



**DIVISION OF AGRICULTURE  
RESEARCH & EXTENSION**

*University of Arkansas System*

# 2024 University of Arkansas System Division of Agriculture Wheat Research Verification Program

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University of Arkansas  
Cooperative Extension Service  
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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 an on-farm demonstration 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.

Three fields were enrolled in the WRVP for the 2023-2024 growing season. Cooperators from the counties selected 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 type for fields enrolled in the program were all silt loam, with one field having a previous crop of corn, one soybean and one field summer fallow. Fields were planted in mid-October with a seeding rate of 120lbs/acre. All fields were drilled planted on 7.5" seed spacing. The White County field was sprayed with a foliar fungicide at flowering for Fusarium Head Blight suppression. The Lawrence County field was sprayed at flowering for Fusarium Head Blight suppression and leaf rust. The Greene, Lawrence and White County fields were treated with herbicides to control winter annuals. Yields from verification fields ranged from 73.9 bushels/acre in Greene County to 67.7 bushels/acre in Lawrence County.

The 2023-2024 Arkansas wheat production season started off dry and several fields needed rain prior to planting or emergence. Fields did not receive excess rainfall over the winter and very little standing water was noted. Warmer temperatures also helped with tillering prior to dormancy. Temperatures in the spring increased quickly and promoted excellent growing conditions.

Spring nitrogen applications were applied starting in late February and continued until mid-March. Foliar disease levels were generally low. White Counties was treated with a foliar

fungicide at flowering for suppression of Fusarium Head Blight and Lawrence County treated for leaf rust and Fusarium Head Blight suppression. Insect pressure remained low throughout the growing season and no treatment was needed. One to two herbicide applications were needed in all Wheat Research Verification fields for winter weed control. Wheat research verification fields were harvested late May to mid- June. Arkansas producers planted an estimated 140,000 acres of wheat in the fall of 2023 and harvested 95,000 acres. Statewide average yield was estimated at 57 bu/acre. The verification program average yield for the 2023-2024 season was 71.2 bushels/acre.

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 the last 10-year period, the WRVP has averaged approximately 10 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 2023-2024 Wheat Research Verification Program Fields**



## Field Reviews

### 2023-2024 Fields – Chris Elkins

#### Greene County

The 191-acre field with Hillemann & Calhoun silt loam soil was located west of Walcott and followed corn. A pre-plant fertilizer application of 0-60-60, according to soil test recommendations was applied. The field was no-till drilled planted on October 18, 2023, with Delta Grow 1800 at 120 pounds/acre. Wheat emerged on October 25, 2023, to a stand of 21.5 plants/ft<sup>2</sup>. Initial early spring fertilizer application of 50lbs/acre ammonium sulfate plus 50 pounds/acre urea was applied on February 20, 2024. On March 5, 2024, .75 ounces/acre Harmony Extra plus 1.5 pints/acre 2, 4-D was applied for winter annual control. A second spring nitrogen application was applied on March 6, 2024 of 100 pounds/acre 41-0-0-4. The final spring nitrogen application of 100 pounds/acre 41-0-0-4 was applied on March 20, 2024, for a total spring nitrogen rate of 116 pounds/acre. The field was harvested May 28 and yielded 73.9 bushels/acre adjusted to 13.5% moisture.

#### Lawrence County

The 30-acre field with Amagon & Dundee silt loam soil was located northwest of Walnut Ridge and followed soybeans. A pre-plant fertilizer application of 0-46-90 was applied. The field was no-till drilled planted on October 17, 2023, with Pioneer 26R41 at 120 pounds/acre. Wheat emerged on October 27, 2023, to a stand of 23.3 plants/ft<sup>2</sup>. Anthem Flex was applied early POST at 2.75 ounces/acre for ryegrass control was made on November 7, 2024. Initial early spring fertilizer application of 50lbs/acre ammonium sulfate plus 50 pounds/acre urea was made on February 20, 2024. A second spring nitrogen application was applied on March 12, 2024 of 100 pounds/acre urea. The final spring nitrogen application of 100 pounds/acre urea was applied on March 20, 2024, for a total spring nitrogen rate of 126 pounds/acre. On March 22, 2024, .9 ounces/acre Harmony Extra was applied for winter annual control. Miravis Ace fungicide was aerially applied at flowering on April 20 at 13.7 ounces/acre for Fusarium Head Blight suppression and leaf rust. The field was harvested May 31 and yielded 67.7 bushels/acre adjusted to 13.5% moisture.

#### White County

The 50-acre field with Calloway silt loam soil was located south of Higginson and was planted on summer fallow ground. The field was drill planted on October 12, 2023 with Agri Maxx 503 at 120 pounds/acre. A delayed pre-emerge application of 3.25 ounces/acre Zidua for ryegrass control was made on October 17, 2023. Wheat emerged on October 17, 2023 to a stand of 20.1 plants/ft<sup>2</sup>. Initial early spring fertilizer application of 75 pounds/acre urea plus 50 pounds/acre ammonium sulfate was applied on February 28, 2024. The final nitrogen application of 100 pounds/acre urea was applied on March 13, 2023. Total spring nitrogen rate of 91 pounds/acre was applied. Prosaro fungicide was aerially applied at flowering on April 17 at 6.5 ounces/acre for Fusarium Head Blight suppression. The field was harvested on June 12, 2024, and yielded 71.9 bushels/acre adjusted to 13.5% moisture.

County	Variety	Acres	Planting Method	Seeding Rate lb/a	Planting Date	Previous Crop	Yield Bu/a
Greene	Delta Grow 1800	191	Drilled	120	10/18/23	Corn	73.9
Lawrence	Pioneer P26R41	30	Drilled	120	10/17/23	Soybean	67.7
White	Agri Maxx 5003	50	Drilled	120	10/12/23	Fallow	71.9
<b>Average</b>		<b>90.</b>		<b>120</b>	<b>10/15/23</b>		<b>71.2 bu/A</b>

County	Soil Type	Fall Fertilizer	Spring Fertilizer	Total Spring Nitrogen
Greene	Hillemann & Calhoun Silt loam	0-60-60	1 <sup>st</sup> , 50# ammonium sulfate + 50# urea; 2 <sup>nd</sup> , 100# 41-0-0-4; 3 <sup>rd</sup> , 100# 41-0-0-4	116
Lawrence	Amagon & Dundee Silt Loam	0-46-90	1 <sup>st</sup> ; 50 # ammonium sulfate + 50 # urea 2 <sup>nd</sup> ; 100 # urea; 3 <sup>rd</sup> 100 #urea	126
White	Calloway Silt Loam	0-0-0	1 <sup>st</sup> , 75# urea + 50# ammonium sulfate; 2 <sup>nd</sup> , 100 # urea	91
<b>Average</b>				<b>111 lbs N</b>

County	Herbicide	Insecticide	Foliar Fungicide
Greene	Spring: 1.5 pts. 2,4-D + .75 oz Harmony Extra	None	None
Lawrence	Fall: 2.75 oz Anthem Flex Spring: .9 oz. Harmony Extra	None	13.7 oz. Miravis Ace
White	Spring: 3.25 oz. Zidua	None	6.5 oz. Prosaro



## **Economic Analysis of the 2024 Wheat Research Verification Program**

This section reports information on costs and returns for the 2024 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 coordinator, county Extension agents, and cooperators. Production data from the 3 fields were applied to determine costs and returns above operating costs, as well as total specified costs. Operating costs per bushel and total costs per bushel indicate the commodity price needed to meet each costs type.

Production 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 production inputs as reported by the cooperators are used in this analysis. Input prices are determined by data from the fall 2023 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 and maintenance costs should be regarded as estimated values, and actual cash outlays could differ as producers utilize employee 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 4. Price received for wheat grain was estimated to be \$5.90/bu. and is determined by the Arkansas average cash price during the reported harvest period of the WRVP fields. Average wheat yield was 71.2 bu. per acre.

Average operating costs for wheat in Table 4 are \$303.59 per acre. Table 5 indicates that fertilizers and nutrients are the largest expense category at \$113.51 per acre, or 37% of total production expenses. Seed cost is the second largest expense category at \$45.60 per acre, or 15% of total production expenses.

With an average yield of 71.2 bu. per acre, average operating costs are \$4.29/bu. Operating costs range from a low of \$239.55 per acre in White County to a high of \$370.49 per acre in the Lawrence County field. Returns to operating costs average \$116.29 per acre. The low is \$28.94 in Lawrence County, and the high is \$184.66 in White County. Average fixed costs are \$59.34 per acre which leads to average total costs of \$362.60 per acre. Returns to total costs average \$56.95 per acre with a low of -\$35.92 in Lawrence County and a high of \$123.37 in White County. Total specified costs average \$5.13/bu.

Table 4. 2024 Operating Costs, Total Costs, and Returns

Field	Operating Costs	Operating Costs per Bushel	Returns to Operating Costs	Total Fixed Costs	Total Costs <sup>1</sup>	Returns to Total Costs	Total Costs per Bushel
Greene	300.74	4.07	135.27	51.88	352.62	83.39	4.77
Lawrence	370.49	5.47	28.94	64.85	435.35	-35.92	6.43
White	239.55	3.33	184.66	61.29	300.84	123.37	4.18
<b>Average</b>	<b>303.59</b>	<b>4.29</b>	<b>116.29</b>	<b>59.34</b>	<b>362.60</b>	<b>56.95</b>	<b>5.13</b>

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

Table 5. 2024 Revenue and Expenses per Acre

Revenue	Field			
	Greene	Lawrence	White	Average
Yield (bu.)	73.9	67.7	71.9	71.2
Price (\$/bu.)	5.90	5.90	5.90	5.90
<b>Total Crop Revenue</b>	<b>436.01</b>	<b>399.43</b>	<b>424.21</b>	<b>420.08</b>
<b>Expenses</b>				
Seed	45.60	45.60	45.60	45.60
Fertilizers & Nutrients	141.51	145.13	53.88	113.51
Chemicals	7.76	49.01	30.42	29.06
Custom Applications	33.50	50.50	34.00	39.33
Diesel Fuel	10.51	13.77	13.89	12.72
Irrigation Energy Costs	0.00	0.00	0.00	0.00
<b>Input Costs</b>	<b>238.88</b>	<b>304.01</b>	<b>177.78</b>	<b>240.22</b>
Crop Insurance	8.22	8.22	8.22	8.22
Repairs & Maintenance <sup>1</sup>	11.47	13.52	13.27	12.75
Labor, Field Activities	3.92	5.16	5.19	4.76
Scouting/Consultant Fee	5.50	5.50	5.50	5.50
<b>Production Expenses</b>	<b>267.99</b>	<b>336.40</b>	<b>209.97</b>	<b>271.45</b>
Interest	12.06	15.14	9.45	12.22
Post-harvest Expenses	19.95	18.96	19.41	19.44
<b>Total Operating Expenses</b>	<b>300.74</b>	<b>370.49</b>	<b>239.55</b>	<b>303.59</b>
<b>Returns to Operating Expenses</b>	<b>135.27</b>	<b>28.94</b>	<b>184.66</b>	<b>116.29</b>
Capital Recovery & Fixed Costs	51.88	64.85	61.29	59.34
<b>Total Specified Expenses<sup>2</sup></b>	<b>352.39</b>	<b>435.35</b>	<b>300.84</b>	<b>362.86</b>
<b>Returns to Specified Expenses</b>	<b>83.39</b>	<b>-35.92</b>	<b>123.37</b>	<b>56.95</b>
Operating Expenses/bu.	4.07	5.47	3.33	4.29
Total Specified Expenses/bu.	4.77	6.43	4.18	5.13