

2010 Arkansas



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Abstract

The 2010 Wheat Research Verification Program (WRVP) was implemented by the University of Arkansas Cooperative Extension Service on 5 producer fields located across Arkansas. Cooperators from the counties selected 4 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 silt loam, with previous crops of soybean and corn. Seeding dates ranged from October 17 through November 12, 2009, with seeding rates varying from 135 to 180 lbs/ac. Three fields were drill seeded, while two were broadcast seeded. Three of the 5 fields were treated with herbicides. Foliar fungicides were applied to control stripe rust, leaf rust, and/or septoria leaf blotch near heading in three of the five fields. Conditions following application were not favorable for further disease development, and stripe rust did not develop to harmful levels. Unlike 2009, fusarium head blight incidence was negligible this year. None of the fields required treatment for armyworms. Harvest dates ranged from June 3 through June 7. The average yield for WRVP fields was 74.5 bu/ac, compared to the state average of 54 bu/ac. Yields ranged from 64.8 bu/ac in Desha County to 90 bu/ac at the Arkansas County South location. Yields were surprisingly good despite the late planting of all fields. Dry, Spring weather lessened the effects of disease and nitrogen losses were minimal. An economic analysis was conducted by Dr. Archie Flanders, Extension Economist, to estimate specific costs of production for each field. Economic analysis can be found on pages 11-12. 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 24-year period, the WRVP has averaged 13 bu/ac greater than the state average yield. The program is funded by the wheat checkoff dollars and administered through the Arkansas Wheat Promotion Board.

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.

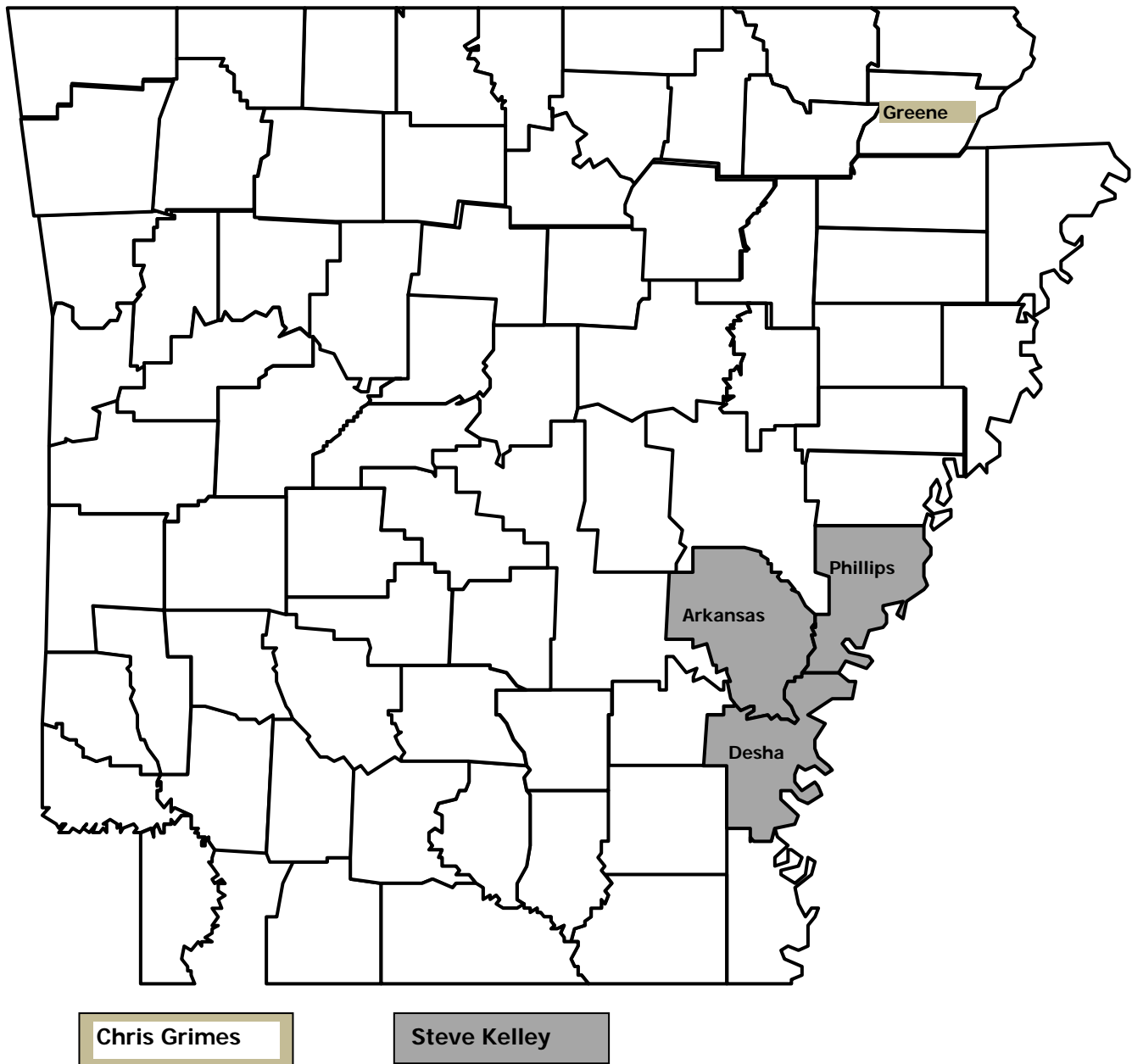
The WRVP program is designed as on-farm demonstrations of all the research-based recommendations required to grow wheat profitably in Arkansas. The WRVP program is part of the University of Arkansas Extension Service's goal of helping wheat producers make economical, agronomical, and environmentally 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.
3. To demonstrate that consistently high yields of wheat can be produced economically with the use of available technology and inputs.
4. To identify specific problems and opportunities in Arkansas wheat production for further investigation.
5. To promote timely cultural and management practices among all wheat farmers.
6. To provide training and assistance to county agents with limited expertise in wheat production.

2010 WRVP Methodology

Five farms enrolled a field in the Wheat Research Verification Program in the fall of 2009. The fields were located on commercial wheat farms and ranged in size from 36 to 155 acres. The locations of the WRVP fields are shown in Figure 1, designated according to the WRVP coordinator responsible for each field.

Figure 1. Location of the 2010 WRVP Fields



The program is conducted for two consecutive years with each grower/cooperator. When an interested cooperator was identified, the cooperator, county agent, and specialist selected a field to enroll in the program in the fall of 2009. Prospective fields are required to meet the following criteria specified by the WRVP advisory committee:

1. Field size of at least 15 acres.
2. A yield potential equal to or greater than the county average.
3. A soil pH above 5.6.
4. A previous crop of corn, sorghum, soybeans, summer fallow, rice, or pasture.
5. The potential for good surface drainage.

A representative soil sample of the field was analyzed and the field was inspected by the coordinator and county agent. When the soil test results were obtained, the county agent, cooperator, and coordinator met to discuss recommended practices for seedbed preparation, wheat variety selection, and fertilization. All management decisions were made based on current extension recommendations.

For situations where there were no specific recommendations included in the field plan, a member of the Wheat Verification Committee was consulted. As often as practical, members of the committee were consulted and updated on the condition of the fields. Once seedbed preparation began, the day-to-day management decisions were made by the county agent and coordinator with assistance from appropriate specialists and researchers as conditions warranted. Data were collected on stand counts, growth stage, tillering, heads per square foot, diseases, weeds, and insects during the course of the growing season. Grain yields and test weights were determined by elevator weigh tickets on all WRVP fields.

An economic analysis of each field was conducted by Dr. Archie Flanders, Extension economist and is included on pages 11-12.

Results and Discussion

The variety, field size and preplant fertilizer for each WRVP field are listed in Table 1. The average field size was 73.4 acres and ranged in size from 36 to 155 acres.

Table 1. Variety, Field Size, and Preplant Fertilizer, WRVP Fields 2009

County	Variety	Field Size (Acres)	Preplant Fertilizer ¹ (lbs/ac)
Arkansas South	AgriPro Beretta	54	3 tons/ac litter
Arkansas North	Progeny 185	36	37-92-120
Desha	Progeny 185	65	None
Greene	Delta King 9318	155	40-80-80
Phillips	Coker 9553	57	18-46-75

¹Nitrogen – Phosphorus – Potassium.

Coordinators of the Wheat Research Verification Program met with the Extension Wheat Agronomist to develop a short list of varieties suited to each potential verification field's environment. For those fields that were planted, the *Wheat Update*, a summary of variety trials conducted by the University of Arkansas Agricultural Experiment Station, was used to obtain yield, physiological, and disease data for certain varieties on a range of soil types. The producer made the final variety selection using those on the list provided by the county agent. The best overall disease resistance and yield history is sought in variety selection. Four varieties were planted in the WRVP in the fall of 2009, reflecting the specific needs of different soil types, geographic regions, and the overall management strategy employed by the cooperators.

Table 2 shows the soil classification for each WRVP field. These fields consisted of clay, sand, and silt loam soils. The range in soil types reflects the range of soils where wheat could be planted in Arkansas during the fall of 2009.

Good surface drainage is key to profitable wheat production, and each WRVP cooperator was encouraged to provide the best drainage possible. Drainage furrows were constructed at regular intervals to enhance surface drainage in all fields. Additionally, growers were requested to monitor and maintain drainage from planting through harvest.

Table 2. General Soil Information, WRVP Fields 2009

County	Soil Classification
Arkansas South	Stuttgart Silt Loam
Arkansas North	Stuttgart Silt Loam
Desha	Henry/McGehee Silt Loam
Greene	Silt Loam
Phillips	Calloway/Henry/Loring Silt Loam

Previous crop and tillage operations are listed in Table 3. Four fields were planted following soybean and one following corn. Conventional tillage operations were used for seedbed preparation in all fields.

Table 3. Previous Crop and Preplant Tillage Operation for WRVP Fields, 2009.

County	Previous Crop	Tillage Operations
Arkansas South	Soybean	Field Cultivated 2X, Float
Arkansas North	Soybean	Disked, Field Cultivated 2X
Desha	Soybean	Disked, Field Cultivated
Greene	Corn	Chisel Plow, Disked, Field Cultivated
Phillips	Soybean	Disked, Field Cultivated

The seeding date and rate for each county and variety are given in Table 4. The recommended planting dates for wheat are: North Arkansas - October 1 through October 30, Central Arkansas – October 10 through November 10, South Arkansas – October 15 through November 20.

Table 4. Variety, Seeding Date, Rate, Method, WRVP Fields, Fall, 2009.

County	Variety	Seeding Date	Emerg. Date	Seeding Rate (lbs/ac)	Seeding Method
Arkansas South	AgriPro Beretta	4 – Nov	10–Nov	145	Drill
Arkansas North	Progeny 185	12 - Nov	18-Nov	135	Drill
Desha	Progeny 185	7 – Nov	13-Nov	180	Broadcast
Greene	Delta King 9318	17 - Oct	23-Oct	150	Broadcast
Phillips	Coker 9553	10 - Nov	16-Nov	180	Broadcast

Seeding rates ranged from 135 to 180 pounds per acre. The recommended seeding rates vary according to seed size, seedbed conditions, anticipated germination, and seedling survival. Seeding rates are designed to achieve a final stand of 26 plants per square foot. Two fields were drill seeded while three fields were broadcast seeded.

Information on spring nitrogen applications are displayed in Table 5 below. Total applied nitrogen ranged from 122 lbs/acre to 132 lbs/acre. The average spring nitrogen rate was 126.7 lbs/acre.

On loamy soils with good drainage, 110-120 pounds of nitrogen per acre is generally recommended for high yields. A single application at mid-tillering stage of wheat development may often satisfy the nitrogen requirements of the crop. However, heavy or frequent spring rainfall causes saturated soils and subsequent loss and/or leaching of nitrates outside the root zone. Thus, split applications of nitrogen are often required to avoid excessive nitrogen losses. In addition, standing water may cause nitrogen losses that can be corrected with supplemental fertilizer of 20-40 pounds of nitrogen per acre, according to extension recommendations. Excessive wetness caused little problem during the season. Spring nitrogen was applied in a timely manner in WRVP fields as well as the majority of wheat fields in Arkansas in 2010.

All 2010 WRVP fields received split applications of nitrogen. Three locations utilized a three way split, while two locations used only two applications.

Table 5. Spring Nitrogen, WRVP Fields, 2010.

County	First Application		Second Application		Third Application		Total lb N/A
	Date	Source	Date	Source	Date	Source	
Arkansas South	2/18	70# Urea + 30# Am. Sulfate	3/19	100# Urea	4/2	100# Urea	130.5
Arkansas North	2/18	50# Urea + 50# Am. Sulfate	3/8	100# Urea	3/26	100# Urea	125.5
Desha	2/19	125# Urea + 50# Am. Sulfate	3/30	120# Urea	---	---	123.2
Greene	3/3	110# Urea + 50# Am. Sulfate	4/2	110# Urea + 50# Am. Sulfate	---	---	122.2
Phillips	2/17	60# Urea + 60# Am. Sulfate	3/8	100# Urea	3/24	100# Urea	132.2

Three of the WRVP fields required treatment with a recommended foliar fungicide for disease control. None of the fields reached treatment level for any insects. Three of the fields required herbicide applications for ryegrass and/or garlic control. A summary of pest management practices are displayed in Table 6.

Table 6. Weed, Disease, and Insect Summary - WRVP, 2010

County	Pest Summary and Chemical Application
Arkansas South	14 oz. Quilt
Arkansas North	14 oz. Quilt
Desha	3/4 oz. Harmony SG + 3.5 oz. Powerflex, 14 oz. Quilt
Greene	3/4 oz. First Shot + 1 pt. 2, 4-d
Phillips	1 oz. Finesse, 16.4 oz. Axial (border application)

The harvest date, grain yield, test weight, and pounds of nitrogen per bushel are shown in Table 7. Harvest dates ranged from June 3 through June 7. Average yield for the WRVP was 74.5 bu/ac, compared to a state average yield of 54 bu/ac.

The pounds of nitrogen per bushel variable is a simple ratio of total applied nitrogen divided by the grain yield. It attempts to measure the efficiency of nitrogen fertilizer applications. The efficiency ranged from 1.45 lbs N/bu to 1.97 lbs N/bu and averaged 1.7 lb N/bu of wheat.

Table 7. Harvest Date, Grain Yield, Test Weight for WRVP Fields, 2010

County	Harvest Date	Test Weight (lb/bu)	Yield (bu/ac @ 13.5%)	Pounds N/bu
Arkansas South	7 – June	57	90	1.45
Arkansas North	6 – June	57.5	84.5	1.49
Desha	5 – June	57	64.8	1.90
Greene	5 – June	56.5	66	1.85
Phillips	3 – June	57	67	1.97
WRVP Average:			74.5	
Predicted State Yield Average:				54.0

Economic Analysis

This section provides information on production costs for the 2010 WRVP. Records of field operations on each field provided the basis for estimating these costs. The field records were compiled by the WRVP coordinators, county Extension agents, and cooperators. Production data from the 5 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. Applications of phosphorous and potassium, as well as poultry litter, are adjusted so that 50% is attributed to the current wheat crop. The balance is considered as applications for a subsequent soybean crop. Input prices are determined by data from the 2010 Crop Enterprise Budgets published by the Cooperative Extension Service and information provided by the producer cooperators. 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 1. 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 2. Price received for wheat of \$4.55/bu. is the Arkansas average for weeks in May and June corresponding to harvest dates for participating fields. Average wheat yield is 74.5 bu./acre.

Average operating costs for wheat in Table 1 are \$250.76 per acre. Table 2 indicates that fertilizers and nutrients are the largest expense category at \$115.24 per acre, or 46% of total operating costs. Seed costs average \$39.50, and custom applications average \$33.30 per acre.

With average yield of 74.5 bu./acre, average operating costs are \$3.43/bu. Operating costs range from a low of \$231.07 in Greene County to a high of \$273.20 in Desha County. Returns to operating costs average \$88.04 per acre with a low of \$21.64 in Desha County and a high of \$150.49 in the Arkansas County (South) field. Average fixed costs are \$27.06 which leads to average total costs of \$277.82 per acre. Returns to total costs average \$60.98 per acre with a low of \$12.62 in Desha County and a high of \$124.96 in the Arkansas County (South) field. Total specified costs average \$3.79/bu.

Table 1. Operating Costs, Total Costs, and Returns for Wheat Research Verification Program, 2010

County	Operating Costs	Operating Cost/ Bu.	Returns to Operating Costs	Total Fixed Costs	Total Costs	Returns to Total Costs	Total Costs Costs/Bu.
Phillips	232.28	3.47	72.57	24.77	257.05	47.80	3.84
Greene	231.07	3.50	69.23	39.03	270.10	30.20	4.09
Desha	273.20	4.22	21.64	9.02	282.22	12.62	4.36
Arkansas (South)	259.01	2.88	150.49	25.53	284.54	124.96	3.16
Arkansas (North)	258.22	3.06	126.25	36.95	295.17	89.30	3.49
Average	250.76	3.43	88.04	27.06	277.82	60.98	3.79

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

Table 2. Summary of Revenue and Expenses per Acre, Wheat Research Verification Program, 2010

Receipts	County					Average
	Phillips	Greene	Desha	Arkansas (South)	Arkansas (North)	
Yield (bu.)	67.0	66	64.8	90.0	84.5	74.5
Price Received	4.55	4.55	4.55	4.55	4.55	4.55
Total Crop Revenue	304.85	300.30	294.84	409.50	384.48	338.79
Operating Expenses						
Seed	45.00	37.50	45.00	36.25	33.75	39.50
Fertilizers & Nutrients	97.92	118.87	100.55	135.31	123.56	115.24
Chemicals	23.69	7.27	39.07	17.36	17.36	20.95
Custom Applications	30.50	17.50	61.00	26.00	31.50	33.30
Fuel & Lube	7.02	15.31	3.40	8.91	13.33	9.59
Repairs & Maintenance	5.94	10.16	1.99	6.63	9.26	6.80
Irrigation Energy Costs	0.00	0.00	0.00	0.00	0.00	0.00
Labor, Field Activities	2.43	4.91	1.93	3.20	5.32	3.56
Other Inputs & Fees, Pre-harvest	5.05	5.02	6.01	5.55	5.56	5.44
Post-harvest Expenses	14.74	14.52	14.26	19.80	18.59	16.38
Total Operating Expenses	232.28	231.07	273.20	259.01	258.22	250.76
Returns to Operating Expenses	72.57	69.23	21.64	150.49	126.25	88.04
Capital Recovery & Fixed Costs	24.77	39.03	9.02	25.53	36.95	27.06
Total Specified Expenses¹	257.05	270.10	282.22	284.54	295.17	277.82
Returns to Specified Expenses	47.80	30.20	12.62	124.96	89.30	60.98
Operating Expenses/bu.	3.47	3.50	4.22	2.88	3.06	3.43
Total Expenses/bu.	3.84	4.09	4.36	3.16	3.49	3.79

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