francis	14.85	85.08	38.50	17.31	0.00	14.41	80.79
White	Cheniere	22.67	80.09	56.90	0.00	0.00	12.48	73.79
Average	**2006**	35.34	88.61	58.23	5.29	5.66	15.38	75.95
Average	**2005**[u]	26.68	99.89	52.17	13.32	1.35	22.30	92.65
Change[t]		8.66	**-11.28**	6.06	**-8.04**	4.31	**-6.92**	**-16.70**

[z] Does not include all variable costs, such as drying, hauling, equipment repair, etc.
[y] Includes Seed cost and treatments.
[x] Includes the cost of material and application for each input.
[w] Fuel for Tractors, Combines, and Self Propelled Equipment
[v] Includes Irrigation Labor, Irrigation Supplies (Levee Gates & Poly-pipe), Irrigation Repair and Maintenance, and Diesel Fuel.
[u] Average costs from 2005 RRVP Fields using 2005 costs of production.
[t] Change in average costs from 2005 to 2006.

The producers' actual field operations were used as a basis for calculations and actual equipment sizes and types were matched as closely as possible. Fuel and repair costs were calculated by Extension models based on the size or horsepower of the equipment. A diesel price of $2.20 per gallon was used for 2006 ($1.80 was used for 2005). Therefore, the producers' actual machinery costs may vary from the machinery cost estimates that are presented in this report. Specified operating costs for the 20 RRVP fields ranged from $294/A for Clark County to $510/A for Desha County with an overall average of $396/A (Table 7).

Land costs incurred by producers participating in the RRVP would likely vary from land ownership, cash rent, or some form of crop share arrangement. Therefore, a comparison of these divergent cost structures would contribute little to this analysis. For this reason, a 20% crop share rent was assumed to provide a consistent standard for comparison. This is not meant to imply that this arrangement is normal or that it should be used in place of existing arrangements. It is simply a consistent measure to be used across all RRVP fields. The average break-even price needed to cover specified operating costs including the assumed 20% crop share rent was $3.00/bu, which is $0.20/bu less than the $3.20 price required in 2005. Furthermore, break-even prices ranged from $2.25/bu in Independence County up to $4.03/bu in White County (Table 7).

Table 7 includes estimated net returns above Specified Operating Expenses and Total Specified Costs. Net land costs and impacts of milling yields on gross returns are also included. Estimated landowner returns or net land costs were calculated assuming the landowner pays 20% of the drying expenses and $19.35/A for the irrigation system fixed costs. All Costs for risk, overhead and management were not included.

Crop price was estimated based on a harvest season average price of $4.01/bu, which was a reported total cash price average for the period of August 15, 2006 – October 10, 2006. The associated premium above loan rate was $1.05/bu based on the $6.58/CWT loan rate for long-grain rice. The 2006 price was higher than the 2005 price of $3.22 per bushel including a $0.25 per bushel premium. Crop prices were calculated based on milling yields for each field and the 2006 USDA loan rates for whole and broken rice kernels. Estimated prices varied from $3.87/bu in White County to $4.37/bu in Lonoke County, with an average of $4.11/bu.

Net returns ranged from a $12/A loss in White County to a $311/A profit in Independence County. Much of the difference in net returns across RRVP fields can be attributed to yields, herbicide use, and irrigation amounts, i.e. Irrigation of 49.0 ac-in in Crittenden County versus 14.0 ac-in in Clark County. Figure 2 gives a visual representation of all fields in the 2006 RRVP from highest yield to lowest. It shows that other factors besides yield, can have a huge impact on farm profits.

Table 7: Economic Summary of 2006 RRVP Fields[z]

County	*Yield*	*Milling Yield*	*Crop Price[y]*	*Specified Direct Expenses[x]*	*Specified Ownership Expenses[w]*	*Land Costs[v]*	*Return above Direct Costs*	*Return above Total Costs*	*BEP[u] to Equal Operating Costs*	*BEP to Equal Total Costs*	*Milling Yield Contribution to Gross Returns[t]*
	bu/ac		$/bu	----------($/ac)----------					-----$/bu-----		$/ac
Arkansas	155	65/74	4.34	493	43	125	55	12	3.90	4.24	51.36
Clark	104	60/70	4.13	294	39	80	56	17	3.46	3.93	12.31
Clay	153	54/72	4.03	348	52	114	155	103	2.77	3.19	3.62
Craighead	213	60/70	4.13	470	58	163	246	189	2.68	3.02	25.21
Crittenden	124	54/70	3.99	263	46	91	140	94	2.58	3.04	**-2.94**
Desha	207	64/73	4.30	510	35	165	214	178	3.00	3.22	58.80
Independence	199	60/73	4.20	370	52	155	311	259	2.25	2.57	37.68
Lafayette	135	48/71	3.87	331	38	96	95	57	2.99	3.34	**-19.17**
Lawrence	171	54/72	4.03	392	48	128	170	123	2.79	3.14	4.05
Lee	142	59/69	4.08	442	37	107	30	**-7**	3.82	4.15	10.08
Lonoke (1)	217	51/71	3.94	504	42	158	193	151	2.83	3.07	**-15.41**
Lonoke (2)	176	67/73	4.37	401	39	143	224	186	2.77	3.05	62.49
Mississippi	154	60/70	4.13	371	39	118	147	108	2.94	3.25	18.23
Phillips	197	53/69	3.94	503	42	143	130	88	3.12	3.38	**-13.99**
Poinsett (1)	145	59/73	4.18	353	47	112	140	95	2.97	3.36	24.03
Poinsett (2)	168	59/70	4.11	438	40	128	124	84	3.18	3.48	15.91
Prairie	157	65/72	4.30	351	61	125	198	137	2.72	3.20	44.59
Randolph	186	59/71	4.13	400	48	142	226	178	2.61	2.93	22.01
St. Francis	173	61/71	4.18	366	45	134	222	178	2.57	2.89	28.66
White	100	50/69	3.87	328	38	71	**-12**	**-50**	4.03	4.50	**-14.20**
Average 2006	164	58/71	4.11	396	44	125	153	109	3.00	3.35	17.67
Average 2005[7]	170	56/71	3.25	430	48	101	13	(35)	3.20	3.55	4.68
Change[s]	***-6***	--	0.86	***-34***	***-4***	24	140	144	***-0.20***	***-0.20***	12.99

[z] 20% Crop-Share Rent was Assumed.

[y] Loan Rate Milling Yield Value plus $1.05/bu Premium.

[x] Includes all Variable Expenses from Table 6 plus Drying, Hauling, Miscellaneous Custom Expenses, Fuel, Repairs, Labor for field operations, Interest on Operating Capital, and Arkansas Rice Checkoff.

[w] Excludes ownership expenses of Irrigation Well, which are paid by the landlord.

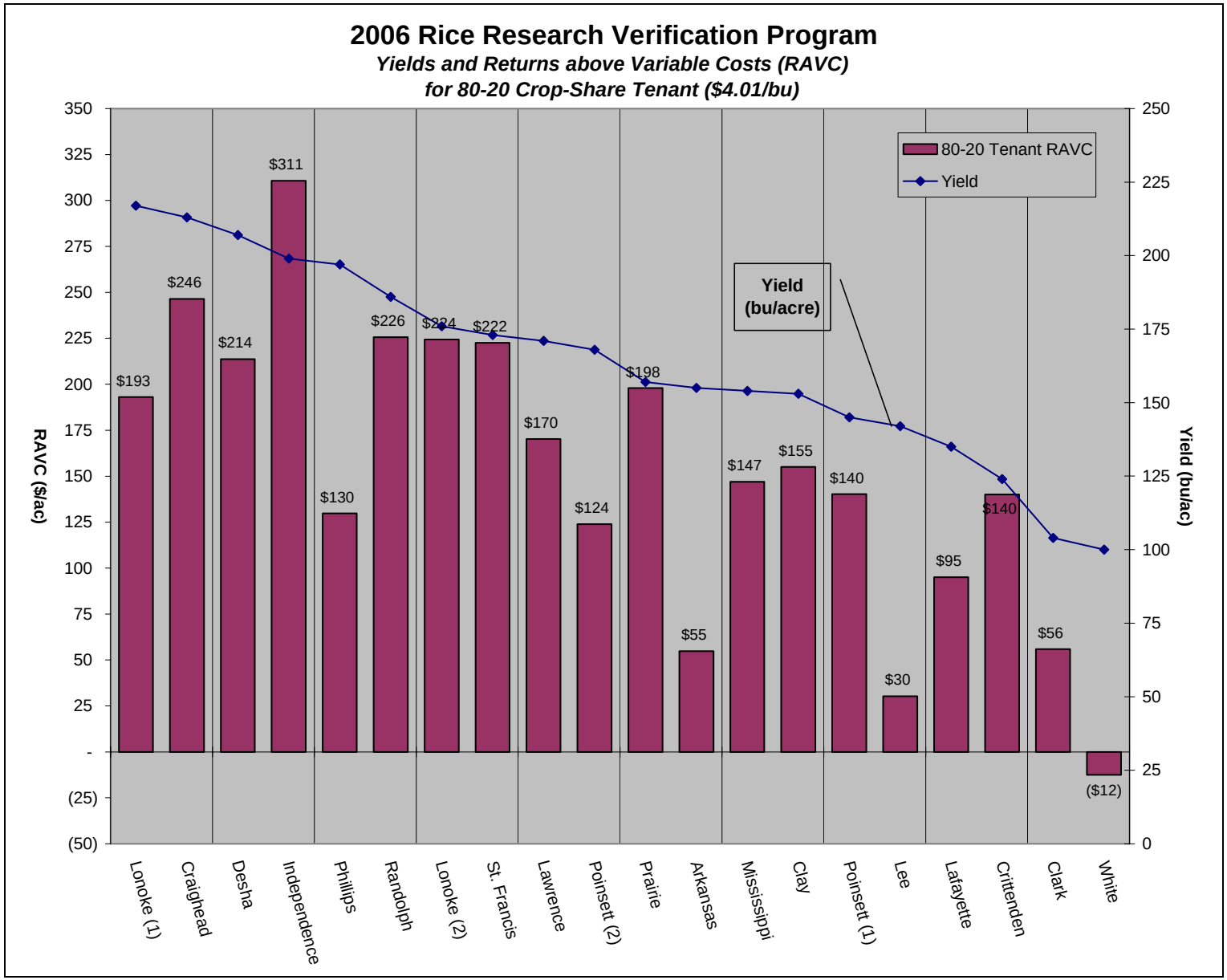
[v] Gross Value of landlords 20% share of crop less drying charges.

[u] BEP=Break Even Price

[t] Impact of milling on Gross Returns. (Gross Returns at milling yields – Gross Returns at Standard Milling, i.e. 55/70)

[s] Averages from 2005 RRVP fields and the change from 2005 to 2006.

Figure 2: Yield and Net Returns of 2006 Rice Verification Fields



DISCUSSION

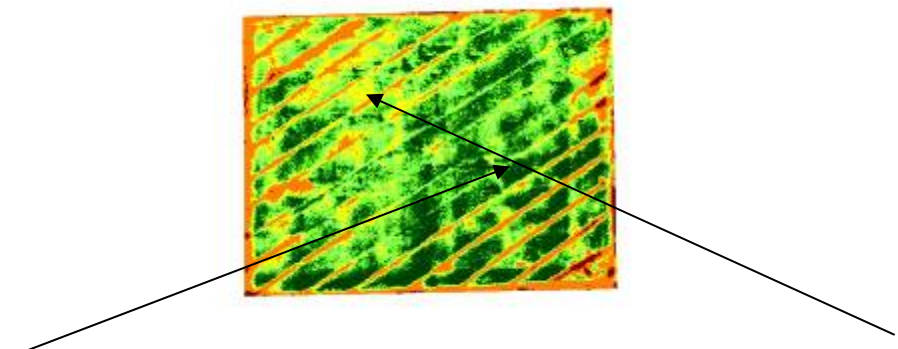
Field Summaries

As you read the contents of this report, you will notice some extremely good yields, some exceeding 200 bu/acre. Success has to be measured on a field by field basis. Many of the producers experienced a yield increase of 10, 20 or more bushels per acre over the fields' historic yield. You will also notice some low yields. These are fields that experienced specific problems which were out of our control and are explained in the summaries following. The disappointing figures are the input costs. Utilizing IPM practices, we are able to limit the number of applications made to the field, however with the increase in fuel and fertilizer prices, the costs continue to rise.

Northern Fields

Clay

The Clay county field was planted April 11 in Wells. It took a longer than average 14 days to get a stand with parts of the field another week later. The field was flushed and then received a rain. The temperature dropped and stayed cool for a period of time. Holes in the field held water and never did come up. Plant stand counts averaged 16 plants/ft². It felt like we were pushing the field all season. The nitrogen applications were made on the earlier side of the application window as I recommended. In this field with uneven emergence, some of the rice plants were 2-3 leaf while the majority of the field was 4 leaf or larger. It took a long time for the field to finally take off and grow. Red rice pressure was heavier than expected in this field and may have reduced yields significantly. No significant insect or disease pressure was present.



The dark green areas indicate heavy biomass or in this case red rice. The yellow and orange areas are thin spots where the water stood and an adequate stand was not achieved.

Craighead

The Craighead county field was planted very early on April 4th. The field was seeded in CL XL 730 at a rate of 30 lb/acre. The field required flushing in order to get a stand. Stand counts averaged 10 plants/ft².

No herbicides were used pre-emergence. Barnyardgrass, sprangletop, and scattered red rice were present following the flush. Clearpath was used for the first herbicide application and was applied by air in the mud. The Facet component of the product was necessary for control of the larger barnyardgrass plants. The herbicide did an excellent job and held until flood. A second application of Newpath was applied pre flood.

The rice appeared to be stunted and yellow after the first newpath application. The cool wet conditions played a factor in this delayed growth. After a couple of weeks and some warm weather, the field recovered and growth and development was normal the rest of the season. The field was sprayed for stink bug control as it was one of the first fields to head in the area. The field yielded an impressive 213 bu/acre.

Crittenden

The zero grade, heavy clay field in Crittenden County took a long time to dry out so that it could be planted. It was the last field in the program to be planted on May 22nd. The field was a little wet when planted. Good drill row closure was not achieved in some areas causing uneven emergence. The stand was a little thin, but averaged 16 plants/ft². Facet and prowl applied delayed pre was the herbicide of choice. The field was flushed about a week after the application. Ammonium sulfate and D.A.P. was applied at a rate of 50 lb/acre of each product ahead of the flush. The herbicide did an excellent job and no other herbicide applications were required.

300 lb of urea was applied by ground around two weeks later than recommended. The producer was waiting on the soil to dry so that a ground application could be made. Due to unforeseen circumstances, the recommended mid season nitrogen application was not made. The field yellowed up and appeared to be deficient of nitrogen at mid season. The plants greened up eventually after tapping some reserve nitrogen in the soil. The plants did not tiller well and the field appeared thin all year. No disease or insect pressure was present. The field yielded a disappointing 124 bu/acre.

Independence

In Independence County this year, everything seemed to go just right. From a perfect seedbed and stand to virtually no weed pressure. The field was planted in Wells on April 10. Command was applied and it was off to the races. The plants took off and grew like crazy. As is the case in most “healthy” fields, disease pressure was heavy. This field was one of only two in NE Arkansas that was sprayed for sheath blight. The field also was treated for stinkbugs as it was one of the first fields to head in the area. Neck blast was observed late in the season but did not seem to cause any significant loss. I was impressed with this field every week. The end result was 199 bu/acre.

Lawrence

Cybonnet was the selected variety in Lawrence County, but a last minute good deal on XP 710 changed the variety. The soil test indicated very low potassium levels and 200 lb/acre of potash was applied. The field was seeded at 27 lbs/acre with a germination of 65%. As you can imagine, I was a little nervous. We didn't take any chances and went ahead and flushed the field in order to get every seed possible up. The overall stand count was 10 plants/ft², which allowed me to relax a little. Areas of the field especially the deepest cuts and areas where water stood were thin and some spots were replanted. Overall it was in pretty good shape.

Command was applied pre, and Facet was used post followed by a second flush. Ammonium sulfate was applied prior to the flush in order to promote tillering and get the rice big enough to flood. Urea and the permanent flood was applied as soon as the field dried, about a week later. No significant disease pressure was observed. The field was treated for stinkbugs. The field yielded a respectable 171 bu/acre.

Mississippi

Mississippi County was a broadcast seeded field of Wells. This was actually two 40 acre precision leveled fields. This field was in the program last year so it was following rice. The field was flushed following the Command application with a center pivot and came up to a stand at 15 plants/ft² compared to last year's 20. There were areas of the field that were thinner than the average. RiceStar was used post and did an excellent job as conditions were just right for the application. The herbicide was applied in the mud. Blazer was used for coffeebean control and part of the field was treated with permit for yellow nutsedge.

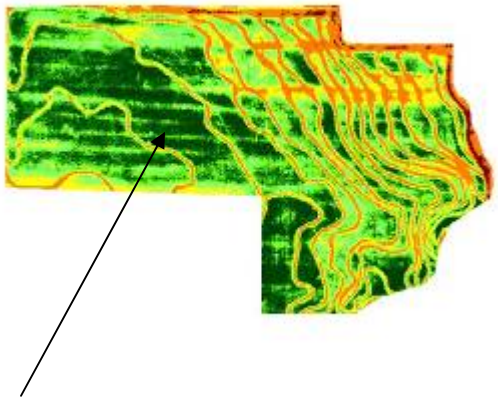
The yield this year was 154 bu/acre, which was fifteen bushels less than last year. The only differences I can attribute this to were a thinner stand and rice following rice. The nitrogen rate was increased as recommended however total nitrogen applied last year was a little more. Last year the nitrogen was applied as urea at a rate of 230lb, 100lb, 70lb (pre-flood, mid-season, boot). This year 300, 100 (pre-flood, mid-season).

Poinsett 1

The 80 acre field was planted mid-April in Wells. This field has a history of Grape Colaspis injury so the seeding rate was increased to 105 lb/acre to compensate. Mustang Max was applied with the command on half of the field in order to take a look at this as a control option. This year, however, no significant pressure was observed. RiceStar was used for barnyardgrass control, and 30 acres was sprayed with Grandstand for Indigo.

The field looked excellent up until the nitrogen was applied. It became apparent quickly that the field had been streaked. Additional nitrogen was flown in the streaks, by another pilot, but the yield loss can never be made up. As shown on the picture below it appeared that about half of the field actually got fertilized. The field yielded a

disappointing 145 bu/acre. This field also had a lot of blanking which I am contributing to high nighttime temperatures during flowering. It appears that fields planted in mid to late April in Poinsett, Jackson and other counties were affected.



Urea application streaks. The dark green areas received urea; the light green areas did not.

Poinsett 2

The second Poinsett County field was 9 acres, seeded in XP 723. An area in the middle of the field stayed wet and was very thin. It ended up filling in and looking fair by the end of the season. The field was hit early by water weevils and aphids. The rice plants had heavy feeding scars and appeared yellow and stunted. The field was sprayed with Mustang Max. Later, the field reached treatment level of water weevils for a second time. The field was sprayed again with Karate.

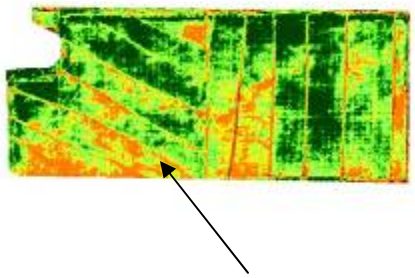
The main problem with the field was that the pilot told us he had applied the pre-flood urea. After the field was flooded, it was determined that the urea had not been applied. The field was drained, and we started over. It is difficult to recover from a set back like this. After the soil is saturated, the nitrogen does not move down in the soil like it should. The field yielded 168 bu/acre, which is much lower than the potential of this variety.

Prairie

The Prairie County field was seeded in Cheniere on May 16. Wet weather in April delayed planting in this field. Glyphosate and command was applied behind the planter. The command was not activated until the following rainfall a couple of weeks later. Some barnyardgrass and broadleaf signalgrass emerged. RiceStar was applied in wet soil and cleaned up the field. The field reached treatment level for stink bugs. Karate was recommended for control. Over the next two weeks, the stinkbug numbers

continued to increase. I determined that the field may not have gotten sprayed. I am not sure what happened, but the field was sprayed again with excellent results. The parties involved donated the insecticide and flying for the second application.

As indicated in the image below, Glyphosate and Valor drifted onto the field from a burndown application to the adjacent soybean field. The plants started to recover until the flood was applied and the Valor kicked in. The affected areas in the field were severely injured which effected the overall yield in the field. The non affected areas were much better than the average yield on this field of 157 bu/acre.

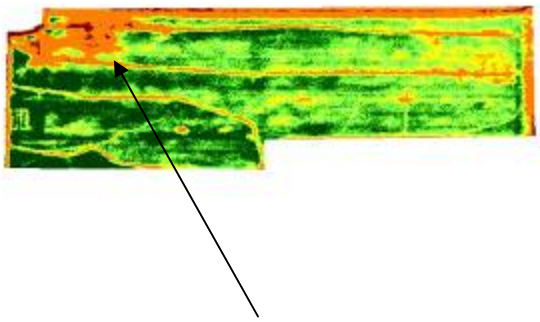


Glyphosate/Valor drift.

Randolph

This was the second year in the program for the field in Randolph County. A couple of changes were made this year from what we learned last year. The seeding rate was reduced by 10 lbs/acre and fewer levees were constructed in order to more effectively water the field. No benefit from agrotain was observed last year so it was not used this year. The composite soil test did not indicate the need for Phosphorus fertilizer, only Potassium and Zink. As a result, a large area in the field was Phosphorus deficient. The area recovered to some extent, but yields were reduced in that area.

This field was sprayed for sheath blight. The disease appeared later this year, due to weather and a thinner stand. The field was treated with a low rate of Quadris for control. The field yielded 186 bu/acre this year compared to last year 190 bu/acre. It just takes one small area in the field to reduce yields by a few bushels. The field overall was as good as or better than last year.



Phosphorus deficiency areas indicated in orange.

White

The White County Field was the only water seeded field in the program. The field was water seeded in order to control red rice and the method was convenient for the producer. Soaking and pre germination of the seed was recommended, however was not done. A poor stand was achieved in this field due to seed midge and application.

Three applications of Glyphoste for burn down were applied. The field was flooded after the final application. The seed was flown in the flood and the flood maintained until one inch leaves were observed on the plants. The field was then drained before the plants started to float. Red rice control was not achieved in this field. Multiple flushes of red rice occurred.

Command and Regiment was applied by air for control of barnyardgrass and ducksalad. The herbicide did an excellent job, however severe root pruning occurred. The plants took a very long time to recover from the loss of roots. Nitrogen uptake was most likely affected as well.

Blast came into the field, especially areas where the flood was lost, late in the season and caused significant yield loss. This was the lowest yielding field in the program at 100 bu/acre.

Southern Fields

Arkansas County

Furrow irrigated rice is not a new concept; however, this year was the first time the management practice was implemented in the RRVP. Arkansas County was one of two counties that used furrow irrigation instead of holding a continuous flood once the rice reached tillering. The field was seeded with XP723 at 28 lbs/acre. Many factors can cause problems in this production system, such as the height of the bed. In this field the beds were a little to high, which lead to some of the seed in the middles not getting

covered with soil. The stand was reduced in these areas, but the average stand count was sufficient.

Weed control proved to be the most challenging component in this practice. Weeds that are not usually a problem in flooded rice can become a huge problem in furrow irrigated rice. Multiple flushes of pigweeds were a major part of the $101 per/A spent on herbicides in this field. Command and Facet were applied preemergence, but provided little control of pigweeds. Aim in combination with Prowl was applied early postemergence for control of emerged pigweeds and to provide residual control. Prowl provided residual control that lasted approximately 10 days. Three of the four herbicide applications in this field were due to pigweeds.

Insects that are usually not economically important can also present problems in this system. Bill bug damage was significant in both furrow irrigated fields. This insect usually only causes damage on the levees, but without the flood the insect can cause wide spread damage.

The yield was 155 bu/acre, but the soil type was extremely sandy and the yield was in line with the historical yields for this field. The yield was also achieved without the expense of building levees or the expense of tearing them down.

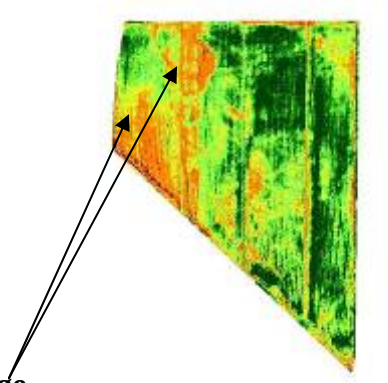
Pigweeds in Arkansas County.

Bill bug damage caused approximately 5 % yield loss.

Clark County

Clark was one of two fields in the south that were planted at the end of May. The field was to be planted the third week pf April, but one day prior to planting, rainfall was received. Periodically for the next 4 weeks rainfall was received and delayed planting until May 20th. The field was seeded with Cybonnet and emerged quickly to a uniform stand. However, the weather had changed dramatically since the field was planted. Hot and dry weather had replaced the cool and wet climate experienced in early spring. This weather pattern can lead to chinch bugs moving into the rice. Chinch bugs are not usually a problem in rice, but prior to flood they can cause serious damage.

Smut was also a severe problem and played the largest role in determining the yield. Smut blanked out as much as half of the grains on almost all panicles. This was the second year in a row for the field to be planted in rice. Very little smut was observed in the previous rice crop. An infestation this heavy without a strong field history of the disease is uncommon, but can occur under certain environmental conditions combined with late planting date.



Chinch bug damage

Desha County

The field in Desha County recorded the third highest yield in the history of the program at 207 bu/acre. The field was seeded with XP723 on April 13th, but failed to establish a uniform stand, and was replanted on May 16th. The field emerged quickly with the warmer temperatures in May and was ready to establish the flood in 2.5 weeks.

Stinkbugs were the only other problem that occurred in the Desha County field. Since the field was younger than the surrounding fields, stinkbug numbers increased rapidly at the end of the season and required treatment.

Lafayette County

The verification field in Lafayette County was the first field in the program to be planted. The field was seeded with Cocodrie on April 2nd. Emergence was slow and the field had to be flushed to ensure emergence. A somewhat uniform stand was achieved, but there were places in the field where the stand density was a little low. However, the average across the field was more than sufficient.

The field looked good once it had reached the flood stage. Seven days following the establishment of the permanent flood heavy water weevil scaring was observed. This was not surprising due to the hundreds of acres of water seeded rice surrounding the field. Karate was applied to about 1/3 of the field and provided excellent control of the rice water weevils.

The field was utilizing surface water for irrigation. With the extremely high temperatures and low rainfall the surface water was gone when the rice started heading.

A nearby well was used to try and get water back on the field, but the well was not able to keep up with the demands of the rice and the August temperatures. Approximately 7 acres were affected by the shortage of water.

Glyphosate drift was also apparent once the rice started to head. No visible symptoms of drift were observed prior to heading. Around 30 % of all panicles were severely affected, as well as, the yield.

Brown areas are drought stressed heading.

Glyphosate drift resulted in deformed panicles

Lee County

Lee County was the second county in the program utilizing the furrow irrigation production system. The field had similar problems as the Arkansas County. One problem that was different was the height of the bed. In Arkansas County they were too high, but in Lee County they were to low. The field was no-tilled onto last year's bean rows. Everything looked fine until the well was turned on the first time. The low beds allowed the water to break over the beds and many of the middles were not being watered. A lot a hard work by the cooperator corrected the problem.

Weed control was challenging in this field as well, but for a different reason. The field was no-till and glyphosate resistant horseweed was everywhere. Regiment was applied and provided excellent control of this hard to kill weed.

Bill bugs were also a problem in this field. The loss in the Lee county field was greater than that observed in Arkansas County. The heads were white and blanked out down every middle in the field. The yield loss was significant, and there are no known treatments for this insect.

This production practice potential on certain fields, but this is not something that can be adapted across the farm. For this production system to remain viable there are many areas that need to be researched.

Glyphosate resistant horseweed

Bill bug damage

Lonoke County 1

This field recorded the highest yield in the history of the program at 217 bu/acre. The field was seeded with CLXP-730. Newpath and Command were applied preemergence and provided excellent early season control of grasses and sedges. The preemergence application timing with Newpath was chosen due to sensitive crops and to ensure that two applications were possible.

Very little Newpath injury was observed in this field. Some stunted plants were found, but there was no visible chlorosis or dead plants following Newpath applications. Northern jointvetch was present in the weed spectrum. Grandstand combined with 1 qt. of propanil, instead of crop oil, provided excellent control of this troublesome and hard to kill weed.

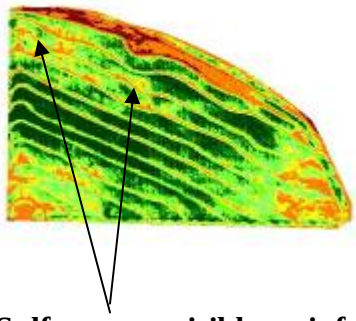
Lonoke County 2

The second RRVP field in Lonoke County was also a late planted field due to the weather in mid-April. The field was seeded with Wells and reached flood stage quickly due to the warm temperatures and ideal growing conditions. The field had a history of poor yields which was one of the reasons this field was chosen for the program. The field was being treated like the surrounding fields that were producing 30-50 bu/acre more.

The soil samples did not provide much help, as far as diagnosing the problem; because all of the nutrient levels were above thresholds that trigger fertilizer applications. The field had been leveled over 20 years ago, and the problem also was visible in the soybean crop every year as well.

The problem turned out to be extremely low sulfur in areas of the field. The soil samples were mixed between the good and bad parts of the field, which gave the appearance that the field average was acceptable. This is a common problem with soil sampling, and is one reason multiple samples should be taken.

Sulfur symptoms on leaf



Sulfur areas visible on infrared

Phillips County

The field in Phillips County was the best looking field in the program and the worst looking field with only seven days in between. Glyphosate almost destroyed the entire field. When looking at the field, drift never occurred to me because there was no drift pattern. The entire field was affected and critical decisions had to be made.

The weeds were still growing, but we could not spray due to the injured rice. Fertilize and flush was the only option. Ammonium sulfate was applied and flushed into the soil to try and stimulate growth. At one time replanting was discussed, but the decision was made to give it a few more days. Slowly, but surely, green started appearing across the field. However, the grass and sedges were way ahead of the rice in development. It took two herbicide applications to get the weeds under control.

The field yielded more than anyone thought possible with everything that had happened. The yield was 197 bu/acre. It was hard to believe that the field that was only a couple of days away from replanting had done so well. This fits with previous research findings that show if drift occurs prior to the reproductive stages the yield will not be affected if the plant density is not significantly reduced.

Early symptoms of drift

One week following drift

Three weeks after drift

St. Francis County

The field in St. Francis County was one of the most inexpensive fields in the program. Command did an excellent job of controlling grasses. No postemergence grass herbicide was applied. This is the main reason for the herbicide cost being $38/A which is well below the average.

Hemp sesbania, yellow nutsedge and morningglory species were treated with Aim and Permit. Most of the time this combination of herbicides works; However, antagonism can occur. Aim provided excellent of morningglory, but failed to control hemp sesbania.

Disease pressure was also light and sheath blight was hard to find. The field did have a history of kernel smut, and the variety was Francis, so Quilt was applied at 14 oz/acre and no smut was observed.

On Farm Research

Research was conducted in many of the verification fields in 2006. Disease monitoring tests were planted in nine RRVP fields (Table 8). This provides information on how varieties perform under various environmental conditions and different soil types across the state. The highest yielding variety in 2006 was CL XP 729 at 262 bu/acre in Randolph County. Hybrid yields raged from 173 bu/acre to 262 bu/A in Randolph County. Wells and Francis also performed well with yields averaging 204 bu/acre and 207 bu/acre, respectively.

Summary

The 2006 Rice Research Verification Program was conducted on 20 commercial rice fields across the state. Grain yield in the 2006 RRVP averaged 164 bu/acre with a range of 100 to 217 bu/acre. All fields were planted in April and May and many of the fields had to be flushed to emerge. The 2006 RRVP average yield was 14 bushels/acre greater than the estimated Arkansas state average of 150 bu/acre. The highest yielding fields were in Lonoke and Craighead Counties with a grain yield of 217 and 213 bu/acre. The lowest yielding field was in White County and produced 100 bushels/A. Milling quality in the RRVP was comparable with milling from the Arkansas Rice Performance Trials and averaged 58/71.

Table 8. Performance of selected varieties in replicated rice disease monitoring tests located in RRVP fields in 2006.

Cultivar	Arkansas	Clark	Crittenden	Desha	Independence	Lafayette	Lawrence	Phillips	Randolph
	----------Bushels/acre----------								
4484	---	84	144	151	116	140	215	207	192
Banks	86	137	135	140	148	171	203	197	194
Bengal	62	142	135	130	134	126	201	152	200
Cheniere	93	135	121	109	142	147	181	166	183
CL 131	103	82	124	111	160	129	169	143	197
CL 151	20	---	137	---	---	---	---	---	---
CL 161	75	120	115	105	127	214	179	160	188
CL 171 AR	85	138	112	101	162	194	176	147	195
Cocodrie	95	77	130	137	141	243	186	163	198
Cybonnet	103	136	118	96	155	196	182	154	194
Francis	15	144	127	119	148	229	189	219	207
Jupiter	---	175	126	119	156	203	201	200	217
Medark	48	151	115	96	114	200	184	177	189
Pace	96	168	100	128	146	222	186	173	206
Pirogue	4	156	135	91	130	114	213	200	199
Presidio	111	143	105	118	127	183	153	155	174
RT CL XP 729	161	215	162	113	213	186	246	226	262
RT CL XL 730	184	207	170	150	193	165	250	232	232
RT XL 723	166	217	165	136	184	143	249	226	242
RU 050 1084	103	142	129	109	145	165	210	142	191
RU 050 1099	101	144	131	130	144	169	196	175	191
RU 050 1136	33	142	121	111	122	159	154	158	182
RU 050 1145	82	162	137	129	152	173	182	195	205
Spring	26	114	99	81	131	195	171	155	191
Trenasse	122	85	147	133	138	141	204	177	204
Wells	91	171	122	137	159	101	193	184	204
Mean	**86**	**147**	**129**	**119**	**147**	**172**	**195**	**179**	**201**
C.V. (%)	**25.1**	**24.3**	**14.2**	**15.4**	**15.8**	**21.3**	**13.2**	**15.5**	**9.6**