DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

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Wheat Research Verification Program

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And County Governments Cooperating

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Arkansas
ROW CROP
VERIFICATION
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Authors and Acknowledgements

Conducted by:

Mr. Chris Grimes, Program Associate
Mr.Steve Kelley, former Program Associate (Now Drew Co. Extension Agent)
Mr. A.J. Hood, former Program Associate
Dr. Jason Kelley, Extension Agronomist – Wheat and Feed Grains
Dr. Archie Flanders, Extension Economist

Acknowledgments:

Cooperating Wheat Producers:
Glen Price, Miller County
Greg Helms, Lafayette County
Arkansas Dept. of Cor., Lincoln County
Jackie Lauhon, Ashley County
Jason Kimbrell, Chicot County
David Edwards, Jefferson County
Brandon Baumon, Arkansas County
Nick & Luke Moore, Conway County
Bill Dooley, Lee County
Victor Sample, Randolph County

Cooperating County Extension Agents:
Grant Beckwith, Arkansas County
Mike Andrews, Randolph County
Kevin VanPelt, Conway County
Joe Vestal, Lafayette County
Dennis Bailey, Jefferson County
Kevin Norton, Ashley County
Gus Wilson, Chicot County
Stan Baker, Lee County
Steven Stone, Lincoln County
Anthony Whittington, Jefferson County
Doug Petty, Miller County

Cooperative Extension Service:
Dr. Leo Espinoza, Extension Soils Specialist
Dr. Gus Lorenz, Extension Entomologist
Dr. Glenn Studebaker, Extension Entomologist
Dr. Bob Scott, Extension Weed Scientist
Mr. Chris Meux, Extension Design Specialist
Dr. Robert Bacon, Department Head, Department of Crop, Soil, and Environmental Sciences
Dr. Terry Kirkpatrick, Extension Plant Pathologist

Agricultural Experiment Station:
Dr. Gene Milus, Professor, Department of Plant Pathology
Dr. Esten Mason, Assistant Professor, Wheat Breeding and Genetics

Arkansas Wheat Promotion Board:

Mr. Terry Dabbs	Mr. Herrick Norcross	Mr. Jackie Prince
Mr. Tim Smith	Mr. Blake Swears	Mr. Steven Tinsley
Mr. George Toll	Mr. William Turner	Mr. Barry Walls

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

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.

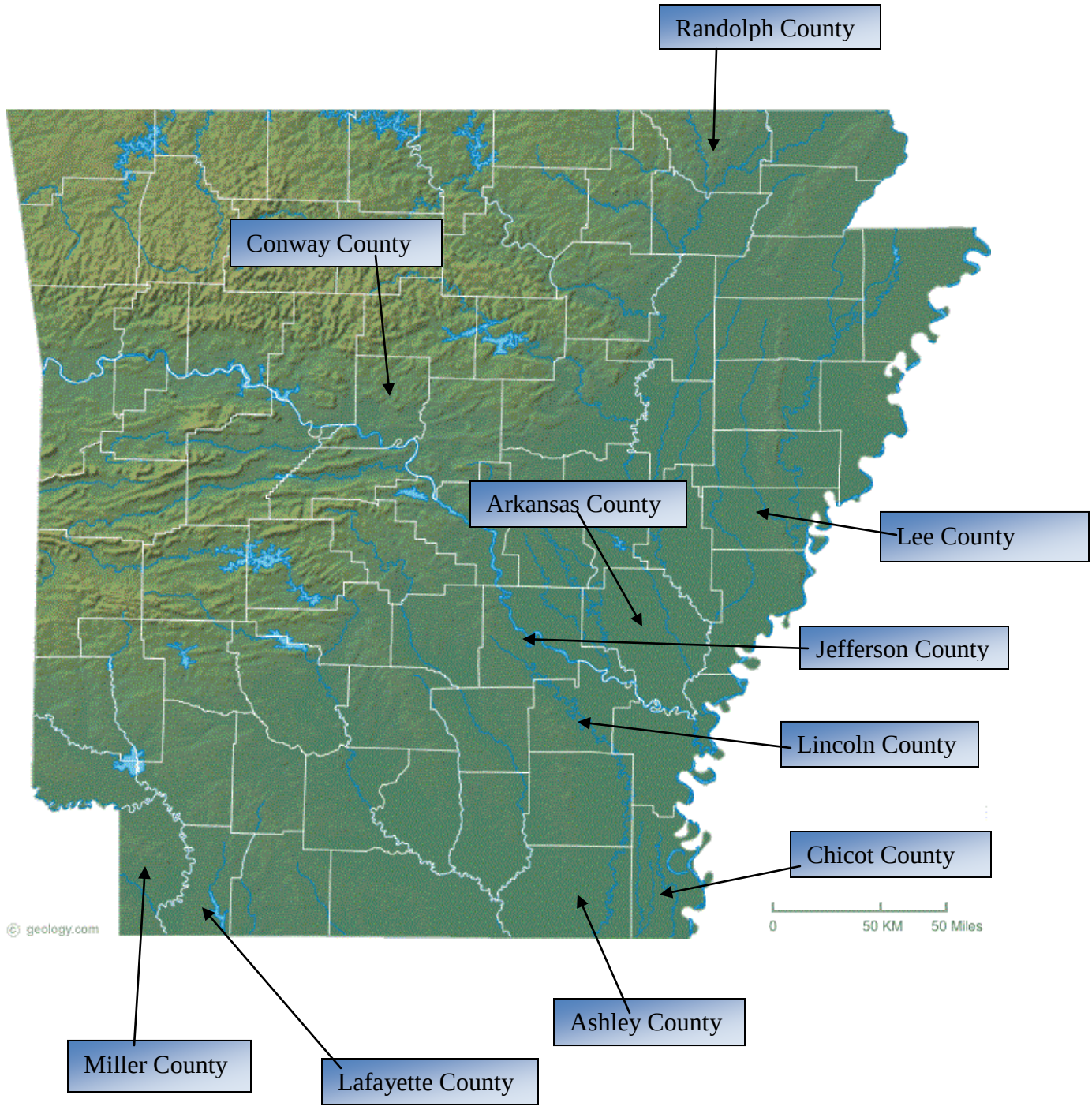
Ten producer fields were enrolled in the WRVP for the 2012-2013 growing season. Cooperators from the counties selected six varieties from a short list provided by the agent and research verification coordinator. These varieties were selected based upon multi-year performance and characteristics determined by the University of Arkansas wheat variety testing program.

Soil types for fields enrolled in the program ranged from silt loam to clay, with previous crops of soybean, corn, grain sorghum and fallow. Seeding dates ranged from October 9 to November 3, 2012, with seeding rates varying from 90 to 180 lbs/ac. Five fields were drill seeded, and five were broadcast seeded. There were no fields that warranted treatment for insects, and five fields required fungicide applications and five fields required a herbicide application to control weeds.

Harvest dates ranged June 5 – 26, which is typical for Arkansas. The average yield for WRVP fields was 75.4 bu/A, compared to the estimated state average of 62 bu/A. Yields ranged from 54 bu/ac in Lee County to 86.5 bu/ac at the Ashley County field.

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 27 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. Locations of 2012-2013 Wheat Research Verification Program Fields



Field Reviews

Arkansas County

The 70 acre Arkansas County field was located just north of Stuttgart on a DeWitt and Stuttgart silt loam soil. Following land preparation and pre-plant fertilizer, Progeny 870, was planted with a drill on October 24th at a rate of 107 lbs/A. Spring nitrogen was applied in a two-way split application and the first application was applied February 8th at a rate of 125 pounds of urea and 100 pounds of Ammonia sulfate. The second application was applied on March 8th at 100 pounds of urea. A fungicide application of 4oz/acre of tilt was applied on April 9th for control of foliar diseases. The field was harvested on June 10th with a final yield of 84.3 bu/A.

Ashley County

The Ashley County location was located west of Montrose on a mixed soil comprised of Perry clay, Portland clay, and Rilla silt loam. Following land preparation, a pre-plant application of fertilizer was applied on October 10th. The field was 71 acres in size, and was drilled planted with Progeny 870 on October 30th at a seeding rate 130 lbs/A. Two spring nitrogen applications were applied with a total spring N rate of 128 lbs/A. Prosaro foliar fungicide was applied at 7 oz/acre on April the 12th for control of stripe rust and to reduce the risk of fusarium head blight. No herbicides or insecticides were warranted throughout the season. Harvest occurred on June 5th with a yield of 86.5 bu/A.

Chicot County

The 49 acre Chicot County field was broadcast planted on November 1st. The field was planted in Terral TV8861 at a seeding rate of 180 lbs/A. No pre-plant fertilizer was required on the Sharkey clay soil. Spring nitrogen applications were made on February 9th and March 8th for a total spring N rate of 145 units. No herbicides, insecticides, or foliar fungicides were needed during the growing season. The field was harvested on June the 10th with a yield of 73 bu/A.

Conway County

The 21 acre Conway County field was located south of Plummerville on a Gallion silt loam soil that was previously planted to corn. Chicken litter was used at 2 ton/A as a pre-plant fertilizer. Armor Ricochet was broadcast planted at 180 lbs/A of seed on October 25. Total spring nitrogen was 113 lbs/A, and was applied on March 5th as a single application due to wet soil conditions that limited earlier ground applications. The field required no foliar fungicide, herbicide, or insecticide applications during the growing season. The field was harvested on June 26 with a yield of 72.5 bu/A.

Jefferson County

The 22 acre Jefferson County field was located at Pastoria in the northern portion of the county. The Soil type for this field was a McGehee silt loam which received an application of 0-60-60 on October 17th. The field was drill planted on November 2 with Syngenta Oakes at a rate of 120 lbs./A. Spring nitrogen was applied in a two-way split application, with a total spring N rate of 138lbs/A. An application of Powerflex herbicide was made on November 20th to control ryegrass. No foliar fungicides or insecticides were needed during the growing season. The field was harvested on June 16th with a yield of 76 bu/A.

Lafayette County

The 73 acre Lafayette County field was located west of Lewisville in the northern part of the county on a field that previously had been planted to corn. The soil type was a Rilla Silt Loam/Billyhaw clay. Terral TV 8861 was broadcast planted on October 12 at a seeding rate of 120 lbs. /A. No pre-plant mixed fertilizer was needed. Spring nitrogen was applied with a dribble applicator at a rate of 22.5 gals/A of 32% UAN. A foliar fungicide of 14 oz/A of Quilt Xcel was applied on April 1st. The field was harvested on June 5th with a final yield of 72 bu/A.

Lee County

The Lee County field was located west of Marianna. The field was 32 acres and the previous crop was soybeans. The soil type was Calloway silt loam. Ricochet was broadcast seeded at a rate of 165 lbs/A on November 3. Preplant fertilizer of 23-60-0 was applied prior to planting and a total spring N rate of 106lbs/A of spring nitrogen was applied in a two way split application. Axial XL herbicide was applied on March 9th for ryegrass control. No insect or disease control was required, and the field was harvested on June 23 with a final yield of 54 bu/A.

Lincoln County

The 108 acre Lincoln County field was located on the Arkansas Department of Corrections farm near Grady. The previous crop was corn, and the soil type consisted of Rilla and Hebert silt loam soils. The 108 acre field was broadcast planted with Pioneer 26R20 at a rate of 157 lbs/A on October 11. Harmony SG herbicide was applied on March 11th for garlic control. The total spring N rate was 128 lbs/A, and was split applied. Bumper foliar fungicide was applied at 4 oz/acre on March 27th for stripe rust control. The field was harvested on June 12th with a final yield of 71.9 bu/A.

Miller County

The 92 acre Miller County field was located west of Garland on a Caspiana silt loam that had previously been fallow. On October 9th the field was drill planted with Terral TV 8861 at a rate of 100 lbs/A. No pre-plant fertilizer was needed. Spring nitrogen was applied in a two-way split application, with a total N rate of 101lbs/A. No herbicides, foliar fungicides, or insecticides were needed throughout the growing season. The field was custom harvested on June 14th with a final yield of 84bu/A.

Randolph County

The Randolph County field was located south of Pocahontas on a Gallion silt loam soil. The field was 90 acres and the previous crop was grain sorghum. Coker 9553 was drill seeded at a rate of 90 lbs/A on October 9. Preplant fertilizer of 30-27-69-3s was applied prior to planting and a total spring N rate of 120lbs/A of nitrogen was split applied. 2,4-D herbicide was applied on March 7th for broadleaf weed control. Propiconazole foliar fungicide was applied for Septoria control on March 20th. The field was harvested on June 13 with a final yield of 80 bu/A.

Table 1. General Agronomic Information								
County	**Variety**	**Acres**	**Planting Method & Rate**	**2012 Planting Date**	**Previous Crop**	**2013 Harvest Date**	**Plant Density Plants/ Sq.Ft.**	**Yield Bu/A**
Arkansas	Progeny 870	40	Drill 107 lbs/A	Oct. 24	Soybean	June 10	30	84.3
Ashley	Progeny 870	70	Drill 130 lbs/A	Oct. 30	Soybean	June 05	30	86.5
Chicot	Terral TV8861	49	Broadcast 180 lbs/A	Nov. 01	Soybean	June 10	28	73.0
Conway	Armor Ricochet	21	Broadcast 180 lbs/A	Oct. 25	Corn	June 26	29	72.5
Jefferson	Syngenta Oakes	22	Drill 120 lbs/A	Nov. 2	Soybean	June 16	28	76.0
Lafayette	Terral TV 8861	73	Broadcast 120 lbs/A	Oct. 12	Corn	June 15	29	72.0
Lee	Armor Ricochet	32	Broadcast 165 lbs/A	Nov. 03	Soybean	June 23	26	54.0
Lincoln	Pioneer 26R20	108	Broadcast 157 lbs/A	Oct. 11	Corn	June 12	28	71.9
Miller	Terral TV 8861	92	Drill 100 lbs/A	Oct. 09	Fallow	June 08	30	84.0
Randolph	Coker 9553	90	Drill 90 lbs/A	Oct. 09	Grain Sorghum	June 13	30	80.0
Average								**75.4**

Table 2. Soil Type and Fertilizer Inputs				
County	**Soil Classification**	**Fall Fertilizer**	**Spring Fertilizer**	**Total Spring Nitrogen**
Arkansas	DeWitt/Stuttgart silt loam	0-60-60	Feb. 08 - 125 lbs/A urea + 100 lbs/A ammonia sulfate March 8 – 100 lbs/A urea	124
Ashley	Perry/Portland clay, Rilla silt loam	0-40-60	Feb. 08 – 125 lbs/A urea + 100 lbs/A ammonia sulfate March 6 – 100 lbs/A urea	124
Chicot	Sharkey clay	-	Feb. 09 – 100 lbs/A urea + 100 lbs/A 18-46-0 March 8 – 150 lbs/A urea	145
Conway	Gallion silt loam	2 Ton/A Chicken Litter	March 05 – 200 lbs/A urea + 100 lbs/A ammonia sulfate	113
Jefferson	McGehee silt loam	0-60-60	Feb. 07 – 150 lbs/A urea March 15 – 150 lbs/A urea	138
Lafayette	Rilla silt loam/Billyhaw clay	-	Feb. 20 – 22.5 gal/A UAN	80
Lee	Calloway silt loam	23-60-0	March 1 – 130lb/A urea March 17 – 100lb/A urea	106
Lincoln	Hebert/Rilla silt loam	-	March 08 – 125 lbs/A urea + 100 lbs/A ammonia sulfate March 24 – 100 lbs/A urea	128
Miller	Caspiana silt loam	-	Feb. 05 – 120 lbs/A urea March 26 – 100 lbs/A urea	101
Randolph	Gallion silt loam	30-27-69-3s	Feb. 15 – 125 lbs/A urea + 50 lbs/A ammonia sulfate March 01 – 135 lbs/A urea	150

Table 3. Pesticide Information			
County	**Herbicides**	**Insecticides**	**Fungicides**
Arkansas	-	-	April 9, 4oz/A Tilt
Ashley	March 22, 0.8ozA Harmony Extra SG	-	April 12, 7 oz/A Prosaro
Chicot	-	-	-
Conway	-	-	-
Jefferson	Nov. 20, 3.5oz/A Powerflex	-	-
Lafayette	-	-	April 1, 14 oz Quilt Xcel
Lee	March 9, 16.4oz/A Axial XL	-	-
Lincoln	March 11, 0.75oz/A Harmony Extra SG		March 27, 4oz/A Bumper
Miller	-	-	-
Randolph	March 07, 16oz/A 2,4-D	-	March 20, 4oz/A Propiconazole

Economic Analysis
Dr. Archie Flanders

This section reports information on production costs and returns for the 2013 Wheat Research Verification Program (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 10 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 2013 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 $7.00/bu. is the estimated Arkansas average. This price is based on data for Arkansas prices received from the National Agricultural Statistics Service during the 2013 harvest period. Average wheat yield was 75.4 bu./acre.

Average operating costs for wheat in Table 4 are $288.47 per acre. Table 5 indicates that fertilizers and nutrients are the largest expense category at $146.89 per acre, or 51% of total operating costs. Seed costs average $41.13 per acre, and custom applications average $33.11 per acre.

With average yield of 75.4 bu./acre, average operating costs are $3.84/bu. Operating costs range from a low of $177.78 in Lafayette County to a high of $393.43 in the Arkansas County field. Returns to operating costs average $239.48 per acre, and the low is $109.68 in Lee County and the high is $374.19 in Miller County. Average fixed costs are $31.24 which leads to average total costs of $319.70 per acre. Returns to total costs average $208.25 per acre with a low of $82.02 in Lee County and a high of $367.39 in Miller County. Total specified costs average $4.26/bu.
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Table 4. Operating Costs, Total Costs[1], and Returns

County	Operating Costs	Operating Costs per Bushel	Returns to Operating Costs	Total Fixed Costs	Total Costs	Returns to Total Costs	Total Costs per Bushel
Arkansas	393.43	4.67	196.67	41.86	435.30	154.80	5.16
Ashley	360.15	4.16	245.35	31.18	391.33	214.17	4.52
Chicot	241.89	3.31	269.11	33.66	275.55	235.45	3.77
Conway	254.46	3.51	253.04	32.36	286.83	220.67	3.96
Jefferson	389.57	5.12	142.64	29.30	418.88	113.33	5.51
Lafayette	177.78	2.47	326.22	35.35	213.12	290.88	2.96
Lee	268.32	4.97	109.68	27.66	295.98	82.02	5.48
Lincoln	248.52	3.46	254.71	34.88	283.40	219.83	3.94
Miller	213.81	2.55	374.19	6.80	220.61	367.39	2.63
Randolph	336.75	4.21	223.25	39.30	376.05	183.95	4.70
Average	**288.47**	**3.84**	**239.48**	**31.24**	**319.70**	**208.25**	**4.26**

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

Table 5. Summary of Revenue and Expenses per Acre

	County					
Receipts	Arkansas	Ashley	Chicot	Conway	Jefferson	Lafayette
Yield (bu)	84.3	86.5	73.0	72.5	76.0	72.0
Price ($/bu)	7.00	7.00	7.00	7.00	7.00	7.00
Total Crop Revenue	**590.10**	**605.50**	**511.00**	**507.50**	**532.21**	**504.00**
Operating Expenses						
Seed	32.10	39.00	54.00	54.00	36.00	36.00
Fertilizers & Nutrients	253.69	199.52	121.53	80.90	256.78	54.51
Herbicides	0.00	10.62	0.00	0.00	13.13	0.00
Insecticides	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals	5.04	22.75	0.00	0.00	0.00	23.21
Custom Applications	28.75	29.75	9.00	65.00	28.00	7.00
Diesel Fuel	23.59	13.62	18.59	16.19	13.95	18.30
Repairs & Maintenance	14.50	12.13	11.53	11.41	11.36	13.78
Irrigation Energy Costs	0.00	0.00	0.00	0.00	0.00	0.00
Labor, Field Activities	7.63	5.01	5.41	4.91	4.09	5.00
Other Inputs & Fees, Pre-harvest	9.59	8.73	5.78	6.10	9.54	4.14
Post-harvest Expenses	18.55	19.03	16.06	15.95	16.73	15.84
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	**393.43**	**360.15**	**241.89**	**254.46**	**389.57**	**177.78**
Returns to Operating Expenses	**196.67**	**245.35**	**269.11**	**253.04**	**142.64**	**326.22**
Land Rent	0.00	0.00	0.00	0.00	0.00	0.00
Capital Recovery & Fixed Costs	41.86	31.18	33.66	32.36	29.30	35.35
Total Specified Expenses[1]	**435.30**	**391.33**	**275.55**	**286.83**	**418.88**	**213.12**
Returns to Specified Expenses	**154.80**	**214.17**	**235.45**	**220.67**	**113.33**	**290.88**
Operating Expenses/bu	4.67	4.16	3.31	3.51	5.12	2.47
Total Expenses/bu	5.16	4.52	3.77	3.96	5.51	2.96

[1]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

	County				
Receipts	Lee	Lincoln	Miller	Randolph	**Average**
Yield (bu)	54.0	71.9	84.0	80.0	75.4
Price ($/bu)	7.00	7.00	7.00	7.00	7.00
Total Crop Revenue	**378.00**	**503.23**	**588.00**	**560.00**	**527.95**
Operating Expenses					
Seed	56.10	47.10	30.00	27.00	41.13
Fertilizers & Nutrients	126.12	94.99	71.80	209.06	146.89
Herbicides	16.07	13.27	0.00	2.31	5.54
Insecticides	0.00	0.00	0.00	0.00	0.00
Other Chemicals	0.00	5.08	2.28	5.08	6.34
Custom Applications	27.00	29.75	78.82	28.00	33.11
Diesel Fuel	11.42	19.90	4.11	18.72	15.84
Repairs & Maintenance	9.80	12.34	1.70	14.45	11.30
Irrigation Energy Costs	0.00	0.00	0.00	0.00	0.00
Labor, Field Activities	3.37	4.33	1.63	6.36	4.77
Other Inputs & Fees, Pre-harvest	6.56	5.95	5.00	8.16	6.95
Post-harvest Expenses	11.88	15.82	18.48	17.60	16.59
Custom Harvest	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	**268.32**	**248.52**	**213.81**	**336.75**	**288.47**
Returns to Operating Expenses	**109.68**	**254.71**	**374.19**	**223.25**	**239.48**
Land Rent	0.00	0.00	0.00	0.00	0.00
Capital Recovery & Fixed Costs	27.66	34.88	6.80	39.30	31.24
Total Specified Expenses[1]	**295.98**	**283.40**	**220.61**	**376.05**	**319.70**
Returns to Specified Expenses	**82.02**	**219.83**	**367.39**	**183.95**	**208.25**
Operating Expenses/bu	4.97	3.46	2.55	4.21	3.84
Total Expenses/bu	5.48	3.94	2.63	4.70	4.26

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