UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

2007
University of Arkansas
Rice Research Verification Program

AG 1066

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 275 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 1.325 million acres in Arkansas in 2007. The distribution of varieties was: Wells (37%), Francis (12%), Bengal (10%), CL 161 (10%), Cocodrie (7%), Rice Tec XP 723 (7%), Rice Tec CL Hybrids (7%), Cybonnet (4%) and Jupiter (4%). Warm, dry weather in March encouraged several producers to get a head start on the planting season. As of April 1, farmers had planted 17% of the rice acreage and 50% of the rice acreage was planted by April 23. All of the verification fields were planted prior to 23 April. While less than 1% was officially emerged as of April 1, some fields had emerged. It is uncommon to have rice emerge in March. After surveying the effects of the Easter freeze, the rice faired much better than some of the other crops. Some fields required re-planting, however, it was a relatively small amount. Cool night time temperatures during the flowering period for the early planted rice provided for excellent yield and quality. Record yields were produced in the 2007 RRVP. Input costs for herbicides and insecticides were lower than in 2006, however, input costs were increased overall largely as a result of high fuel costs.

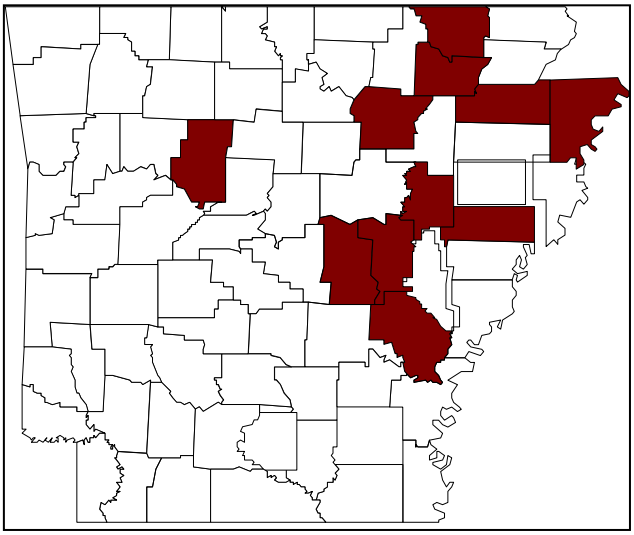
PROCEDURES

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 2007 included Arkansas, Craighead, Independence, Lawrence, Lonoke (2 fields), Mississippi, Pope, Prairie, Randolph, St. Francis, and Woodruff (Figure 1). A total of 645 acres were enrolled in the program. Five varieties were seeded ('Wells', 'Cybonnet', 'XP 723', 'CL XL 730 Red Tag', and 'CL XL 729 Brand') in the 12 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 2007 RRVP Fields



RESULTS

Yield

The average RRVP yield was 189 bu/acre with a range of 148 to 231 bu/acre (Table 1). The RRVP average yield was 29 bu/acre more than the estimated state average yield of 160 bu/acre. This difference has been observed many times since the program began, and can be attributed in part to intensive management practices and utilization of University of Arkansas recommendations. The 2007 RRVP average was 17 bu/acre more than the programs highest average yield of 172 bu/acre set in 2003. The highest yielding field yielded 231 bu/acre and is a new program record. The field was seeded with XP 723 in Pope County. Three additional fields, Craighead, Lawrence, and Randolph Counties, exceeded 200 bu/acre. The lowest yielding field yielded 148 bu/acre and was seeded with Wells in Lonoke County.

Milling data was also recorded on all of the RRVP fields. The average milling yield for the 12 fields was 58/72 (head rice / total white rice) with the highest milling yield of 63/71 occurring in Randolph 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 Wells in Lonoke County and only milled 52/68.

Table 1. Variety, soil series, previous crop, acreage, yield, and milling for the 2007 RRVP

County	Variety	Soil series	Previous crop	Acres	Yield	Milling yield[z]	Harvest moisture
					(bu/acre)		(%)
Arkansas	XP723	Rilla silt loam	Soybean	40	179	52/74	13.8
Craighead	Wells	Roellen Silty Clay Loam	Soybean	50	219	55/73	19
Independence	Wells	Amagon Silt Loam	Soybean	119	191	60/73	14.9
Lawrence	CLXL729 Brand	Jackport Silty Clay	Rice	38	213	57/69	18.4
Lonoke-1	Wells	Loring Silt Loam	Soybean	78	148	52/68	15
Lonoke-2	CLXL730 Red Tag	Herbert Silt Loam	Rice	20	167	53/72	15
Mississippi	Wells	Tunica Silty Clay	Soybean	45	181	61/73	14.7
Pope	XP723	Roellen Clay	Fallow	40	231	61/71	17
Prairie	Cybonnet	Loring Silt Loam	Soybean	43	175	61/72	16.2
Randolph	XP723	Bosket Fine Sandy Loam	Soybean	68	212	63/71	15.0
St. Francis	Wells	Dundee Silt Loam	Rice	26	195	55/72	15.9
Woodruff	XP723	Jackport Silty Clay Loam	Soybean	78	178	60/70	18.3
Average				54	189	58/72	16

[z]Head rice/total white rice

Planting and Emergence

All the fields were planted in the optimum time frame beginning with Craighead County planted 26 March and ending with Independence County planted 23 April (Table 2). An average of 77 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 16 days was required for emergence. Stand density ranged from 5 to 23 plants/ft^2, with an average of 14 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.

Irrigation

Well water was used to irrigate nine of the twelve fields in the 2007 RRVP. Lonoke-2, Pope, and Prairie Counties were irrigated with surface water. The Arkansas County field was furrow irrigated. Three fields were zero grade (Lonoke-2, Pope, and St. Francis). One field, Craighead County, used multiple inlet (MI) irrigation. Flow meters were used in nine 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 27 acre-inches was used.

An average of 27 acre-inches of water was used across all irrigation methods (Table 2). The field with MI irrigation averaged 21 acre-inches of water. Difference in water used was due in part by rainfall amounts. Typically a 25 % reduction in water used is seen when using MI irrigation.

Table 2. Stand density, irrigation, seeding rate, and important dates in the 2007 RRVP season

County	Stand density (plants/ft^2)	Rainfall (inches)	Irrigation[z] (acre-in.)	Rainfall + Irrigation (inches)	Seeding rate (lb/acre)	Planting date	Emergence date	Harvest date
Arkansas	14	13	40	53	30	19 Apr	27 Apr	2 Sept
Craighead	16	12	21	33	150	26 Mar	13 Apr	22 Aug
Independence	22	10	27	37	87	23 Apr	4 May	19 Sept
Lawrence	6	11	22	33	49	10 Apr	2 May	1 Sept
Lonoke-1	20	8	27	35	80	19 Apr	29 Apr	12 Sept
Lonoke-2	5	11	16	27	33	10 Apr	23 Apr	17 Aug
Mississippi	15	6	27	33	115	30 Mar	23 Apr	15 Sept
Pope	12	14	13	27	31	20 Apr	3 May	3 Sept
Prairie	15	10	33	43	85	18 Apr	29 Apr	10 Sept
Randolph	12	14	44	58	30	9 Apr	26 Apr	23 Aug
St. Francis	23	8	28	36	202	29 Mar	26 Apr	23 Aug
Woodruff	10	11	25	36	30	9 Apr	28 Apr	26 Aug
Average	14	10.7	27	37.6	76.8			

[z]An average of 27 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 rice 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- to 3-leaf stage in Arkansas County 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, Lawrence, Lonoke-2, Pope, Randolph and Woodruff Counties.

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 Lawrence, Lonoke-2, Pope and St. Francis Counties in the form of Diammonium Phosphate (DAP; 18-46-0). The DAP was applied pre-plant in Lawrence County, flushed in at the 2- to 3-leaf stage in Lonoke-2 County and blended with the pre-flood nitrogen in Pope and St. Francis Counties. Zinc was applied as a seed treatment in fields with hybrid rice varieties at a rate of one half pound of zinc per sixty pounds of seed. The average cost of fertilizer across all fields was $82.65 (Table 6) which was less than the $88.61 spent in 2006.

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)		
Arkansas	5.8	104	297	3.5	100-100-70	143	21-0-0-.25-24[w]
Craighead	6.3	117	513	14.5	250-100-0	168	10-40-80-0
Independence	5.6	34	180	6.6	230-100-0	149	0-30-90-0
Lawrence	6.3	47	459	7.7	250-0-70	162	18-46-0-.41
Lonoke-1	5.8	36	170	8.6	250-100-0	158	0-30-90-0
Lonoke-2	6.9	73	588	5.0	250-0-70	162	18-46-0-.27
Mississippi	7.2	84	476	11.4	300-100-0	180	0-0-0-0
Pope	5.4	54	764	8.8	200-0-70	140	18-46-0-.26
Prairie	6.6	40	161	17.4	230-100-0	149	0-88-176-0
Randolph	5.8	91	219	8.7	200-70-100	167	0-0-0-.25
St. Francis	5.6	61	312	8.6	250-100-0	176	18-46-0-0
Woodruff	6.3	94	206	4.8	200-0-75	124	0-23-90-.25

[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- to 3-leaf rice

Weed Control

In 2007, the average herbicide cost was $57.80/acre (Table 6). Command was utilized in seven of the twelve fields for early-season grass control (Table 4). Command was applied in two of those fields (Lonoke-2 and Prairie Counties) early post-emergence as a tank mix with a post-emergence herbicide and provided season long grass weed control. Facet was applied in three fields (Arkansas, Craighead, and Woodruff Counties) pre-emergence and in Pope County early post-emergence and provided excellent grass weed control. Facet was used in these fields instead of Command because of either recent land leveling or to aid in the control of Hemp Sesbania and/or Indigo. All of the fields utilized a herbicide for pre-emergence weed control. None of the fields required flushing in order to activate the herbicides as rainfall was adequate early in the season. Two fields, (Lawrence and Lonoke-2 Counties) were seeded in Clearfield varieties and Newpath was applied for red rice and other weeds control. The Pope County field was the only field that did not require a post-emergence herbicide application for grass weed control resulting in the least expensive herbicide program at $35.11/acre. Lonoke-1 County had the most expensive weed control program at $79.54/acre (Table 6).

Table 4. Herbicide rate and timings for 2007 RRVP fields.[z]

Arkansas	**PRE[y]:** Facet (0.333 lb) Prowl (2 pt) **POST:** Duet (4 pt) Permit (0.333 oz) Facet (0.25 lb)
Craighead	**PRE:** Facet (0.5 lb) Prowl H_20 (1.8 pt) **POST[x]:** Propanil (4 qt) Permit (0.5 oz)
Independence	**POST:** Propanil (4 qt) Prowl (2 pt) fb RiceStar HT (17 oz) Permit (0.333 oz)
Lawrence	**PRE:** Glyphosate (2 pt) Command (1 pt) **POST:** Clearpath (0.5 lb) fb Newpath (4 oz)
Lonoke-1	**PRE:** Glyphosate (1 qt) fb Command (13 oz) **POST:** RiceStar HT(17 oz) fb Facet (0.5 lb) Aim (1 oz)
Lonoke-2	**PRE:** Glyphosate (1 qt) fb Glyphosate (1 qt) **POST:** Command (10 oz)
Mississippi	**PRE:** Command (20 oz) **POST:** Propanil (4 qt) fb RiceStar HT (20 oz)
Pope	**POST:** Facet (0.5 lb) Prowl (2 pt) fb Aim (1 oz)
Prairie	**PRE:** Glyphosate (1.5 pt) **POST:** Propanil (4 qt) Command (12.8 oz)
Randolph	**PRE:** Command (8 oz) **POST:** Propanil (4 qt) Facet (0.25 lb)
St. Francis	**PRE:** Command (12 oz) **POST:** RiceStar HT (17 oz) fb Ultra Blazer (0.5 pt)
Woodruff	**PRE:** Glyphosate (12 oz) Harmony (0.125 oz) fb Facet ((0.25 lb) Prowl H20 (2.0 pt) **POST:** Propanil (3 pt) Facet (0.125 lb)

[z]All rates are on a per-acre basis
[y]PRE=preemergence
[x]POST=post emergence

Disease Control

Fungicides were applied to three of the fields in 2007 for control of sheath blight and/or blast (Table 5). The average cost for fungicide was $5.47 an acre (Table 6). Disease pressure was mild in the verification fields in 2007. Early planting and rapid growth throughout the season allowed the crop to stay ahead of Sheath Blight. Leaf blast lesions were present in Independence and Lonoke-1 Counties, and weather patterns favored the development of the disease at heading. Very little neck or panicle blast was observed in either field after heading. Quadris or Stratego were used to control sheath blight and blast, and rates were determined based on variety, growth stage, climate, disease incidence/severity, and disease history (Table 5).

Insect Control

None of the fields required treatment for rice water weevil in 2007 (Table 5). Only the Pope County field was treated for rice stink bug. Rice stink bug pressure was very low in the verification fields across the state. The average cost for insecticides was $0.83/acre (Table 6).

Table 5. Fungicide and insecticides applications in 2007 RRVP fields

County	Sheath Blight	Blast	Rice Water Weevil	Rice Stink Bug
Arkansas	------	------	------	------
Craighead	------	------	------	------
Independence	------	Stratego (16 oz)	------	------
Lawrence	------	------	------	------
Lonoke-1	------	Stratego (16 oz)	------	------
Lonoke-2	------	------	------	------
Mississippi	Quadris (7 oz)	------	------	------
Pope	------	------	------	Karate (1.6 oz)
Prairie	------	------	------	------
Randolph	------	------	------	------
St. Francis	------	------	------	------
Woodruff	------	------	------	------

Economic Analysis

This section provides information on the development of estimated production costs for the 2007 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 2007 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 along with input prices collected for use in the Arkansas Cooperative Extension Service 2007 Rice Budgets.

Table 6. Selected variable input expenses from 2007 RRVP fields[z]

County	Variety	Seed[y]	Fertilizer[x]	Herbicides[x]	Fungicides[x]	Insecticides[x]	Fuel[w]	Irrigation[v]
		(Input cost $/acre)						
Arkansas	XP723	71.70	70.00	61.82	0.00	0.00	21.15	119.11
Craighead	Wells	49.47	95.96	39.34	0.00	0.00	18.42	63.08
Independence	Wells	16.27	90.16	44.98	23.31	0.00	20.38	67.03
Lawrence	CLXL729	115.99	68.21	74.94	0.00	0.00	23.23	55.49
Lonoke-1	Wells	15.02	95.59	79.54	23.31	0.00	19.04	73.18
Lonoke-2	CLXL730	100.65	79.90	51.23	0.00	0.00	12.62	21.28
Mississippi	Wells	20.44	63.20	78.57	19.00	0.00	16.89	67.03
Pope	XP723	74.09	71.45	35.11	0.00	10.01	26.18	36.80
Prairie	Cybonnet	15.91	117.71	57.16	0.00	0.00	19.94	43.89
Randolph	XP723	72.50	79.40	59.66	0.00	0.00	20.47	107.99
St. Francis	Wells	41.00	71.95	45.02	0.00	0.00	14.83	68.72
Woodruff	XP723	72.50	88.26	66.19	0.00	0.00	20.79	68.27
Average	2007	55.46	82.65	57.80	5.47	0.83	19.50	65.99
Average	2006[u]	35.34	88.61	58.23	5.29	5.66	15.38	75.95
Change[t]		20.12	-5.96	-0.43	0.18	-4.83	4.12	-9.96
Hybrid Seed Average		84.57	76.20	58.16	0.00	1.67	20.74	68.16
Conventional Seed Average		26.35	89.10	57.44	10.94	0.00	18.25	63.82

[z] Does not include all variable costs, such as drying, hauling, equipment repair, etc.
[y] Includes seed cost and treatments.
[x] Includes material and application for each input.
[w] Fuel for tractors, combines, and self propelled equipment ($2.22/gal).
[v] Includes irrigation labor, irrigation supplies (levee gates & poly-pipe), irrigation repair and maintenance, and diesel fuel ($2.22/gal).
[u] Average costs from 2006 RRVP fields using 2006 costs of production.
[t] Change in average costs from 2006 to 2007.

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. Therefore, the producers' actual machinery costs may vary from the machinery cost estimates that are presented in this report. A diesel price of $2.22 per gallon was used for 2007 ($2.20 was used for 2006). Specified operating costs for the 2007 RRVP fields averaged $43/acre less than the 2006 average and ranged from $385/acre for St. Francis County to $512/acre for Lawrence County with an overall average of $439/ac (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 $2.67/bu, which is $0.33/bu less than the $3.00 price required in 2006. Furthermore, break-even prices ranged from $1.99/bu in Pope County up to $3.44/bu in Lonoke-1 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 an irrigation system fixed costs at $25.22/acre for a typical well or $24.69/acre for a re-lift system. Lonoke-2, Pope, and Prairie Counties used a re-lift irrigation system. All Costs for risk, overhead and management were not included.

Crop price was estimated based on a harvest season average price of $4.57/bu, which was a reported total cash price average for the period of August 13, 2007 – October 5, 2007. The associated market premium above the loan rate was $1.60/bu based on the $6.59/cwt loan rate for long-grain rice. The 2007 price was higher than the 2006 price of $4.01/bu including a $0.55/bu market premium. Crop prices were calculated based on milling yields for each field and the 2007 USDA loan rates for whole and broken rice kernels. Estimated prices varied from $4.46/bu in Lonoke-1 County to $4.75/bu in Mississippi County, with an average of $4.65/bu.

Net returns above total costs ranged from $125/acre in Lonoke-1 County to a $500/acre profit in Pope County. Much of the difference in net returns across RRVP fields can be attributed to yields and irrigation amounts, i.e. Irrigation of 44 and 40 ac-in in Randolph and Arkansas County, respectively versus 13.0 ac-in in Pope County. Figure 2 gives a visual representation of all fields in the 2007 RRVP from highest yield to lowest. It shows that other factors besides yield, can impact farm returns.

Table 7: Economic Summary of 2007 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	179	52/74	4.65	490	55	143	223	168	3.17	3.55	13.94
Craighead	219	55/73	4.66	432	47	188	426	379	2.24	2.51	20.13
Independence	191	60/73	4.73	414	55	166	350	295	2.47	2.83	31.78
Lawrence	213	57/69	4.57	512	60	179	307	247	2.78	3.13	-0.18
Lonoke-1	148	52/68	4.46	441	52	120	125	73	3.44	3.87	-15.68
Lonoke-2	167	53/72	4.60	401	38	141	251	212	2.74	3.03	5.26
Mississippi	181	61/73	4.75	409	47	157	318	271	2.57	2.90	32.82
Pope	231	61/71	4.69	407	63	201	500	437	1.99	2.33	27.72
Prairie	175	61/72	4.72	401	50	150	299	249	2.61	2.97	26.37
Randolph	212	63/71	4.72	505	53	182	339	286	2.75	3.06	31.76
St. Francis	195	55/72	4.63	385	41	165	378	337	2.23	2.50	11.95
Woodruff	178	60/70	4.64	469	55	151	231	176	3.04	3.42	13.26
Average 2007	189	58/72	4.65	439	51	162	312	261	2.67	3.01	16.59
Average 2006	164	58/71	4.11	396	44	125	153	109	3.00	3.35	17.67
Change[s]	25	--	0.54	43	7	37	159	152	-0.33	-0.34	-1.08
Hybrid Seed Average	198	58/71	4.64	464	54	166	309	255	2.74	3.09	15.29
Conventional Seed Average	183	57/72	4.66	414	49	158	316	267	2.59	2.93	17.89

[z] 20% Crop-share rent was assumed.

[y] Loan rate milling yield value plus $1.06/bu market premium above standard milling rate loan value.

[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 the Arkansas Rice Checkoff fee.

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

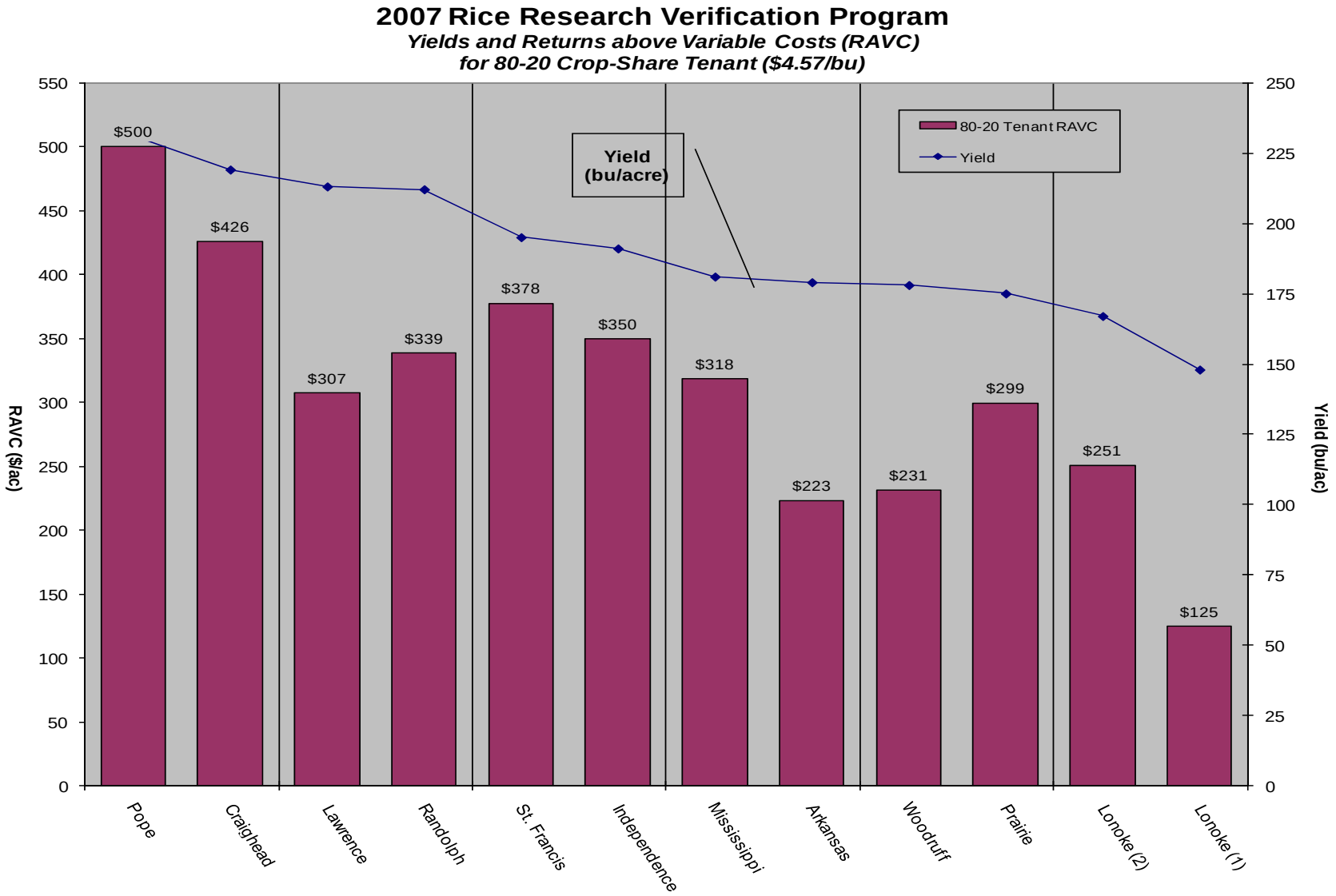
[v] Gross Value of landlords 20% share of crop less drying charges and checkoff fee.

[u] BEP=break even price

[t] Impact of milling on gross returns. (Gross returns at milling yields minus gross returns at standard milling, i.e. 55/70)

[s] Change in averages from 2006 to 2007.

Figure 2: Yield and Net Returns of 2007 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. The following is a summary of all the fields in the 2007 Rice Research Verification Program (RRVP).

Arkansas County

Furrow irrigated rice is not a new concept; however, this year was just the second year the management practice was implemented in the RRVP. Arkansas County was the only county in the program that used furrow irrigation instead of holding a continuous flood once the rice reached tillering. The field was seeded with XP723 at 30 lbs/acre. Many factors can cause problems in this production system, such as the height of the bed. Last year 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. This year, the beds were about right and an excellent stand was achieved both on top of the beds and in the furrows.

Another problem is frequency of irrigation. This year the field was irrigated for one 24 hour period a week during tillering and 48 hours per week during grain fill. A levee was constructed at the bottom of the field to catch and hold the water; however, a flood was never maintained on the field. In fact, most of the time I could walk the field without getting mud on the bottom of my boots.

Nitrogen utilization can be another challenge. At midseason a noticeable difference in plant color between the beds and furrows could be detected. Plant samples were obtained prior to the last urea application and analyzed for nitrogen content. The resulting analysis showed a 35% decrease in plant nitrogen in the furrows vs. the plants on the top of the beds. The plants in the furrows also headed earlier than the plants on the beds. It appeared that a lot of nitrogen had been lost in the furrows due to leaching through the soil profile.

Insects that are usually not economically important can also present problems in this system. Bill bug damage was significant in the field, but not as bad as the previous year. This insect usually only causes damage on the levees, but without the flood the insect can cause wide spread damage.

The yield was 179 bu/acre, compared to last year's yield of 155 bu/acre. This year's yield was better than the historical yields for this field. The yield was also achieved without the expense of building levees or the expense of tearing them down.

Bill bug damage caused yield loss.

Craighead

The Craighead County field was the first field planted on March 26. The field was broadcast seeded in Wells at a rate of 150 lb/acre. As is typical for broadcast seeded fields, the stand was much too thick in areas and thin in others resulting in holes in the field, especially on the edge of the field where the truck turned around. I never would have guessed this would be the highest yielding conventional variety field in the program after seeing the uneven stand and coming through the Easter freeze (that's what I get for guessing). The field yielded a surprising 219 bu/acre, which is an all time program record for Wells.

Facet and Prowl was applied delayed pre-emergence and provided excellent control of the grass weeds. An additional application of propanil and Permit was made mainly for control of broadleaf weeds, some small grass, and yellow nutsedge.

Independence

The Independence County field was one of the last fields planted. Command or Facet could not be used in this field due to its close proximity to the city of Newark. This made weed control somewhat of a challenge. Propanil and Prowl was applied seven days after emergence. The propanil killed most of the grass, but missed some 3- and 4-leaf signalgrass. RiceStar and Permit was applied seven days later on wet soil and cleaned up the field. This field was the largest in the program this year at 119 acres. The field was a challenge to keep flooded resulting in a couple of dry spots and a very shallow flood on a lot of the field. There was also a tree line on one side. Blast lesions were observed around the edge of the field and on the levees. This was one of only two fields sprayed for blast. The field yielded 191 bu/acre, not quite the 200 we were hoping for, but we will take it.

Lawrence

Lawrence County was one of two Clearfield fields in the program. Everything was pretty much by the book and worked just like the Clearfield system is supposed to. The only change was the use of Clearpath in place of the first Newpath application for control of hemp sesbania and curly indigo. No red rice escapes were found and the field was weed-free all season. I am always impressed with the weed control in this system.

Lonoke-1

This field was a more traditional rice field. An 80-acre field on a hill side with lots of levees—the kind of field where you turn the well off and come back the next day to no flood. The biggest challenge in this field was weed control. Command was applied by air after the levees were pulled. The Command didn't provide great control of the signalgrass. I made the decision to apply RiceStar following a rain. At that time there was 3-leaf grass present—mainly broadleaf signalgrass with scattered barnyardgrass. I really wanted to put some Facet with the RiceStar, but I knew that the field could not be flushed, and if it didn't rain it would be a waste of money so I decided against it. The RiceStar did a good job. I was hoping to flood the field the following week as the rice was 3- to 4-leaf, however it turned out to be two weeks after the application before flood was established. Another flush of grass came through and it was too big to flood up on. There were lots of morningglories and big grass on the levees. The agent and I decided we would feel more comfortable with Facet ahead of the flood than taking a chance on propanil alone. Traditionally the producer uses 2,4-D at mid-season for the morningglory, but I felt like we could control it with Aim pre-flood and skip an additional application. So, we applied Facet and Aim. The field was clean after the flood was established.

Leaf blast was present in areas of the field and the producer was concerned about kernel smut so Stratego was applied at boot split to 10% heading. The field normally yields 130 to 140 bu/acre. We all thought the field would yield much better than that this year as it appeared to have excellent yield potential. The field yielded a disappointing 148 bu/acre.

Lonoke-2

This was the other Clearfield field in the program. This was a 20-acre zero grade field. The producer only had enough seed to plant 33 lb/acre. The recommended seeding rate for CL XL730 Red Tag is 46 lb/acre. The initial stand counts indicated 7 plants/ft^2. After the herbicide application, the off types were killed and the stand was reduced to 5 plants/ft^2. That's enough to make anybody nervous. 100 lb/acre of 18-46-00 (DAP) was flushed in at the 2- to 3-leaf stage to promote tillering. There were a few thin areas in the field, however the stand appeared to be adequate. Rice water weevil adults were present in the field, and heavy leaf scaring appeared after the flush. We continued to monitor the insects; however, they never reached treatment level. The roots of the plants were excellent and no root pruning form larvae was evident. The field was drained early, late R6 to early R7, and was the first verification field harvested. It seems we always expect the hybrids to make 200 plus bu/acre, but sometimes they don't. The field yielded 167 bu/acre. I can not attribute anything specific to the low yield besides the thin stand.

Mississippi

The Mississippi County field was a clay field seeded in Wells. This area of the state was extremely dry receiving very little rainfall early in the year. It took over three weeks to get a stand in this field. I really thought we might have to re-plant this one. Weed control was difficult due to the dry conditions. The propanil applied missed some 4-leaf signalgrass. The field required flushing in order to have enough moisture for

RiceStar. Ultra Blazer was used for control of hemp sesbania. This was the only field that was treated for sheath blight as the disease was very aggressive. The field yielded a respectable 181 bu/acre

Pope

The Pope County field was a 40-acre zero grade field just leveled prior to this crop. The producer actually had over 600 acres of 40 acre zero grade fields, and this was his first time to grow rice. He applied 3 to 4 tons/acre of chicken litter on the whole farm after leveling. I think the litter was a big contributor to his excellent yields. This field of rice was probably the best field I have ever seen. It was extremely lush and rank and a challenge to walk through later in the season. This field set an all time program record yield of 231 bu/acre.

The field was seeded in XP723 at a rate of 31 lb/acre. Facet and Prowl was applied instead of Command due to the recent leveling and to aid in control of hemp sesbania. Aim was applied for control of smartweed and morningglory. The Facet did allow for some sprangletop to emerge but it was not enough to worry with this year. Now we know it's there. These flat, clay fields hold water like a bathtub. That, with a lot of rainfall and surface water irrigation, made this a very cheap field to water.

Prairie

The Prairie County field was seeded in Cybonnet on April 18. Propanil plus Command was applied early post emergence and did an excellent job controlling the weeds. The levees had groundcherry and 2,4-D plus Aim was applied to the entire field at mid-season. The field looked excellent all year and yielded 175 bu/acre which is good for that variety.

Randolph

At the beginning of the year, I had this field picked to be the highest-yielding field (I am never right but it's still fun to guess). It ended up in the top three. The field was seeded in XP723 and 1.5 tons/acre of chicken litter was applied. The field came up to an excellent stand and was very uniform. Shortly after the establishment of the permanent flood, the flood was removed in order to construct another levee to aid in irrigating the field. This along with the sandy soil type made this field the highest water use field in the program. It's been my experience that when the flood is lost for whatever reason, it's difficult to recover form the nitrogen loss. An additional 70 lb/acre of urea was applied before the field was pumped back up. It is hard to get good movement of nitrogen into the root zone after the soil has been saturated, even if it is dry on the surface. The rice turned yellow at mid season and 100 lb/acre of urea was applied prior to the boot stage. The field still made 212 bu/acre, which is excellent.

St. Francis

The St. Francis County field was a 28-acre zero grade field broadcast seeded in Wells. Due to the early planting date, seeding method, and seed quality, 202 lb/acre of seed was sown. Stand counts indicated 23 plants/ft^2. The stand was thicker in areas of

the field. Command was applied followed by RiceStar. Ultra Blazer was applied at midseason for hemp sesbania control. Sheath blight was present in the field, especially in the thicker areas; however, the disease threshold remained slightly below 50% of the field and below the third leaf. Treatment was not necessary. The field yielded 195 bu/acre.

Woodruff

The Woodruff County field was seeded in XP723 at a rate of 30 lb/acre. Part of the field was leveled immediately prior to planting. Even though litter and phosphorus was applied the plants in the cut area showed signs of phosphorus deficiency. The plants were stunted and did not tiller well. They seemed to recover by the end of the season; however, I am certain that some yield loss occurred is this area. The remainder of the field was excellent and most likely yielded very high. The whole field yield was 178 bu/acre.

On Farm Research

Research was conducted in three of the verification fields in 2007. Disease monitoring tests were planted in the Independence and Randolph County Fields. The Independence County test was not harvested due to a poor stand. A fungicide trial was conducted in the Craighead County field looking at milling yield benefits from fungicide with no disease is present. The results indicated no significant milling yield increase from the application of a fungicide.

Summary

The 2007 Rice Research Verification Program was conducted on 12 commercial rice fields across the state. Grain yield in the 2007 RRVP averaged 189 bu/acre with a range of 148 to 231 bu/acre. All fields were planted in March and April. The 2007 RRVP average yield was 29 bushels/acre, greater than the estimated Arkansas state average yield of 160 bu/acre. The highest yielding fields were in Pope, Craighead, and Randolph Counties with grain yield of 231, 219, and 212 bu/acre. The lowest yielding field was in Lonoke-1 County and produced 148 bu/acre. Milling quality in the RRVP was comparable with milling from the Arkansas Rice Performance Trials and averaged 58/72.