



**DIVISION OF AGRICULTURE  
RESEARCH & EXTENSION**

*University of Arkansas System*

# 2011 University of Arkansas Division of Agriculture Wheat Research Verification Program

The Wheat Research Verification Program is funded by Arkansas wheat producers through check-off funds administered by the Arkansas Wheat Promotion Board.

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

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*Arkansas*  
**ROW CROP  
VERIFICATION**

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## Introduction

The Wheat Research Verification Program (WRVP) represents an interdisciplinary effort of farmers, county Extension agents, Extension specialists, and researchers committed to improving the profitability of wheat production in Arkansas. The WRVP program began in 1986 under the direction of the University of Arkansas Cooperative Extension Service. The Arkansas Wheat Promotion Board has allocated the funding necessary for the WRVP program each year since its inception.

The WRVP program is designed as on-farm demonstrations of all the research-based recommendations required to grow wheat profitably in Arkansas. The WRVP program is part of the University of Arkansas Extension Service's goal of helping wheat producers make economical, agronomical, and environmentally sound decisions on their farms. The specific objectives of the program are:

1. To verify research-based recommendations for profitable wheat production in all wheat producing areas of Arkansas.
2. To develop a database for economic analysis of all aspects of wheat production to demonstrate that consistently high yields of wheat can be produced economically by the use of available technology and inputs.
3. To identify specific problems and opportunities in Arkansas wheat production for further investigation.
4. To promote timely cultural and management practices among all wheat farmers.
5. To provide training and assistance to county agents with limited expertise in wheat production.

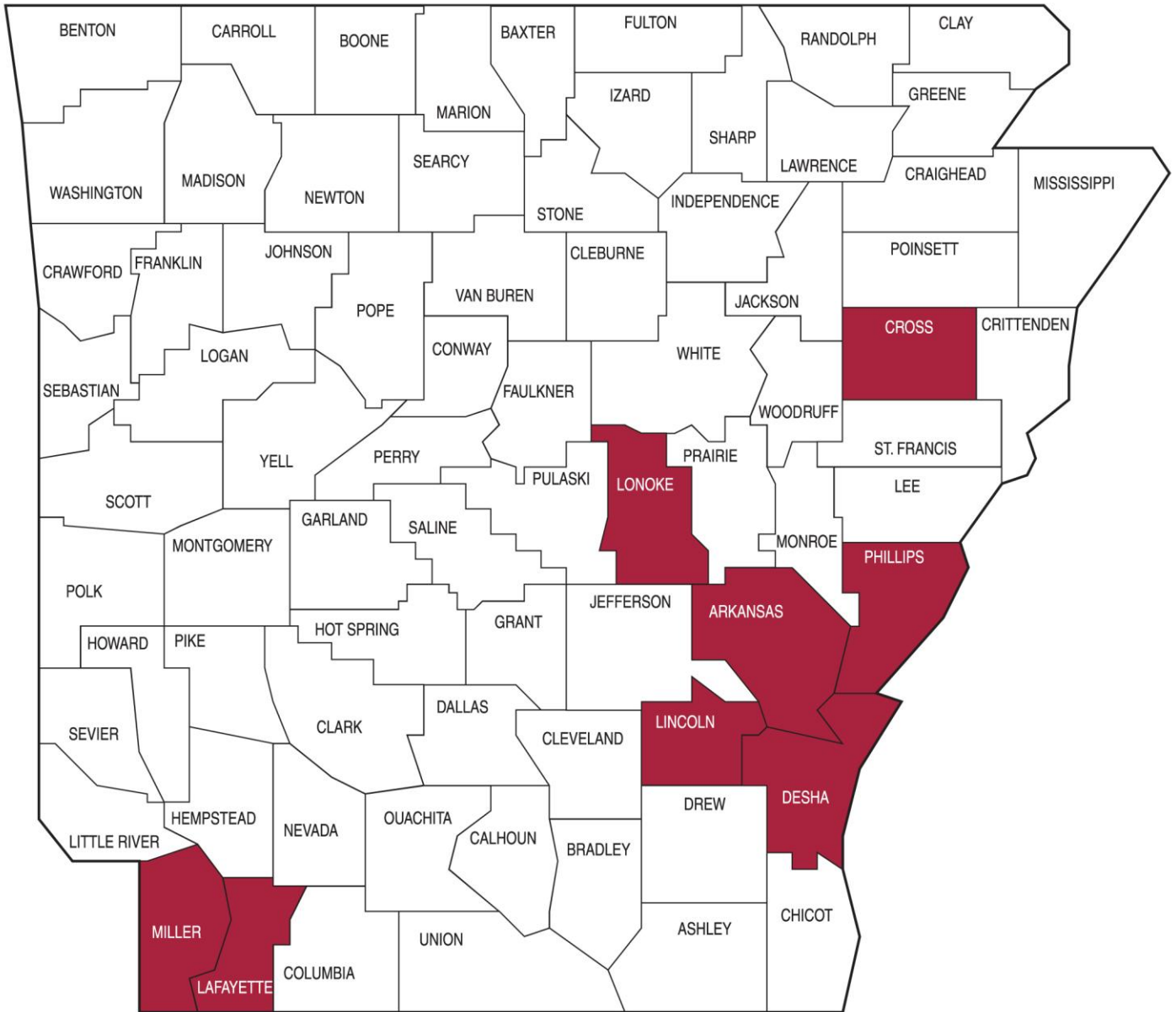
Nine producer fields were enrolled in the WRVP for the 2010-2011 growing season. Cooperators from the counties selected eight varieties from a short list provided by the agent and research verification coordinator. These varieties were selected based upon multi-year performance and characteristics determined by the University of Arkansas wheat variety testing program.

Soil types for fields enrolled in the program ranged from sandy loam to clay loam, with previous crops of soybean, corn, and fallow. Seeding dates ranged from October 16 through November 7, 2010, with seeding rates varying from 92 to 180 lbs/ac. Five fields were drill seeded, while four were broadcast seeded. Eight of the nine fields were treated with herbicides. Foliar fungicides were applied to control stripe rust, leaf rust, and/or septoria leaf blotch near heading in seven of the nine fields.

Harvest dates ranged from May 27 through June 17. The average yield for WRVP fields was 71 bu/ac, compared to the state average of 58 bu/ac. Yields ranged from 44.4 bu/ac in Cross County to 88 bu/ac at each of the Arkansas County locations. Yields were surprisingly good in most fields, despite heavy rainfall in April and glyphosate herbicide drift that was common in many fields.

The Wheat Research Verification Program continues to demonstrate that Extension's research-based recommendations can produce profitable, high yielding wheat across a wide range of conditions and soil types. Over a 25 year period, the WRVP has averaged 13 bushels above the average state yield. The program is funded by wheat check-off dollars and is administered through the Arkansas Wheat Promotion Board.

**Figure 1. Location of 2011 Wheat Research Verification Program Fields**



## Field Reviews

### Arkansas County North

The northern Arkansas county location was near Casscoe on a Stuttgart silt loam soil. The field was 36 acres and followed a previous crop of soybean. Preplant fertilizer was applied according to soil test recommendations. Progeny 185 was drilled at a rate of 135 lbs/A on October 18. An application of Harmony Extra herbicide was applied in early March. 125 units of spring nitrogen were applied as a three-way split application. Quilt fungicide was applied at 14 fl oz/acre in mid-April for control of stripe rust. The field was harvested on June 9 and yielded 88 bu/A.

### Arkansas County South

The southern Arkansas county location was a 64 acre field northwest of Gillett. The soil type was a Stuttgart silt loam and the previous crop was soybean. Preplant fertilizer was applied according to soil test recommendations. AgriPro Arcadia was drill seeded at a rate of 120 lbs/A on October 16. Harmony SG herbicide was applied in February for garlic control. 123 units of spring nitrogen were applied in a three-way split application. Quilt fungicide was applied at 14 fl oz/acre in early April for stripe rust control. The field was harvested on June 7 and yielded 88 bu/A.

### Cross County

The Cross county field was located near Hickory Ridge. The field was 57 acres and the previous crop was wheat. The soil type was Henry/Providence/Calloway silt loam. Armor Renegade was drilled at 92 lbs/A on October 21. On October 22, Touchdown herbicide at 1 qt/acre + 0.5 oz/A of Finesse were applied to control existing vegetation and provide control of ryegrass. The field was known to have heavy ryegrass pressure. Final wheat stand averaged 28 plants per square foot. Ryegrass pressure was very high, despite the application of Finesse at planting. Powerflex and Prowl herbicides were tank-mixed and applied on November 12, and an application of Axial XL herbicide was applied on February 23. The three ryegrass herbicide treatments did not provide adequate control, indicating the ryegrass was resistant to multiple modes of herbicide chemistry. Spring nitrogen of 133 units of nitrogen were applied in a two way split application. Insects were never a problem throughout the growing season, and disease pressure showed up late with little affect on yield. The field was harvested on June 14, and yielded 44.4 bu/A adjusted to 13.5% moisture. Rainfall during heading, and extreme ryegrass pressure were major factors in the low yield produced in this field.

### Desha County

The Desha county field was located east of Tillar on a Hebert/McGehee silt loam soil. It was 65 acres, and followed a previous crop of soybean. It was broadcast planted with Progeny 185 at a rate of 180 lbs/A on November 7. Finesse G&B was applied soon after planting for ryegrass and broadleaf weed control. 123 units of spring nitrogen were applied as a two-way split application. Quilt fungicide was applied at 14 fl oz/acre in mid-April for stripe rust control. The field was harvested June 5 and yielded 72 bu/acre.

## **Lafayette County**

The Lafayette county field was located near Gin City in the southern part of the county. The soil type was a Billyhaw clay, and was 60 acres in size. The previous crop was soybean. No preplant fertilizer was needed according to soil tests. The field was broadcast seeded with Dixie 427 on October 29 at a rate of 120 lbs/A. No herbicides were warranted. 152 units of spring nitrogen were applied as a two-way split application. Quilt fungicide was applied at 14 fl oz/acre in early April for stripe rust control. The field was harvested on May 27 and yielded 87 bu/A.

## **Lincoln County**

The Lincoln county field was located at Grady on a Perry/Portland clay. It was 44 acres in size, and was planted no-till on the previous soybean crop's beds. Hornbeck 3266 was seeded at a rate of 132 lbs/A on November 1. Dicamba and 2,4-D was tank-mixed and applied in late February for winter weeds, especially horseweed. 133 units of spring nitrogen were applied as a two-way split application in February and March. Quilt fungicide was applied at 14 fl oz/acre in early April for leaf and stripe rust control. The field was harvested on June 9 and yielded 60 bu/A.

## **Lonoke County**

The Lonoke county field was located near the city of Lonoke. The field was 90 acres and the previous crop was fallow. The soil type was Loring silt loam. Armor 360Z was broadcasted at a rate of 180 lbs/A and then disked in on November 1. Finesse herbicide was applied at 0.5 oz/acre after planting to control ryegrass. Rainfall of about 1 inch fell soon afterwards and provided good activation. Final wheat stand was 24 plants per square foot. The Finesse herbicide did not provide adequate ryegrass control and Axial XL + Prowl were applied for ryegrass control. Spring nitrogen of 150 units of nitrogen was applied in a three way split application in February and March. Insect pressure was low throughout the growing season, but stripe rust did develop late in the season prior to heading. Tubucure (generic Folicur) was at 4 fl oz/acre applied for stripe rust control. The field was harvested on June 17 and yielded 69 bu/A.

## **Miller County**

The Miller county field was located at Garland on a Billyhaw clay soil. It was 27 acres in size and followed a previous crop of soybean that had been planted flat. No preplant fertilizer was needed according to soil tests. Delta King 9108 was custom no-till drilled at a rate of 140 lbs/A on October 22. Powerflex herbicide was applied on December 2 for ryegrass control, and a spring application was not needed. 120 units of spring nitrogen were applied as a two-way split in February and March. A foliar fungicide was not warranted for spring diseases, but there was substantial damage from loose smut. The field yielded 50 bu/A when harvested on June 6.

## **Phillips County**

The Phillips county field was located just west of Helena. The field was 57 acres, the previous crop was soybean, and the soil consisted of Calloway/Henry/Loring silt loam. Preplant fertilizer was applied according to soil test recommendations. AgriPro/Coker 9553 was broadcast planted on November 2 at a rate of 180 lbs/A. Finesse was applied at 0.5 oz/acre for preemerge ryegrass control. Spring nitrogen of 118 units was split applied in February and March. Prosaro fungicide at 6.5 fl oz/acre and Tombstone insecticide at 3.65 fl oz/acre were applied at early heading for foliar disease and armyworm control. The field was harvested on June 3 and yielded 83 bu/A.



<b>County</b>	<b>Variety</b>	<b>Acres</b>	<b>Planting Method &amp; Rate</b>	<b>Planting Date</b>	<b>Previous Crop</b>	<b>Harvest Date</b>	<b>Plant Density Plts/sq.ft.</b>	<b>Yield Bu/A</b>
Arkansas North	Progeny 185	36	Drill 135 lbs/ac	October 18	Soybean	June 9	28	88
Arkansas South	AgriPro Arcadia	64	Drill 120 lbs/ac	October 16	Soybean	June 7	30	88
Cross	Armor Renegade	57	Drill 92 lbs/ac	October 21	Wheat	June 14	28	44
Desha	Progeny 185	65	Broadcast 180 lbs/ac	November 7	Soybean	June 5	32	72
Lafayette	Dixie 427	60	Broadcast 120 lbs/ac	October 29	Soybean	May 27	32	87
Lincoln	Hornbeck 3266	44	Drill 132 lbs/ac	November 1	Soybean	June 9	29	60
Lonoke	Armor 360Z	90	Broadcast 180 lbs/ac	November 1	Fallow	June 17	24	69
Miller	Delta King 9108	27	Drill 140 lbs/ac	October 22	Soybean	June 6	26	50
Phillips	AgriPro Coker 9553	57	Broadcast 180 lbs/ac	November 2	Soybean	June 3	30	83
<b>Average</b>								<b>71</b>

<b>County</b>	<b>Soil Classification</b>	<b>Fall Fertilizer</b>	<b>Spring Fertilizer</b>	<b>Total Spring Nitrogen</b>
Arkansas North	Stuttgart silt loam	0-92-120	Feb. 18 – 50 # urea + 50 # ammonia sulfate March 4 – 100 # urea March 25 – 100 # urea	125 lbs/ac
Arkansas South	Stuttgart silt loam	0-47-81	Feb. 21 – 75 # urea + 25 # ammonia sulfate March 17 – 100 # urea April 2 – 80 # urea	123 lbs/ac
Cross	Henry/Providence silt loam	None	Feb. 23 – 145 # urea + 60 # ammonia sulfate March 21 - 117 # urea	133 lbs/ac
Desha	Hebert/McGehee silt loam	None	Feb. 19 – 125 # urea + 50 # ammonia sulfate March 30 – 120 # urea	123 lbs/ac
Lafayette	Billyhaw clay	None	Feb. 18 – 165 # urea April 4 – 165 # urea	152 lbs/ac
Lincoln	Perry/Portland clay	0-30-60	Feb. 26 – 150 # urea March 23 – 140 # urea	133 lbs/ac
Lonoke	Loring silt loam	None	Feb. 22 – 125 # urea March 9 – 100 # urea March 22 – 100 # urea	150 lbs/ac
Miller	Billyhaw clay	None	Feb. 18 – 150 # urea March 25 – 110 # urea	120 lbs/ac
Phillips	Calloway/Henry/Loring silt loam	13-34-60	Feb. 17 – 100 # urea + 125 # ammonia sulfate March 12 – 100 # urea	118 lbs/ac

<b>County</b>	<b>Herbicides</b>	<b>Insecticides</b>	<b>Fungicides</b>
Arkansas North	March 2 – Harmony SG @ 0.8 oz/A	None	April 12 – Quilt @ 14 oz/A
Arkansas South	Feb. 20 – Harmony SG @ 0.8 oz/A	None	April 8 – Quilt @ 14 oz/A
Cross	Oct. 22 – Touchdown @ 1 qt/A + Finesse @ 0.5 oz/A Nov. 12 – Powerflex @ 3.5 oz/A + Prowl @ 1 qt/A Feb. 23 – Axial @ 16.4 oz/A	None	None
Desha	Nov. 15 – Finesse G&B @ 0.8 oz/A	None	April 16 – Quilt @ 14 oz/A
Lafayette	None	None	April 4 – Quilt @ 14 oz/A
Lincoln	Feb. 26 – Clarity @ 4 oz/A + 2, 4-D @ 1 ½ pt/A	None	April 9 – Quilt @ 14 oz/A
Lonoke	Nov. 1 – Finesse @ 0.5 oz/A Dec. 6 – Axial @ 16.4 oz/A + Prowl @ 1 ½ pt/A	None	April 10 – Tebucure @ 4 oz/A
Miller	Dec. 2 – Powerflex @ 3.5 oz/A	None	None
Phillips	Nov. 2 – Finesse @ 0.5 oz/A	Tombstone @ 3.65 oz/A	April 14 - Prosaro @ 6.5 oz/A

## Economic Analysis

This section reports information on production costs for the 2011 WRVP. Records of field operations on each field are the basis for estimating these costs. The field records were compiled by the WRVP coordinators, county Extension agents, and cooperators. Production data from the 9 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 expenses 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 2011 Crop Enterprise Budgets published by the Cooperative Extension Service. 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.

Ownership 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, total costs, costs per bushel, and returns are presented in Table 4. Costs in this report do not include land costs, management, or other expenses and fees not associated with production. Budget summaries for wheat are presented in Table 5. Price received for wheat of \$6.95/bu. is the estimated Arkansas average. This price is based on a U.S. price forecasted by the Food and Agricultural Policy Research Institute at the University of Missouri. Average wheat yield is 71.2 bu./acre.

Average operating costs for wheat in Table 4 are \$255.37 per acre. Table 5 indicates that fertilizers and nutrients are the largest expense category at \$97.52 per acre, or 38% of total operating costs. The Arkansas County (North) field has fertilizer costs \$79.90 per acre greater than the average costs. Seed costs average \$42.30 per acre, and custom applications average \$41.38 per acre.

With average yield of 71.2 bu./acre, average operating costs are \$3.71/bu. Operating costs range from a low of \$184.33 in Lafayette County to a high of \$347.18 in the Arkansas County (North) field. Returns to operating costs average \$239.32 per acre with a low of \$95.38 in Cross County and a high of \$420.32 in Lafayette County. Average fixed costs are \$25.82 which leads to average total costs of \$281.19 per acre. Returns to total costs average \$213.50 per acre with a low of \$66.09 in Cross County and a high of \$387.77 in Lafayette County. Total specified costs average \$4.08/bu.

**Table 4. Operating Costs, Total Costs<sup>1</sup>, and Returns**

County	Operating Costs	Operating Costs per Bushel	Returns to Operating Costs	Total Fixed Costs	Total Costs <sup>1</sup>	Returns to Total Costs <sup>1</sup>	Total Costs <sup>1</sup> per Bushel
Arkansas North	347.18	3.95	264.42	35.65	382.83	228.77	4.35
Arkansas South	273.38	3.11	338.22	37.49	310.87	300.73	3.53
Cross	213.20	4.80	95.38	29.30	242.49	66.09	5.46
Desha	241.45	3.35	258.95	8.82	250.27	250.13	3.48
Lafayette	184.33	2.12	420.32	32.55	216.88	387.77	2.49
Lincoln	267.38	4.49	146.84	28.13	295.51	118.71	4.96
Lonoke	263.10	3.84	213.67	32.53	295.64	181.13	4.31
Miller	207.50	4.15	140.00	0.00	207.50	140.00	4.15
Phillips	300.77	3.62	276.08	27.93	328.70	248.15	3.96
<b>Average</b>	<b>255.37</b>	<b>3.71</b>	<b>239.32</b>	<b>25.82</b>	<b>281.19</b>	<b>213.50</b>	<b>4.08</b>

<sup>1</sup>Does not include land costs, management, or other expenses and fees not associated with production.

**Table 5. Summary of Revenue and Expenses per Acre**

Receipts	County				
	Arkansas North	Arkansas South	Cross	Desha	Lafayette
Yield (bu)	88.0	88.0	44.4	72.0	87.0
Price (\$/bu)	6.95	6.95	6.95	6.95	6.95
<b>Total Crop Revenue</b>	<b>611.60</b>	<b>611.60</b>	<b>308.58</b>	<b>500.40</b>	<b>604.65</b>
<b>Operating Expenses</b>					
Seed	40.50	36.00	27.60	54.00	33.00
Fertilizers & Nutrients	177.42	112.03	65.76	66.26	79.04
Chemicals	27.93	27.93	60.45	40.41	17.72
Custom Applications	40.75	35.00	17.25	66.15	18.50
Fuel & Lube	16.52	19.18	12.53	4.25	16.78
Repairs & Maintenance	10.35	10.89	9.79	1.92	9.29
Irrigation Energy Costs	0.00	0.00	0.00	0.00	0.00
Labor, Field Activities	5.58	6.20	4.61	2.00	5.07
Other Inputs & Fees, Pre-harvest	8.77	6.80	5.44	6.46	4.93
Post-harvest Expenses	19.36	19.36	9.77	0.00	0.00
<b>Total Operating Expenses</b>	<b>347.18</b>	<b>273.38</b>	<b>213.20</b>	<b>241.45</b>	<b>184.33</b>
<b>Returns to Operating Expenses</b>	<b>264.42</b>	<b>338.22</b>	<b>95.38</b>	<b>258.95</b>	<b>420.32</b>
Capital Recovery & Fixed Costs	35.65	37.49	29.30	8.82	32.55
<b>Total Specified Expenses<sup>1</sup></b>	<b>382.83</b>	<b>310.87</b>	<b>242.49</b>	<b>250.27</b>	<b>216.88</b>
<b>Returns to Specified Expenses</b>	<b>228.77</b>	<b>300.73</b>	<b>66.09</b>	<b>250.13</b>	<b>387.77</b>
Operating Expenses/bu	3.95	3.11	4.80	3.35	2.12
Total Expenses/bu	4.35	3.53	5.46	3.48	2.49

<sup>1</sup>Does not include land costs, management, or other expenses and fees not associated with production.

**Table 5 (continued). Summary of Revenue and Expenses per Acre**

Receipts	County				Average
	Lincoln	Lonoke	Miller	Phillips	
Yield (bu)	59.6	68.6	50.0	83.0	71.2
Price (\$/bu)	6.95	6.95	6.95	6.95	6.95
<b>Total Crop Revenue</b>	<b>414.22</b>	<b>476.77</b>	<b>347.50</b>	<b>576.85</b>	<b>494.69</b>
<b>Operating Expenses</b>					
Seed	39.60	54.00	42.00	54.00	42.30
Fertilizers & Nutrients	118.66	77.74	62.40	118.34	97.52
Chemicals	23.29	33.91	30.84	35.91	33.15
Custom Applications	40.05	46.00	66.70	42.00	41.38
Fuel & Lube	12.03	16.43	0.00	12.23	12.22
Repairs & Maintenance	9.76	8.29	0.00	8.45	7.64
Irrigation Energy Costs	0.00	0.00	0.00	0.00	0.00
Labor, Field Activities	4.07	5.01	0.00	4.02	4.06
Other Inputs & Fees, Pre-harvest	6.81	6.64	5.55	7.56	6.55
Post-harvest Expenses	13.11	15.09	0.00	18.26	10.55
<b>Total Operating Expenses</b>	<b>267.38</b>	<b>263.10</b>	<b>207.50</b>	<b>300.77</b>	<b>255.37</b>
<b>Returns to Operating Expenses</b>	<b>146.84</b>	<b>213.67</b>	<b>140.00</b>	<b>276.08</b>	<b>239.32</b>
Capital Recovery & Fixed Costs	28.13	32.53	0.00	27.93	25.82
<b>Total Specified Expenses<sup>1</sup></b>	<b>295.51</b>	<b>295.64</b>	<b>207.50</b>	<b>328.70</b>	<b>281.19</b>
<b>Returns to Specified Expenses</b>	<b>118.71</b>	<b>181.13</b>	<b>140.00</b>	<b>248.15</b>	<b>213.50</b>
Operating Expenses/bu	4.49	3.84	4.15	3.62	3.71
Total Expenses/bu	4.96	4.31	4.15	3.96	4.08

<sup>1</sup>Does not include land costs, management, or other expenses and fees not associated with production.