2023
University of Arkansas
Soybean Research Verification Program

Arkansas ROW CROP VERIFICATION

UofA DIVISION OF AGRICULTURE RESEARCH & EXTENSION
University of Arkansas System

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

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SOYBEAN RESEARCH VERIFICATION PROGRAM, 2023

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INTRODUCTION

The 2023 growing season was the thirty eighth year for the Soybean Research Verification Program (SRVP). The SRVP is an interdisciplinary effort between growers, county Extension agents, Extension specialists, and researchers. The SRVP is an on-farm demonstration of all the research-based recommendations required to grow soybeans profitably in Arkansas. The specific objectives of the program are:

To verify research-based recommendations for profitable soybean production in all soybean producing areas of Arkansas.

To develop a database for economic analysis of all aspects of soybean production.

To demonstrate that consistently high yields of soybeans can be produced economically with the use of available technology and inputs.

To identify specific problems and opportunities in Arkansas soybeans for further investigation.

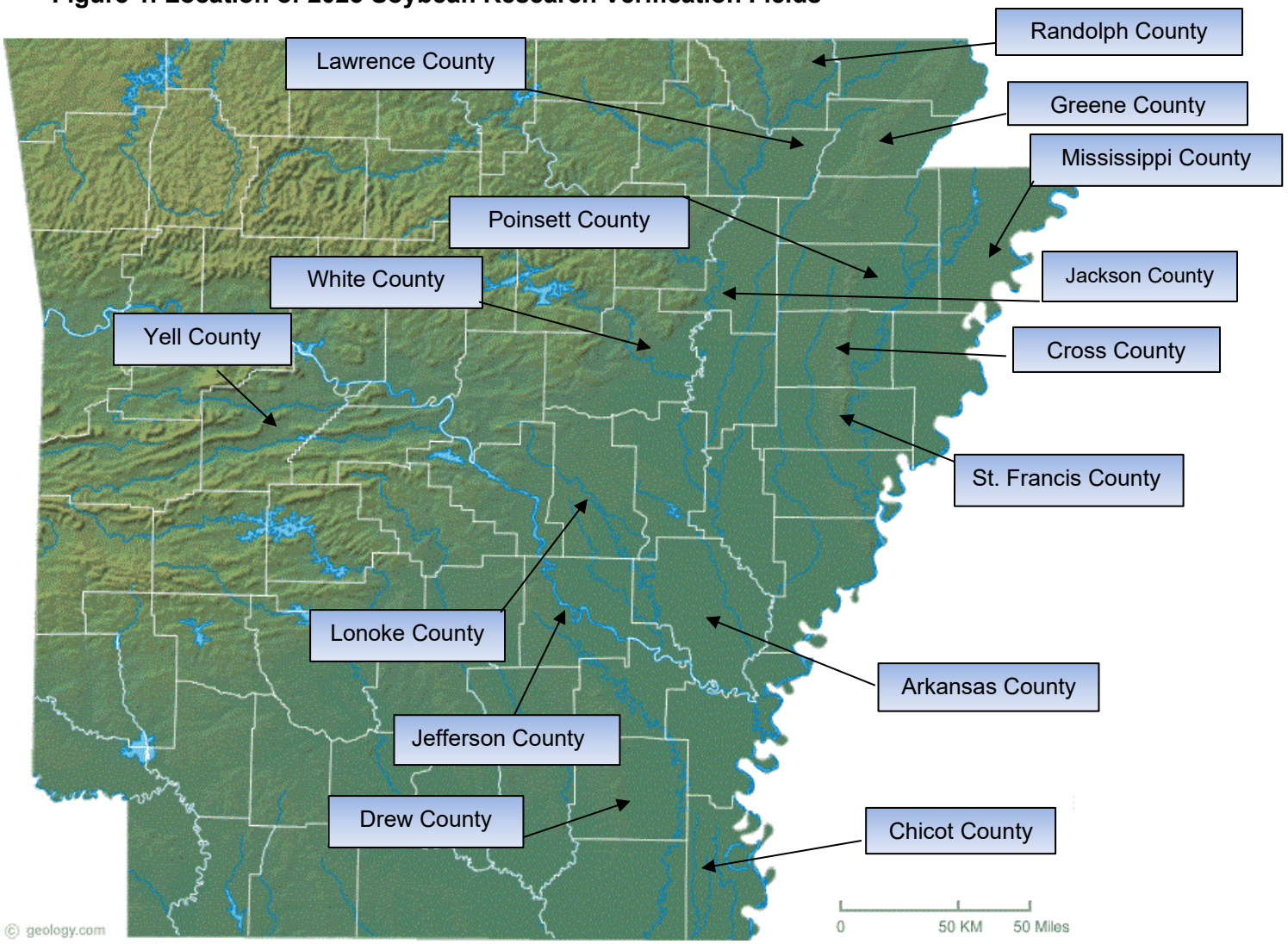
To promote timely implementation of cultural and management practices among soybean growers.

To provide training and assistance to county agents with limited expertise in soybean production.

Each SRVP field and cooperator were selected prior to planting. Cooperators agreed to pay production expenses, provide crop expense data for economic analysis and implement the recommended production practices in a timely manner from seedbed preparation to harvest. Fifteen farms were enrolled in the SRVP in 2023. The fields were located on commercial farms ranging in size from 26 to 74 acres. The average field size was 51 acres.

The 2023 SRVP fields were conducted in Arkansas, Chicot, Cross, Drew, Greene, Jackson, Jefferson, Lawrence, Lonoke, Mississippi, Poinsett, Randolph, St. Francis, White, St. Francis, and Yell counties. One Conventional variety (Virtue 4520S), four different Roundup Ready 2 Xtend® varieties (Asgrow AG46X6, Asgrow AG46X0, Becks 4991X2, and Pioneer P46A36X.), five Enlist E3® (Innvictis B4841E, Pioneer P48A14E, Stine 46EE20, Pioneer P52A14SE, and Armor 46-E50) and three Roundup Ready Flex® varieties (Pioneer P45A40LX, Asgrow AG46XF3, Pioneer 46A20LX) were planted. Management decisions were based on field history, soil test results, variety, and data collected from each individual field during the growing season.

Figure 1. Location of 2023 Soybean Research Verification Fields



FIELD REVIEWS

Northern Fields – Christopher Elkins

Cross County

The 70 acre field, Crowely silt loam, was located west of Hickory Ridge and followed the previous year soybean crop. Following spring tillage and fertilizer application of 0-30-60, the field was planted on May 8 with Virtue 4250S conventional, Crusier Maxx treated seed, at 120,000 seed/acre on 30" row seed spacing. On May 8, 5 ounces/acre Verdict plus 8 ounces/acre Outlook was applied for pre-emerge weed control. The field emerged on May 16 to a plant population of 89,000 seed/acre. A single post emerge herbicide application was made on June 8 of 2.25 pints/acre Prefix plus 8 ounces/acre select. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 2 times and harvested on October19 yielding 41.2 bushels/acre adjusted to 13%.

Greene County

The 65 acre field, Hillemann silt loam, was located west of Walcott and followed the previous year corn crop. Following spring burndown of 40 ounces/acre glyphosate and fertilizer application of 0-0-60, the field was planted on May 8 with Innvictis B4814E, Crusier Maxx treated seed, at 140,000 seed/acre on 30" row seed spacing. The field emerged on May 15 to a plant population of 109,000 seed/acre. Initial post emerge herbicide application was made on May 27 of 2 pints/acre Enlist One plus 1 quart/acre glyphosate plus 2.5 pints/acre Warrant. A second herbicide application was made on June 23 of 1 quart/acre glyphosate plus 2 pints/acre Enlist One plus 1.25 pints/acre s-metolachlor. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 3 times and harvested on October 17 yielding 63.7 bushels/acre adjusted to 13%.

Jackson County

The 32 acre field, Egam silt loam, was located east of Oil Trough and followed the previous year corn crop. Following spring tillage and fertilizer application of 0-0-75, the field was planted on May 17 with Pioneer P48A14E, Crusier Maxx treated seed, at 140,000 seed/acre on 30" row seed spacing. A pre-emerge application of 2 pints/acre Enlist One plus 16 ounces/acre Select plus 1.25 pints/acre s-metolachlor was applied on May 17. The field emerged on May 24 to a plant population of 129,000 seed/acre. Initial post emerge herbicide application was made on June 8 of 2 pints/acre Enlist One plus 1 quart/acre glyphosate. A second post emerge herbicide application was made on July 7 of 1 quart/acre glyphosate plus 2 pints/acre Enlist One. Aerial web blight reached threshold and 13.7 ounces/acre Miravis Top was applied for control on August 18. Insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 6 times and harvested on October 11 yielding 81.9 bushels/acre adjusted to 13%.

Lawrence County

The 73 acre field, Bosket fine sandy loam and Crowley silt loam, was located west of Alicia and followed the previous year rice crop. Following spring tillage and fertilizer application of 0-70-120, the field was planted on April 11 with Stine 46EE20, Stine XP treated seed with inoculant, at 140,000 seed/acre on 30" seed spacing. On April 11, 1 quart/acre Gramoxone plus 1.5 pints/acre Boundary was applied for pre-emerge weed control. The field emerged on April 24 to a plant population of 129,000 seed/acre. A single post emerge herbicide application was made on June 1 of 1 quart/acre glyphosate plus 2 pints/acre Enlist One plus 1 pint/acre s-metolachlor. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 3 times and harvested on October 12 yielding 78 bushels/acre adjusted to 13%.

Mississippi County

The 74 acre field, Sharkey-Steele complex, was located south of Dell and followed the previous year soybean crop. Following fall tillage, the field was planted on April 11 with Becks 4991X2, Escalate treated seed, at 140,000 seed/acre on 38" twin-row seed spacing. On April 11, 1 quart/acre Gramoxone plus 1.5 pints/acre Metalic MTZ was applied for pre-emerge weed control. The field emerged on April 20 to a plant population of 132,000 seed/acre. Middles were plowed on May 23 to improve irrigation efficiency. Initial post emerge herbicide application was made on May 31 of 12.8 ounces/acre Engenia plus 1.25 pints/acre s-metolachlor. A second herbicide application was made on June 1 of 1 quart/acre glyphosate. According to in season tissue samples, the field was Potash deficient and 100 pounds/acre of 0-0-60 was applied by air. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 4 times and harvested on October 2 yielding 78.9 bushels/acre adjusted to 13%.

Poinsett County

The 40 acre field, Calloway & Henry silt loam, was located south of Harrisburg and followed the winter wheat crop. A fertilizer application of 0-30-56 was applied prior to wheat planting. Following tillage, the field was drilled on June 21 with Asgrow AG46XF3, Crusier Maxx treated seed, at 140,000 seed/acre on 7.5" row seed spacing. The field emerged on June 27 to a plant population of 109,000 seed/acre. Initial post emerge herbicide application was made on June 29 of 1 quart/acre glyphosate plus 1 quart/acre Liberty plus 1.25 pints/acre s-metolachlor. A second post emerge herbicide application was made on July 6 of 1 quart/acre glyphosate plus 1 quart/acre Liberty plus 3 pints/acre Warrant. A final post emerge herbicide application was made on July 24 of .3 ounces/acre First Rate plus .12 ounces/acre Python plus .5% crop oil concentrate. Corn earworms reached threshold and 8 ounces/acre Besiege was applied for control on August 18. Disease pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 3 times and harvested on October 20 yielding 59.6 bushels/acre adjusted to 13%.

Randolph County

The 39 acre field, Dexter silt loam & Bosket fine sandy loam, was located east of Success and followed the previous year soybean crop. A burndown application of 40 ounces/ace paraquat was applied for winter weed control. Following spring tillage and fertilizer application of 0-0-100-.3B, the field was drilled on May 8 with Pioneer P52A14SE, Crusier Maxx treated seed, at 160,000 seed/acre on 10" seed spacing. The field emerged on May 17 to a plant population of 147,000 seed/acre. Initial post emerge herbicide application was made on May 16 of 2 pints/acre Enlist One plus 22 ounce/acre Roundup PowerMax 3 plus 3.25 ounces/acre Zidua. A second post emerge herbicide application was made on June 8 of 1 quart/acre Liberty plus 2 pints/acre Enlist One plus 1 pint/acre s-metolachlor. Aerial web blight reached threshold and 13.7 ounces/acre Miravis Top was applied for control on July 31. Insect pressure remained below threshold and no treatment was recommended. The field was pivot irrigated 12 times and harvested on October 19 yielding 64.5 bushels/acre adjusted to 13%.

St. Francis County

The 31 acre field, Calloway & Henry silt loam, was located south of Palestine and followed the previous year corn crop. Following spring tillage and fertilizer application of 0-54-108, the field was planted on April 1 with Pioneer P46A20XF, Crusier Max treated seed, at 135,000 seed/acre on 38" twin-row seed spacing. On April 1, 2 ounces/acre Zidua plus 1.5 pints/acre Boundary was applied for pre-emerge weed control. The field emerged on April 13 to a plant population of 108,000 seed/acre. Initial post emerge herbicide application was made on May 17 of 12.8 ounces/acre Engenia plus 14 ounces/acre Outlook. A second herbicide application was made on May 18 of 28 ounces/acre Roundup PowerMax 3. Disease and insect pressure remained below threshold and no treatment was recommended. A harvest aid was applied on August 29 of 10.67 ounces/acre Gramoxone plus 1% NIS. The field was furrow irrigated 4 times and harvested on September 17 yielding 72.3 bushels/acre adjusted to 13%.

White County

The 43 acre field, Roellen silty clay was located south of Higginson and followed the previous year rice crop. Following spring tillage and fertilizer application of 0-60-120, the field was planted on May 15 with Armor 46E50, Crusier Maxx treated seed plus inoculant, at 140,000 seed/acre on 30" row seed spacing. A pre-emerge herbicide was applied on May 15 of 1.25 pints/acre s-metolachlor. The field emerged on May 22 to a plant population of 122,000 plants/acre. A single post emerge herbicide application was made on June 12 of 2 pints/acre Enlist One plus 1 quart/acre glyphosate plus 6 ounces/acre clethodim. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 7 times and harvested on October 10 yielding 62.0 bushels/acre adjusted to 13%.

Yell County

The 33 acre field, Calhoun & Calloway silt loam, was located east of New Neely and followed the previous year soybean crop. Following spring tillage and fertilizer application of 35-90-0, the field was planted on May 10 with Pioneer P48A14E, Crusier Maxx treated seed, at 150,000 seed/acre on 30" row seed spacing. The field emerged on May 15 to a plant population

of 135,000 plants/acre. Initial post emerge herbicide application was made on May 25 of 2 pints/acre Enlist One plus 1 quart/acre glyphosate plus 1.25 pints/acre s-metolachlor. A second herbicide application was made on June 29 of 1 quart/acre glyphosate. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 1 time and harvested on October 9 yielding 46.2 bushels/acre adjusted to 13%.

Southern Fields – Chad Norton

Arkansas County

The 64 acre field, soil types Herbert and Rilla silt loam and Perry and Portland clay, was located north of Bayou Meto and followed the previous year soybean crop. Following spring burn down application of 1 quart/acre Cornerstone, fertilizer application of 0-36-72, according to soil test recommendations, and bedding the field was planted March 29 with Pioneer P45A40LX, Equity seed treatment, at 130,000 seeds/acre on 30" beds. A pre-emergence application of 1 quart/acre Cornerstone plus 1 quart/acre Liberty plus 1 pint/acre Dual Magnum II March 31 was used for emerged and residual weed control. The field emerged April 12 to a plant population of 110,000 plants/acre. Post-emergence applications of 3.2 ounces/acre Zidua plus 1 quart/acre Cornerstone on May 9 and 22 ounces/acre RoundUp PowerMax III June 3 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds thus insecticide and fungicide applications were unwarranted. The field was furrow irrigated 5 times and harvested August 26 yielding 36 bushels/acre adjusted to 13% moisture.

Chicot County

The 62 acre field, soil types Calloway and Henry silt loam, was located southwest of Eudora and followed the previous year soybean crop. Following spring fertilizer application of 0-0-75, according to soil test recommendations, the field was stale seed bed planted April 16 with Asgrow AG46X6, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 38" twin beds. A pre-emergence application of 1 quart/acre paraquat plus 1 quart/acre Intimidator was applied April 17 for emerged and residual weed control. The field emerged April 23 to a plant population of 118,000 plants/acre. A post-emergence application of 12.8 ounces/acre Engenia plus 1.25 pints/acre Dual Magnum II was also utilized for weed control. The field required an application of 6.4 ounces/acre bifenthrin plus .5 pounds/acre acephate August 1 for red-banded stink bug control. Diseases failed to reach treatment threshold, so fungicide application was unwarranted. An application of 1 pint/acre paraquat plus 1 % NIS August 8 was utilized as a harvest aid. The field was furrow irrigated 4 times and harvested August 25 yielding 55.7 bushels/acre adjusted to 13% moisture.

Drew County

The 26 acre field, soil type Portland clay, was located west of Winchester and followed the previous year soybean crop. Following fertilizer application of 0-70-0, according to soil test recommendations, the field was planted April 19 with Asgrow AG46X0, Cruiser Maxx seed treatment, at 160,000 seeds/acre on 30" beds. A pre-emergence application of 24 ounces/acre paraquat plus 3.25 ounces Anthem Max was applied April 20 for emerged and residual weed control. The field emerged May 1 to a plant population of 110,000 plants/acre. After plowing

middles, an application of 1 quart/acre Cornerstone plus 1.25 pints/acre Charger Basic June 1 was also utilized for weed control. Neither insects nor diseases reached treatment threshold, so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 3 times and harvested September 26 yielding 65.9 bushels/acre adjusted to 13% moisture.

Jefferson County

The 40 acre field, soil types Rilla and Hebert silt loam and Perry clay, was located south of Pine Bluff and followed the previous year soybean crop. Following fertilizer application of 0-0-75, according to soil test recommendations, the field was planted March 20 with Pioneer P46A36X, Equity seed treatment, at 120,000 seeds/acre on 38” twin beds. A pre-emergence application of 24 ounces/acre Boundary plus 1 quart/acre paraquat March 23 was used for emerged and residual weed control. The field emerged April 3 to a plant population of 98,000 plants/acre. A post-emergence application of 56.5 ounces/acre Tavium plus .3 ounces/acre First Rate May 9 was also utilized for weed control. The field required an application of 5.12 ounces/acre bifenthrin June 8 for green stink bug control. Diseases failed to reached treatment threshold, so fungicide application was unwarranted. Paraquat at 1 pint/acre plus 1% NIS applied August 14 was utilized as a harvest aid. The field was furrow irrigated 3 times and harvested August 30 yielding 67.1 bushels/acre adjusted to 13% moisture.

Lonoke County

The 73 acre field, soil types Calloway and Immanuel silt loam, was located north of Lonoke and followed the previous year corn crop. Following fall land preparation, spring burndown application of 1 quart/acre Cornerstone, fertilizer application of 0-0-75, according to soil test recommendations, and bedding the field was planted May 4 with Asgrow AG46F3, Cruiser Maxx seed treatment, at 136K seeds/acre. A pre-emergence application of 1 pint/acre Charger Basic was used for residual weed control. The field emerged May 11 to a plant population of 118K plants/acre. A post-emergence application of 1 quart/acre Transline plus 1 quart/acre Prefix was also utilized for weed control. Neither insects nor diseases reached treatment threshold, so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 5 times and harvested October 10 yielding 64.5 bushels/acre adjusted to 13% moisture.

Table 1. Agronomic information for the 2023 Soybean Research Verification Fields.

County	Variety	Field size (ac)	Previous crop	Production system[1]	Seeding rate (seeds/acre)	Stand density (plants/ac)	Planting date	Emergence date	Harvest date	Yield adj. to 13% moisture (bu/ac)
Arkansas	Pioneer P45A40LX	64	Soybean	ESI	130K	110K	3/29	4/12	8/26	36.0
Chicot	Asgrow AG46X6	62	Soybean	ESI	140K	118K	4/16	4/23	8/25	55.7
Cross	Virtue 4520S	70	Soybean	FSI	120K	89K	5/8	5/16	10/9	41.2
Drew	Asgrow AG46X0	26	Soybean	ESI	160K	110K	4/19	5/1	9/26	65.9
Greene	Innvictis B4841E	65	Corn	FSI	140K	109K	5/8	5/15	10/17	63.7
Jackson	Pioneer P48A14E	32	Corn	FSI	140K	129K	5/17	5/24	10/11	81.9
Jefferson	Pioneer P46A36X	40	Soybean	ESI	120K	98K	3/22	4/3	8/30	67.1
Lawrence	Stine 46EE20	73	Rice	ESI	140K	129K	4/11	4/24	10/12	78.0
Lonoke	Asgrow AG46XF3	73	Corn	FSI	136K	118K	4/27	5/11	10/10	64.5
Mississippi	Becks 4991X2	74	Soybean	ESI	140K	132K	4/11	4/20	10/2	78.9
Poinsett	Asgrow AG46XF3	40	Wheat	LSI	140K	109K	6/21	6/27	10/20	59.6
Randolph	Pioneer P52A14SE	39	Soybean	FSI	160K	147K	5/8	5/17	10/19	64.5
St. Francis	Pioneer 46A20LX	31	Corn	ESI	135K	108K	4/1	4/13	9/17	72.3
White	Armor 46-E50	43	Rice	FSI	140K	122K	5/15	5/22	10/10	62.0
Yell	Pioneer P48A14E	33	Soybean	FSI	150K	135K	5/10	5/15	10/9	46.2
Average		**51**			**139K**	**118K**	**4/27**	**5/6**	**9/30**	**62.5**

[1]Production Systems: ESI = Early Season Irrigated; FSI = Full Season Irrigated; FSNI = Full Season Non-irrigated; LSI = Late Season Irrigated; LSNI = Late Season Non-irrigated

State Avg. – 62.5 bu/ac

Table 2. Soil tests results, applied fertilizer and soil classification for the 2023 Soybean Research Verification Fields

	Soil Test Results (ppm)			Applied Fertilize N-P-K (lb/acre)	Soil Classification
County	pH	P	K	Pre-plant	
Arkansas	6.6	34	91	0-36-72	Herbert and Rilla silt loam
Chicot	7.2	44	101	0-0-75	Calloway and Henry silt loam
Cross	6.4	31	133	0-30-60	Crowley silt loam
Drew	6.2	9	323	0-70-0	Portland clay
Greene	5.8	49	129	0-0-60	Hillemann silt loam
Jackson	6.0	17	167	0-0-75	Egam silt loam
Jefferson	7.1	36	103	0-0-75	Rilla and Herbert silt loam, Perry clay
Lawrence	6.3	13	88	0-70-120	Bosket fine sandy loam & Crowley silt loam
Lonoke	6.5	48	101	0-0-75	Calloway and Immanuel silt loam
Mississippi	7.1	29	99	0-0-60	Sharkey- Steele complex
Poinsett	6.6	29	106	0-30-56	Calloway silt loam & Henry silt loam
Randolph	6.7	57	102	0-0-100-.3B	Bosket fine sandy loam & Dexter silt loam
St. Francis	7.4	12	74	0-54-108	Calloway silt loam & Henry silt loam
White	6.3	16	62	0-60-120	Roellen silty clay
Yell	6.1	8	244	35-90-0	Calhoun silt loam & Calloway silt loam

Table 3. Herbicide rates and timings for 2023 Soybean Research Verification Program fields by county.

	Herbicide	
County	Burndown/Pre-emergence	Post-emergence
Arkansas	Burndown; 1 qt. Cornerstone Pre-emerge; 1 qt. Cornerstone + 1 qt. Liberty + 1 pt. Dual Magnum II	1st; 1 qt. Cornerstone + 3.2 oz. Zidua WG 2nd; 22 oz. RoundUp PowerMax III + 1.2 pt. Dual Magnum II
Chicot	Pre-emerge; 1 qt. paraquat + 1 qt. Intimidator	1st ; 12.8 oz. Engenia + 1.25 pt. Dual Magnum II Harvest Aid; 1 pt. paraquat + 1% NIS
Cross	Pre-emerge: 5 oz. Verdict + 8 oz. Outlook	1st. 2.25 pts. Prefix + 8 oz. Select
Drew	Pre-emerge; 24 oz. paraquat + 3.25 Anthem Max	1 qt. Cornerstone + 1.25 pt. Charger Basic
Greene	Burndown: 40 oz. glyphosate	1st. 1 qt. glyphosate + 2 pts. Enlist One + 2.5 pts. Warrant 2nd. 1 qt. glyphosate + 2 pts. Enlist One + 1.25 pts. s-metolachlor
Jackson	Pre-emerge: 2 pts. Enlist One + 16 oz. Select + 1.25 pts. s-metolachlor	1st. 1 qt. glyphosate + 2 pts. Enlist One 2nd. 1 qt. glyphosate + 2 pts. Enlist One
Jefferson	Pre-emerge; 1 qt. paraquat + 24 oz. Boundary	1st; 56.5 oz. Tavium + .3 oz. First Rate Harvest Aid; 1 pt. paraquat + 1% NIS
Lawrence	Pre-emerge: 1.5 pts. Boundary + 1 qt. Gramoxone	1st. 1 qt. glyphosate + 2 pts. Enlist One + 1 pt. s-metolachlor
Lonoke	Burndown; 1 qt. Cornerstone Pre-emerge; 1 pt. Charger Basic	1 qt. Transline + 1 qt. Prefix
Mississippi	Pre-emerge: 1.5 pts. Metalic MTZ + 1 qt. Gramoxone	1st. 12.8 oz. Engenia + 1.25 pts. s-metolachlor 2nd 1 qt. glyphosate
Poinsett		1st. 1 qt. glyphosate + 1qt. Liberty + 1.25 pts. s-metolachlor 2nd. 1 qt. glyphosate + 1qt. Liberty + 3 pts. Warrant 3rd. .3 oz Firstrate + .12 python + .5% COC
Randolph		1st. 2 pts. Enlist One + 22 oz. Round upPower Max 3 + 3.25 oz. Zidua 2nd 2 pts. Enlist One + 1 qt. Liberty + 1 pt. s-metolachlor
St. Francis	Pre-emerge: 1.5 pts. Boundary + 2 oz. Zidua	1st. 12.8 oz. Engenia + 14 oz. Outlook 2nd. 28 oz. Roundup Power Max 3 Harvest Aid: 10.67 oz Gramoxone
White	Pre-emerge: 1.25 pts. s-metolachlor	1st. 1 qt. glyphosate + 2 pts. Enlist One + 6 oz. clethodim
Yell		1st. 1 qt. glyphosate + 2 pts. Enlist One 2nd 1 qt. glyphosate + 1.25 pts. s-metolachlor

Table 4. Fungicide and insecticides applications in 2023 Soybean Research Verification fields by county.

County	Aerial Web Blight	Frogeye	Bollworm/Defoliators	Stink Bug
Arkansas				
Chicot				6.4 oz. bifenthrin + .5 lb. acephate
Cross				
Drew				
Greene				
Jackson	13.7 oz. Miravis Top			
Jefferson				5.12 oz. bifenthrin
Lawrence				
Lonoke				
Mississippi				
Poinsett			8 oz. Besiege	
Randolph	13.7 oz. Miravis Top			
St. Francis				
White				
Yell				

Table 5. Irrigation and rainfall information for the 2023 Soybean Research Verification Fields.

County	Irrigation Type	Number of Irrigations	Irrigation Water Used (acre inches/acre)*	Rainfall (in)
Arkansas	Furrow	5		8.7
Chicot	Furrow	4		11.0
Cross	Furrow	2		17.1
Drew	Furrow	3		11.9
Greene	Furrow	3		16.9
Jackson	Furrow	6		11.6
Jefferson	Furrow	3		10.0
Lawrence	Furrow	3		15.0
Lonoke	Furrow	5	13.6	10.4
Mississippi	Furrow	4	7.6	14.3
Poinsett	Furrow	3		9.6
Randolph	Pivot	12	8.4	14.5
St. Francis	Furrow	4		13.1
White	Furrow	7	19.6	8.7
Yell	Furrow	1		16.4

*Irrigation water use determined using flow meters installed for entire season. Not all fields had flow meters.

2023 Soybean Research Verification Economic Analysis

This section provides information on production costs and returns for the 2023 SRVP. Records of field operations on each field provided the basis for estimating production costs. The field records were compiled by the SRVP coordinators, county extension agents, and cooperators. Cooperators/county agents for 15 fields were identified for the 2023 program. Production data from the 15 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 cost type.

Operating costs 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 2023 Soybean Crop Enterprise Budgets published by the UA Division of Agriculture Cooperative Extension Service, the Mississippi State Budget Generator program, Southeast Arkansas input providers, and information provided by 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.

Fixed 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, fixed costs, total costs, operating and total costs per bushel, and returns above operating and total specified costs are presented, by field, region, and statewide in Table 6. Costs in this report do not include management, land costs, or other expenses and fees not associated with production. Averages in the final row of Table 6 are simple averages across all SRVP fields in the state program. Averages by North and South geographic areas are also provided. Operating costs per acre range from $257.21/acre for Drew County to $518.20/acre for Randolph County, while operating costs per bushel range from $3.81/bu. for Mississippi County to $10.08/bu. for Arkansas County. Total costs per acre (operating plus fixed) range from $340.10/acre for Drew County to $647.99/acre for Randolph County, and total costs per bushel range from $4.81/bu. for Mississippi County to $11.87/bu. for Arkansas County. Returns to operating costs range from $120.85/acre for Arkansas County to $759.55/acre for Mississippi County. Returns to total costs range from $56.54 for Arkansas County to $681.02/acre for Mississippi County.

A statewide summary of yield, soybean price, revenues, and expenses by expense type across all SRVP fields is presented in Table 7. Averages by North and South geographic areas are also provided in Table 7. Averages in the final three columns of the table are simple averages for the SRVP fields represented in that table. The Average Soybean Yield for the 2023 SRVP is 62.5 bushels, but ranged from 36.0 bushels/acre for Arkansas County to 81.9 bushels/acre for Jackson County. The second highest yield is Mississippi County at 78.9 bushels/acre with two additional fields exceeding the 70.0 bushels/acre yield level in Lawrence County and St. Francis County. Market Price for soybean used in this analysis is $13.44/bushel, the Arkansas average cash price estimated from January 1, 2023 through October 31, 2023 using daily price quotes of the cash market price or cash booking price. The 2023 price is $1.89/bushel lower than the

same period average in 2023. Use of market prices across this entire period of time is justified since we assume Arkansas producers set the price for portions of their crop at various times throughout the year.

The Average Total Operating Expense is calculated to be $356.76/acre for the 15 SRVP fields in 2023 (Table 7). Average Total Operating Expense is $20.66/acre higher in 2023 than 2022. Seed remains the largest share of operating expenses on average (21.86%) although its portion decreased 2.13% from the 2022 percentage share. The second highest percentage of operating expenses comes from herbicides (19.03%) with fertilizers & nutrients third (18.97%). All other categories were less than 7.00% of operating expenses. The 2023 Average Return to Operating Expenses for the 15 fields is $483.24/acre, a decrease of $179.81/acre. The 2023 Average Return to Operating Expenses ranges from $120.852/acre for Arkansas County to $759.55/acre for Mississippi County. The Average Return to Total Specified Expenses (Total Costs) for the 15 fields was $398.37/acre, a decrease of $165.42/acre from 2022, and ranging from $56.54/acre for Arkansas County to $681.02/acre for Mississippi County.

Table 6. Operating Costs, Total Costs, and Returns for Soybean Research Verification Program, 2023

County	Operating Costs ($/acre)	Operating Costs ($/bushel)	Returns to Operating ($/acre)	Fixed Costs ($/acre)	Total Costs ($/acre)	Returns to Total Costs ($/acre)	Total Costs per Bushel ($/bushel)
Cross	302.12	7.33	251.61	93.47	395.59	158.14	9.60
Greene	315.54	4.95	540.59	93.32	408.86	447.27	6.42
Jackson	384.82	4.70	715.92	89.96	474.78	625.96	5.80
Lawrence	473.14	6.07	572.23	104.93	578.07	470.25	7.41
Lonoke	299.61	4.65	567.27	87.77	387.38	479.50	6.01
Mississippi	300.86	3.81	759.55	78.53	379.39	681.02	4.81
Poinsett	430.81	7.23	370.22	78.89	509.70	291.32	8.55
Randolph	518.20	8.03	348.68	129.79	647.99	218.89	10.05
St. Francis	414.95	5.74	556.76	62.09	477.04	494.67	6.60
White	410.67	6.62	422.61	117.26	527.94	305.34	8.52
Yell	304.62	6.59	316.31	60.18	364.80	256.13	7.90
North Average	**377.76**	**5.98**	**492.89**	**90.56**	**468.32**	**402.59**	**7.42**
Arkansas	362.99	10.08	120.85	64.31	427.30	56.54	11.87
Chicot	287.33	5.16	461.27	68.93	356.27	392.34	6.40
Drew	257.21	3.90	628.49	82.89	340.10	545.60	5.16
Jefferson	285.51	4.25	616.31	60.78	346.29	555.54	5.16
South Average	**298.26**	**5.85**	**456.73**	**69.23**	**367.49**	**387.51**	**7.15**
SRVP Program State Average 2023	**356.56**	**5.94**	**483.24**	**84.87**	**441.43**	**398.57**	**7.35**

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2023 (1)						
	Arkansas	Chicot	Cross	Drew	Greene	Jackson
Receipts						
Yield (bu.)	36.00	55.70	41.20	65.90	63.70	81.90
Market Price	13.44	13.44	13.44	13.44	13.44	13.44
Total Crop Revenue	483.84	748.61	553.73	885.70	856.13	1100.74
Seed	79.30	77.00	53.20	57.00	84.00	84.00
Fertilizers & Nutrients	45.90	31.13	70.43	31.15	41.50	51.88
Herbicides	112.44	56.81	33.80	38.14	84.40	86.10
Insecticides	0.00	10.54	0.00	0.00	0.00	0.00
Fungicides	0.00	0.00	0.00	0.00	0.00	26.72
Other Chemicals	0.00	1.32	0.00	0.00	0.00	0.00
Custom Applications	40.00	16.00	24.00	0.00	0.00	16.00
Diesel Fuel	11.80	16.97	34.07	26.87	22.66	18.73
Repairs & Maintenance	17.44	17.22	17.65	18.93	18.65	19.16
Irrigation Energy Costs	10.50	10.63	21.26	31.89	10.54	19.90
Labor, Field Activities	5.90	6.13	8.36	7.33	6.64	6.90
Interest	11.86	9.08	9.75	7.94	9.94	12.08
Other Inputs & Fees, Pre-Harvest	15.68	15.68	15.68	15.68	15.68	15.68
Post-harvest Expenses	12.17	18.83	13.93	22.27	21.53	27.68
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	362.99	287.33	302.12	257.21	315.54	384.82
Returns to Operating Expenses	120.85	461.27	251.61	628.49	540.59	715.92
Capital Recovery & Fixed Costs	64.31	68.93	93.47	82.89	93.32	89.96
Total Specified Expenses	427.30	356.27	395.59	340.10	408.86	474.78
Returns to Specified Expenses	56.54	392.34	158.14	545.60	447.27	625.96
Operating Expenses/Yield Unit	10.08	5.16	7.33	3.90	4.95	4.70
Total Expenses/Yield Unit	11.87	6.40	9.60	5.16	6.42	5.80

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2023 (2) - CONTINUED						
	Jefferson	Lawrence	Lonoke	Mississippi	Poinsett	Randolph
Receipts						
Yield (bu.)	67.10	78.00	64.50	78.90	59.60	64.50
Market Price	13.44	13.44	13.44	13.44	13.44	13.44
Total Crop Revenue	901.82	1048.32	866.88	1060.42	801.02	866.88

Seed	66.00	84.00	82.96	77.00	85.40	84.00
Fertilizers & Nutrients	31.13	149.75	31.13	41.50	67.52	69.76
Herbicides	71.54	67.65	36.92	63.46	109.70	104.36
Insecticides	5.79	0.00	0.00	0.00	22.00	0.00
Fungicides	0.00	0.00	0.00	0.00	0.00	26.17
Other Chemicals	1.40	0.00	0.00	0.00	0.00	0.00
Custom Applications	16.00	24.00	32.00	8.00	40.00	40.00
Diesel Fuel	15.04	33.60	26.31	21.15	21.64	13.91
Repairs & Maintenance	15.51	19.20	17.73	17.23	17.65	22.09
Irrigation Energy Costs	10.54	31.89	17.56	14.05	10.54	96.88
Labor, Field Activities	5.32	8.75	8.12	6.86	6.65	6.77
Interest	8.89	15.21	9.39	9.27	13.89	16.79
Other Inputs & Fees, Pre-Harvest	15.68	15.68	15.68	15.68	15.68	15.68
Post-harvest Expenses	22.68	26.36	21.80	26.67	20.14	21.80
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	285.51	476.09	299.61	300.86	430.81	518.20
Returns to Operating Expenses	616.31	572.23	567.27	759.55	370.22	348.68
Capital Recovery & Fixed Costs	60.78	104.93	87.77	78.53	78.89	129.79
Total Specified Expenses	346.29	581.02	387.38	379.39	509.70	647.99
Returns to Specified Expenses	555.54	467.30	479.50	681.02	291.32	218.89
Operating Expenses/Yield Unit	4.25	6.10	4.65	3.81	7.23	8.03
Total Expenses/Yield Unit	5.16	7.45	6.01	4.81	8.55	10.05

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2023 (3) - CONTINUED

	St. Francis	White	Yell	**North Average**	**South Average**	**SRVP Program State Average**
Receipts						
Yield (bu.)	72.30	62.00	46.20	64.80	56.18	62.50
Market Price	13.44	13.44	13.44	13.44	13.44	13.44
Total Crop Revenue	971.71	833.28	620.93	870.91	754.99	840.00

Seed	81.98	84.00	89.88	80.95	69.83	77.98
Fertilizers & Nutrients	128.10	140.91	83.27	79.61	34.83	67.67
Herbicides	70.40	37.46	45.16	67.22	69.73	67.89
Insecticides	0.00	0.00	0.00	2.00	4.08	2.56
Fungicides	0.00	0.00	0.00	4.81	0.00	3.53
Other Chemicals	0.00	0.00	0.00	0.00	0.68	0.18
Custom Applications	32.00	8.00	0.00	20.36	18.00	19.73
Diesel Fuel	13.03	34.85	13.88	23.08	17.67	21.63
Repairs & Maintenance	15.76	18.52	14.88	18.05	17.28	17.84
Irrigation Energy Costs	15.39	26.93	10.63	25.05	15.89	22.61
Labor, Field Activities	4.96	10.19	5.85	7.28	6.17	6.98
Interest	13.21	13.18	9.77	12.04	9.44	11.35
Other Inputs & Fees, Pre-Harvest	15.68	15.68	15.68	15.68	15.68	15.68
Post-harvest Expenses	24.44	20.96	15.62	21.90	18.99	21.13
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	414.95	410.67	304.62	378.03	298.26	356.76
Returns to Operating Expenses	556.76	422.61	316.31	492.89	456.73	483.24
Capital Recovery & Fixed Costs	62.09	117.26	60.18	90.56	69.23	84.87
Total Specified Expenses	477.04	527.94	364.80	468.59	367.49	441.63
Returns to Specified Expenses	494.67	305.34	256.13	402.32	387.50	398.37
Operating Expenses/Yield Unit	5.74	6.62	6.59	5.98	5.85	5.94
Total Expenses/Yield Unit	6.60	8.52	7.90	7.43	7.15	7.35