2020
University of Arkansas
Soybean Research Verification Program

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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, 2020

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INTRODUCTION

The 2020 growing season was the thirty sixth 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.

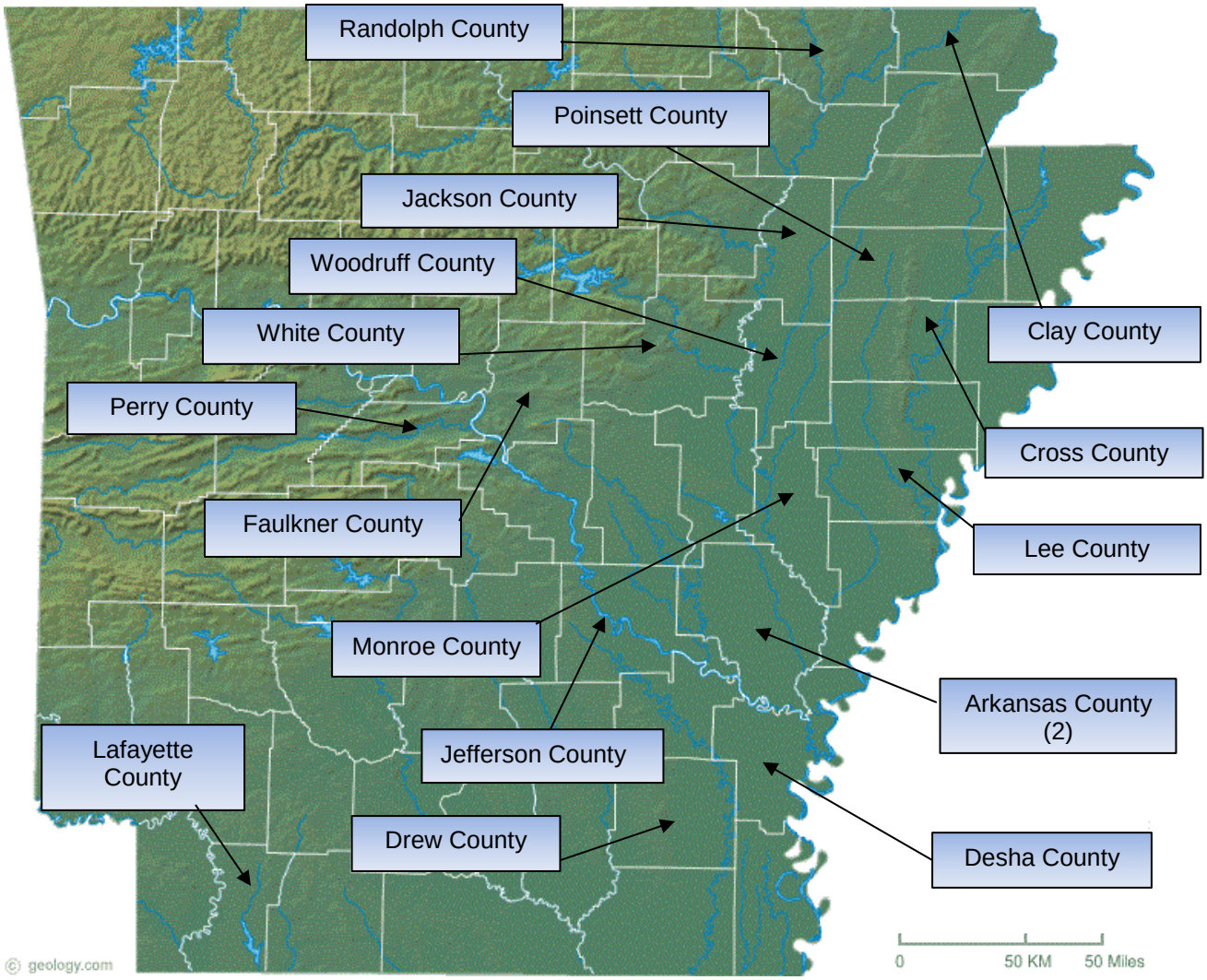
To promote timely implementation of cultural and management practices among soybean growers.

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. Seventeen farms were enrolled in the SRVP in 2020. The fields were located on commercial farms ranging in size from 28 to 140 acres. The average field size was 59 acres.

The 2020 SRVP fields were conducted in Arkansas (2), Clay, Cross, Desha, Drew, Faulkner, Jackson, Jefferson, Lafayette, Lee, Monroe, Perry, Poinsett, Randolph, White, and Woodruff counties. Seven different Roundup Ready 2 Xtend® varieties (Armor 46-D08, Asgrow AG46X0, Asgrow AG46X6, Asgrow AG48X9, Local Seed LS5386X, Morsoy 4846RXT, and Pioneer P42A43X.), three LibertyLink® varieties (DynaGro 49L65, Pioneer P45A29L, and Pioneer P47A76L), three Enlist E3® (Delta Grow DG48E10, Delta Grow DG48E49, and Pioneer P48T22E) and one conventional variety (NSGA DrewSoy 5.0) 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 2020 Soybean Research Verification Fields



FIELD REVIEWS

Northern Fields – Christopher Elkins

Clay County

The 39 acre field, soil type Falaya silt loam, was located in Pollard and followed the previous year corn crop. Following land preparation, the field was planted on May 20th with Morsoy 4846 RXT, with Innovate seed treatment and Exceed inoculant, at 130,000 seeds/acre on 30" beds. A pre-emerge herbicide of 1.25 pints/acre of s-metolachlor plus 0.3 pounds/acre of Metribuzin was applied on May 20th. The field emerged on May 27th to a plant stand of 114,000 plants/acre. A post emerge herbicide application of 0.33 ounces/acre of Classic plus 16 ounces/acre of Outlook plus 1 quart/acre of Glyphosate was applied on June 24th. Disease and insect pressure remained below threshold and did not warrant treatment. The field was furrow irrigated 5 times and harvested on October 17th yielding 65.3 bushels/acre adjusted to 13% moisture.

Cross County

The 96 acre field, soil types Crowley and Hillemann silt loam, was located west of Hickory Ridge and followed the previous year rice crop. Following spring tillage and fertilizer application of 0-60-75, according to soil test recommendations, the field was drilled on June 1 with Pioneer 48T22E treated seed, at 180,000 seed/acre on 7.5"seed spacing. On June 4, 1.5 pints/acre Galvan was applied for pre-emerge weed control. The field emerged on June 9 to a plant population of 129,000 plants/acre. A single herbicide application was made on July 9 of 1 quart/acre glyphosate plus 1 quart/acre Enlist. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 5 times and harvested on November 1 yielding 48.5 bushels/acre adjusted to 13% moisture.

Faulkner County

The 54 acre field, soil type Perry clay, was located west of Conway and followed the previous year soybean crop. A burndown herbicide application of 1 quart/acre Ledger plus 1 quart/acre glyphosate plus 1 ounce/acre Sharpen was applied on June 1. The field was planted on June 5 with Delta Grow 48E10, Cruiser Maxx seed treatment, at 150,000 seed/acre on 30" seed spacing. The field emerged on June 15 to a plant population of 105,000 plants/acre. On July 2, 1 quart/acre Interline plus 1 quart/acre Enlist One was applied for broadleaf and grass control. A second post emerge herbicide control was applied on July 27 consisting of 1 quart/acre glyphosate and 1 quart/acre Enlist One. On August 8 corn earworm pressure reached treatment level and 1.28 ounces/acre Heligen was applied for control. Disease pressure remained below threshold and no treatment was recommended. The dryland field was harvest on November 6 yielding 34 bushels/acre adjusted to 13% moisture.

Jackson County

The 19 acre field, soil types Amagon and Forestdale silt loam, was located west of Newport and followed the previous year rice crop. Following spring tillage and fertilizer application of 1 ton poultry litter, according to soil test recommendations, the field was planted on June 1 with Delta Grow 4849, with inoculant, at 140,000 seed/acre on 30" seed spacing. On June 2, 1.5 pints/acre Enlist plus 1 quart/acre glyphosate plus 1 pint/acre s-metolachlor was applied for burndown and residual control. The field emerged on June 6 to a plant population of

97,000 plants/acre. A second herbicide application was made on June 25 of 1 quart/acre Roundup PowerMax to control escaped grasses. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 4 times and harvested on November 4 yielding 59.6 bushels/acre adjusted to 13% moisture.

Perry County

The 52 acre field, soil type Perry clay, was located west of Newport and followed the previous year soybean crop. Following spring tillage, the field was planted on June 17 with Local Seed 5386x, Cruiser Maxx seed treatment and inoculant, at 140,000 seed/acre on 30" seed spacing. On June 19, 40 ounce/acre paraquat plus 1.25 pints/acre s-metolachlor was applied for burndown and residual weed control. The field emerged on June 25 to a plant population of 124,000 plants/acre. A second herbicide application was made on July 13 of 1 quart/acre glyphosate plus 1.5 pints/acre Blazer plus .5 ounces/acre Classic plus 1 pint/acre s-metolachlor. Insect pressure increased late in the season and reached treatment threshold and an application of 1.9 ounces/acre lambda-cyhalothrin was applied for control. Disease pressure remained below threshold and no treatment was recommended. This field was Pivot irrigated 3 times and harvested on November 5 yielding 59.4 bushels/acre adjusted to 13% moisture.

Poinsett County

The 70 acre field, soil type Hillemann silt loam, was located north of Fisher and followed the previous year soybean crop. Following spring tillage and fertilizer application of 0-50-100, the field was drilled on May 3 with DrewSoy 5.0 at 150,000 seed/acre on 7.5" spacing and 3 ounces/acre Fierce was applied for residual weed control. The field emerged on May 13 to a plant population of 125,000 plants/acre. On June 13, 8 ounces/acre Intensity plus 1.25 pints/acre s-metolachlor was applied for post emerge weed control and residual. Disease and insect pressure remained below threshold and no treatment was recommended. The field was flood irrigated 2 times and harvested on October 8th yielding 64.5 bushels acre adjusted to 13% moisture.

Randolph County

The 29 acre field, soil type Jackport silty clay and Overcup silt loam, was located in O'kean and followed the previous year rice crop. Following spring tillage and fertilizer application of 0-80-50, according to soil test recommendations, the field was planted on June 6 with Pioneer 47A76L, with Crusier Maxx seed treatment, at 140,000 seed/acre on 30" seed spacing. The field emerged on June 14 to a plant population of 125,000 plants/acre. On June 25, 1 quart/acre Liberty plus 8 ounces/acre Intensity was applied for broadleaf and grass control. A second Herbicide application of 1 quart/acre Liberty was applied on July 15. Corn earworm pressure reached threshold and was treated on August 8 with 1.28 ounces/acre Heligen. Disease pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 3 times and harvested on October 16 yielding 41.4 bushels/acre adjusted to 13% moisture.

White County

The 24 acre field, soil type Calloway silt loam, was located at Russell and followed the previous year soybean crop. Following spring tillage and fertilizer application of 0-0-120, according to soil test recommendations, the field was planted on June 3 with Pioneer 47A76L, Seed Shield seed treatment, at 140,000 seed/acre on 30" seed spacing and 3 ounces/acre

Fierce plus 7 ounces/acre MTZ was applied for residual weed control. The field emerged on June 9 to a plant population of 112,000 plants/acre. On June 20, 8 ounces/acre Clethodim was applied for grass control and on July 8, 36 ounce/acre Glufosinate 280 was applied for weed control. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 5 times and harvested on November 3 yielding 40.8 bushels/acre adjusted to 13% moisture.

Woodruff County

The 105 acre field, Soil type Calhoun silt loam and Calloway silt loam, was located northeast of McCory and followed the previous year rice crop. Following spring tillage and fertilizer application of 0-80-120-.5B, according to soil test recommendations, the field was planted on June 13 with Dyno Gro 49L65, Apron Max plus Inoculant, at 160,000 seed/acre on 30" seed spacing. The field emerged on June 23 to a plant population of 115,000 plants/acre. On July 6, 40 ounces/acre Glufosinate 280 plus 1.25 pints/acre s-metolachlor was applied for weed control and pre-emerge. A second herbicide application was made on July 27 with 32 ounces/acre Glufosinate 280. Corn earworm pressure reached economic threshold and was treated on August 20 with 6 ounces/acre Intrepid Edge. Disease pressure did not reach threshold and no treatment was recommended. The field was furrow irrigated 3 times and harvested on November 5 yielding 41.9 bushels/acre adjusted to 13% moisture.

Southern Fields – Chad Norton

Arkansas County 1

The 30 acre field, soil types Stuttgart and Dewitt silt loam, was located south of Stuttgart and followed the previous year rice crop. After fall and spring land preparation and fertilizer application of 0-0-60, according to soil test recommendations, the field was planted May 30 with Asgrow AG46X6, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 30" beds. A pre-emergence application of 1.25 pints/acre plus 24 ounces/acre RoundUp PowerMax was applied June 2 for weed control. The field emerged June 8 to a plant population of 115,000 plants/acre. A post-emergence application of 3 pints/acre Warrant plus 1 quart/acre Cornerstone on June 30 was also utilized for weed control. The field required a 1.28 ounces/acre Heligen plus 1 % COC application August 6 for corn earworm control. Diseases failed to reach treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 5 times and harvested October 18 yielding 52.5 bushels/acre adjusted to 13% moisture.

Arkansas County 2

The 30 acre field, soil types Hebert and Rilla silt loam, was located southwest of Lodge Corner and followed the previous year soybean crop. Following spring fertilizer application of 0-0-60, according to soil test recommendations, and bedding the field was planted April 15 with Pioneer P45A29L, Cruiser Maxx seed treatment, at 120,000 seeds/acre on 30" beds. A pre-emergence application of 1.5 pints/acre Boundary was applied April 16 for weed control. The field emerged April 28 to a plant population of 100,000 plants/acre. A post-emergence application of 1 quart/acre Liberty plus 2 ounces/acre Zidua WG plus 1.45 ounces/acre Pursuit May 29 was utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 3 times and harvested October 3 yielding 75.2 bushels/acre adjusted to 13% moisture.

Desha County

The 50 acre field, soil type Sharkey and Desha clays, was located south of Rohwer and followed the previous year soybean crop. After spring fertilizer application of 0-0-90, according to soil test recommendations, the field was no till planted May 5 with Asgrow AG46X6, Cruiser Maxx seed treatment, at 150,000 seeds/acre on 38" twin beds. A pre-emergence application of 2 ounces/acre Valor plus 1.5 pints/acre Me-Too-Lachlor was used for weed control. The field emerged May 18 to a plant population of 148,000 plants/acre. Post-emergence applications of 1 quart/acre Cornerstone May 26 and 1.5 pints/acre Flexstar plus 1.2 pints/acre Dual Magnum II plus 1 quart/acre Cornerstone June 18 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 4 times and harvested October 4 yielding 72 bushels/acre adjusted to 13% moisture.

Drew County

The 60 acre field, soil type Portland clay, was located southwest of Tillar and followed the previous year rice crop. Following spring land preparation and fertilizer application of 0-90-45, according to soil test recommendations, the field was planted June 3 with Armor 46-D08, Cruiser Maxx seed treatment, at 160,000 seeds/acre on 38" twin beds. The field emerged June 9 to a plant population of 100,000 plants/acre. After plowing middles, applications of 1 quart/acre Prefix plus 1 quart/acre Cornerstone June 20 and 1 quart/acre Cornerstone plus 1 pint/acre Dual Magnum II plus 1 pint/acre Ultra Blazer July 27 were utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 2 times and harvested November 4 yielding 54 bushels/acre adjusted to 13% moisture.

Jefferson County

The 86 acre field, soil types Rilla, Roxana and McGehee silt loam, was located south of Pastoria and followed the previous year corn crop. Following fall land preparation, planting winter cover crop of cereal rye and vetch, spring burndown application of 40 ounces/acre Cornerstone plus 8 ounces/acre 2,4-D plus 1.5 ounces/acre Afforia, and spring fertilizer application of 0-0-120, according to soil test recommendations, the field was planted April 18 with Pioneer P42A43X, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 30" beds. A pre-emergence application of 1 quart/acre Boundary April 19 was used for weed control. The field emerged April 29 to a plant population of 128,000 plants/acre. A post-emergence application of 1 quart/acre Cornerstone plus 2 ounces/acre Zidua WG May 21 was also utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. Gramoxone at 1 pint/acre plus 1% NIS applied September 8 was utilized as a harvest aid. The field was furrow irrigated 6 times and harvested September 23 yielding 74 bushels/acre adjusted to 13% moisture.

Lafayette County

The 58 acre field, soil types Billyhaw clay and Caspiana silt loam, was located north of Gin City and followed the previous year corn crop. Following fall land preparation, spring burndown/pre-emergence application of .67 pounds/acre Metribuzin 75 plus 3 ounces/acre Fierce plus 1 quart/acre Credit, and no fertilizer application, according to soil test recommendations, the field was planted May 12 with Asgrow AG46X0, Cruiser Maxx seed treatment, at 120K seeds/acre. The field emerged May 20 to a plant population of 100K

plants/acre. A post-emergence application of 26 ounces/acre RoundUp PowerMax plus 3.25 ounces/acre Zidua SC was also utilized for weed control. The field required a 6.4 ounces/acre Brigade plus .5 pounds/acre acephate application for stink bug control. Diseases failed to reach treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 2 times and harvested October 7 yielding 64.3 bushels/acre adjusted to 13% moisture.

Lee County

The 39 acre field, soil types Calloway and Hillemann silt loam, was located in New Salem and followed the previous year soybean crop. Following spring land preparation and fertilizer application of 0-54-108, according to soil test recommendations, the field was planted May 14 with Asgrow AG48X9, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 38” twin row beds. A pre-emergence application of 1.33 pints/acre Boundary plus 2 ounces/acre Zidua WG was used for weed control. The field emerged May 20 to a plant population of 123,000 plants/acre. A post-emergence application of 1 quart/acre Cornerstone plus .4 ounces/acre First Rate plus 12 ounces/acre Outlook June 15 was also utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. The field was furrow irrigated 4 times and harvested October 2 yielding 62 bushels/acre adjusted to 13% moisture.

Monroe County

The 70 acre field, soil type Foley-Calhoun-Bonn Complex, was located northwest of Blackton and followed the previous year rice crop. After fall and spring land preparation, fertilizer application of 0-0-90, according to soil test recommendations, and bedding, the field was planted May 16 with Asgrow AG46X6, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 30” rows. A pre-emergence application of 1 quart/acre Cornerstone plus 1 pint/acre Dual Magnum II May 17 was used for weed control. The field emerged May 23 to a plant population of 137,000 plants/acre. Post-emergence applications of 22 ounces/acre RoundUp PowerMax plus 1.33 pints/acre Dual Magnum II June 16 and 22 ounces/acre RoundUp PowerMax June 30 were 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 28 yielding 67 bushels/acre adjusted to 13% moisture.

Table 1. Agronomic information for the 2020 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 1	Asgrow AG46X6	38	Rice	LSI	140K	115K	5/30	6/8	10/18	52.5
Arkansas 2	Pioneer P45A29L	30	Soybean	ESI	125K	100K	4/15	4/28	10/3	75.2
Clay	Morsoy 4846RXT	39	Corn	FSI	130K	114K	5/20	5/27	10/17	65.3
Cross	Pioneer P48T22E	96	Rice	LSI	180K	129K	6/1	6/9	11/1	48.5
Desha	Asgrow AG46X6	50	Soybean	FSI	150K	148K	5/5	5/18	10/4	72
Drew	Armor 46-D08	60	Rice	LSI	160K	100K	6/3	6/9	11/4	54
Faulkner	Delta Grow DG48E10	54	Soybean	LSNI	150K	105K	6/5	6/15	11/6	34
Jackson	Delta Grow DG48E49	19	Rice	LSI	140K	97K	6/1	6/6	11/4	59.6
Jefferson	Pioneer P43A42X	86	Corn	ESI	140K	128K	4/18	4/29	9/23	74
Lafayette	Asgrow AG46X0	58	Corn	FSI	120K	100K	5/12	5/20	10/7	64.3
Lee	Asgrow AG48X9	39	Soybean	FSI	140K	123K	5/14	5/20	10/2	62
Monroe	Asgrow AG46X6	70	Rice	FSI	140K	137K	5/16	5/23	10/28	67
Perry	Local Seed LS5386X	52	Soybean	LSI	140K	124K	6/17	6/25	11/5	59.4
Poinsett	NSGA DrewSoy 5.0	70	Soybean	FSI	150K	125K	5/3	5/13	10/8	64.5
Randolph	Pioneer P47A76L	29	Rice	LSI	140K	125K	6/6	6/14	10/16	41.4
White	Pioneer P47A76L	24	Soybean	LSI	140K	112K	6/3	6/9	11/3	40.8
Woodruff	DynaGro 49L65	105	Rice	LSI	160K	115K	6/13	6/23	11/5	41.9
Average		**59**			**144K**	**117K**	**5/21**	**5/30**	**10/20**	**65.1**

[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. – 50 bu/ac

Table 2. Soil tests results, applied fertilizer and soil classification for the 2020 Soybean Research Verification Fields

	Soil Test Results (ppm)			Applied Fertilize N-P-K (lb/acre)	Soil Classification
County	pH	P	K	Pre-plant	
Arkansas 1	6.2	30	112	0-0-60	Stuttgart, Dewitt silt loam
Arkansas 2	6.2	34	110	0-0-60	Rilla, Hebert silt loam
Clay	6.8	15	71	0-0-0	Falaya silt loam
Cross	6.6	10	127	0-60-75	Crowley and Hillemann silt loam
Desha	6.5	84	84	0-0-90	Sharkey and Desha clays
Drew	7.4	30	188	0-90-45	Portland clay
Faulkner	6.9	11	303	0-0-0	Perry clay
Jackson	6.4	18	125	1 ton poultry litter	Amagon & Forestdale silt loam
Jefferson	7.2	78	86	0-0-120	Rilla, Roxana, MeGehee silt loam, Perry clay
Lafayette	7.2	85	285	0-0-0	Billyhaw clay, Caspiana silt loam
Lee	6.5	25	85	0-54-108	Calloway, Hillemann silt loam
Monroe	6.7	80	96	0-0-90	Foley-Calhoun-Bonn complex, Grenada silt loam, Lafe-Bonn complex
Perry	6.2	29	236	0-0-0	Perry clay
Poinsett	7.1	23	73	0-50-100	HIllemann silt loam
Randolph	7.0	5	135	0-80-50	Jackport silty clay & Overcup silt loam
White	6.4	26	71	0-0-120	Calloway silt loam
Woodruff	6.7	12	56	0-80-120-.5B	Calhoun & Calloway silt loam

Table 3. Herbicide rates and timings for 2020 Soybean Research Verification Program fields by county.

	Herbicide	
County	Burndown/Pre-emergence	Post-emergence
Arkansas 1	Pre-emerge; 1.25 pt. Boundary + 24 oz. RoundUp PowerMax	3 pt. Warrant + 1 qt. Cornerstone
Arkansas 2	Pre-emerge; 1.5 pt. Boundary	1.45 oz. Pursuit + 2 oz. Zidua WG + 1 qt. Liberty
Clay	Pre-emerge; 1.25 pts. s-metolachlor + .3 lbs. metribuzin	1st; .33 oz. Classic + 16 oz. Classic + 1 qt. glyphosate
Cross	Pre-emerge; 1.5 pts. Galvan	1st; 1 qt. glyphosate + 1 qt. Enlist
Desha	Pre-emerged; 2 oz. Valor + 1.5 pt. Me-Too-Lachlor	1st; 1 qt. Cornerstone 2nd; 1.5 pt. Flexstar + 1.2 pt. Dual Magnum II + 1 qt. Cornerstone
Drew		1st; 1qt. Prefix + 1 qt. Cornerstone 2nd; 1 qt. Cornerstone + 1 pt. Dual Magnum II + 1 pt. Ultra Blazer
Faulkner	Pre-emerge; 1 qt. Ledger + 1 qt. glyphosate + 1 oz. Sharpen	1st; 1 qt. Interline + 1 qt. Enlist 2nd; 1 qt. glyphosate + 1 qt. Enlist
Jackson	Pre-emerge; 1.5 pts. Enlist + 1 qt. glyphosate + 1 pt. s-metolachlor + .33 lbs. metribuzin	1st; 1 qt. Roundup PowerMax + AMS
Jefferson	Burndown; 40 oz. Cornerstone + 8 oz. 2,4-D + 1.5 oz. Afforia Pre-emerge; 1 qt. Boundary	1 qt. Cornerstone + 2 oz. Zidua WG Harvest Aid; 1 pt Gramoxone + 1% NIS
Lafayette	Burndown; .67 lb. Metrubuzin 75 + 3 oz. Fierce + 1 qt. Credit	26 oz. RoundUp PowerMax + 3.25 oz. Zidua SC
Lee	Pre-emerge; 1.33 pt. Boundary + 2 oz. Zidua WG	1 qt. Cornerstone + .4 oz. First Rate + 12 oz. Outlook
Monroe	Pre-emerge; 1 qt. Cornerstone + 1 pt. Dual Magnum II	1st; 22 oz. RoundUp PowerMax + 1.33 pt. Dual Magnum II 2nd; 22 oz. RoundUp PowerMax
Perry	Pre-emerge; 40 oz. paraquat + 1.25 pts. s-metolachlor	1st; 1 qt. glyphosate + 1.5 pts. Blazer + .5 oz. Classic + 1 pt. s-metolachlor
Poinsett	Pre-emerge; 3 oz. Fierce	1st; 8 oz. Intensity + 1.25 pts. s-metolachlor +1%COC
Randolph		1st; 1 qt. Liberty + 8 oz. Intensity 2nd; 1 qt. Liberty
White	Pre-emerge; 40 oz. Gramoxone + 3 oz. Fierce + 7 oz. MTZ	1st; 8 oz. Clethodim +1%COC 2nd; 36 oz. Glufosinate 280
Woodruff		1st; 40 oz. Glufosinate 280 + 1.25 pts. s-metolachlor 2nd; 32 oz. Glufosinate 280

Table 4. Fungicide and insecticides applications in 2020 Soybean Research Verification fields by county.

County	Aerial Web Blight	Frogeye	Bollworm/Defoliators	Stink Bug
Arkansas 1			1.28 oz. Heligen + 1% COC	
Arkansas 2				
Clay				
Cross				
Desha				
Drew				
Faulkner			1.28 oz. Heligen	
Jackson				
Jefferson				
Lafayette				6.4 oz. Brigade + .5 lb. acephate
Lee				
Monroe				
Perry			1.9 oz. Lambda-Cyhalothrin	
Poinsett				
Randolph			1.28 oz, Heligen	
White				
Woodruff			6 oz. Intrepid Edge	

Table 5. Irrigation and rainfall information for the 2020 Soybean Research Verification Fields.

County	Irrigation Type	Number of Irrigations	Irrigation Water Used (acre inches/acre)*	Rainfall (in)
Arkansas 1	Furrow	5	16.3	16.3
Arkansas 2	Furrow	3	8.6	25
Clay	Furrow	5	12.9	18.8
Cross	Furrow	5	10.2	15.1
Desha	Furrow	4	11.2	14.8
Drew	Furrow	2		14.7
Faulkner	Dryland			16.7
Jackson	Flood	4	11.5	16.5
Jefferson	Furrow	6	15.8	23.4
Lafayette	Furrow	2		19.5
Lee	Furrow	4	11.6	15
Monroe	Furrow	5	13.9	12.7
Perry	Pivot	3		15.9
Poinsett	Flood	2		17.5”
Randolph	Furrow	3		14.0”
White	Furrow	5	11.4	15.5”
Woodruff	Furrow	3		18.3”

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

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2020 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 22 fields were initially identified to begin the 2020 program. Five fields were removed during the year. Production data from the remaining 17 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 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 the 2020 Crop Enterprise Budgets published by the Cooperative Extension Service, a Southeast Arkansas input provider survey, 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. Operating costs per acre range from $205.58/acre for Perry County to $310.24/acre for Woodruff County, while operating costs per bushel range from $3.20/bu. for Arkansas County-2 to $7.40/bu. for Woodruff County. Total costs per acre (operating plus fixed) range from $278.54/acre for Faulkner County to $425.42/acre for Cross County, and total costs per bushel range from $4.07/bu. for Arkansas County-2 to $9.86/bu. for Woodruff County. Returns to operating costs range from $73.15/acre for Woodruff County to $447.25/acre for Arkansas County-2, and returns to total costs range from -$29.61 for Woodruff County to $381.82/acre for Arkansas County-2.

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 2020 SRVP was 57.44 bushels, but ranged from 34.0 bushels/acre for Faulkner County to 75.2 bushels/acre for Arkansas County-2. Jefferson County followed closely at 74.0 bushels/acre and Desha County at 72.0. The Arkansas average cash price for the 2020 SRVP was estimated from January through October 31 daily price quotes of the cash market price or cash booking price to be $9.15/bu., 41 cents above the same period average in 2019, but still 21 cents less than 2018 and 54 cents under the 2017 average. Arkansas producers set the price for portions of their crop throughout the year.

The average total operating expense for the 17 SRVP fields in 2020 was $258.20/acre (Table 7). Seed accounted for the largest share of operating expenses on average (27.53%) followed by herbicides (16.68%), and fertilizers & nutrients (10.59%). All other categories were less than 8.00% headed by diesel fuel for non-irrigation activities (7.53%). Other notable categories and their percentages of operating expenses were post-harvest expenses (7.02%), repairs & maintenance (6.89%), other inputs & fees preharvest (6.77%), irrigation energy costs (4.97%), and custom applications (4.91%). The average return to operating expenses for the 17 fields was $267.33/acre and ranged from a $73.15/acre for Woodruff County to $447.25/acre for Arkansas County-2. The average return to total specified expenses (Total Costs) for the 17 fields was $172.47/acre, and ranged from -$29.61 for Woodruff County to $381.82/acre for Arkansas County-2.

Table 6. Operating Costs, Total Costs, and Returns for Soybean Research Verification Program, 2020

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)
Clay	225.07	3.45	372.43	106.26	331.32	266.17	5.07
Cross	308.01	6.35	135.77	117.43	425.42	18.37	8.77
Faulkner	227.87	6.70	83.23	50.61	278.54	32.56	8.19
Jackson	244.49	4.10	300.85	77.81	322.30	223.04	5.41
Perry	205.58	3.46	337.93	113.76	319.34	224.17	5.38
Poinsett	226.65	3.51	363.53	90.63	317.27	272.90	4.92
Randolph	276.71	6.68	102.10	82.64	359.34	19.47	8.68
White	268.83	6.59	104.49	92.96	361.79	11.53	8.87
Woodruff	310.24	7.40	73.15	102.76	413.00	-29.61	9.86
North Avrg.	**254.83**	**5.36**	**208.16**	**92.76**	**347.59**	**115.40**	**7.24**
Arkansas-1	260.03	4.95	220.35	129.98	390.00	90.38	7.43
Arkansas-2	240.83	3.20	447.25	65.43	306.26	381.82	4.07
Desha	251.83	3.50	406.97	76.70	328.54	330.26	4.56
Drew	266.99	4.94	227.11	104.24	371.20	122.90	6.87
Jefferson	270.88	3.66	406.22	101.53	372.40	304.70	5.03
Lafayette	259.12	4.03	329.23	104.40	363.52	224.82	5.65
Lee	295.29	4.76	272.01	77.08	372.35	194.95	6.01
Monroe	251.03	3.75	362.02	118.50	369.53	243.52	5.52
South Avrg.	**262.00**	**4.10**	**333.90**	**97.23**	**359.23**	**236.67**	**5.64**
Statewide Average	**258.20**	**4.77**	**267.33**	**94.86**	**353.07**	**172.47**	**6.49**

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2020 (1)							
	Arkansas-1	Arkansas-2	Clay	Cross	Desha	Drew	Faulkner
Receipts							
Yield (bu.)	52.5	75.2	65.3	48.5	72.0	54.0	34.0
Price	9.15	9.15	9.15	9.15	9.15	9.15	9.15
Total Crop Revenue	**480.38**	**688.08**	**597.50**	**443.78**	**658.80**	**494.10**	**311.10**
Seed	68.04	62.16	63.28	93.55	72.90	77.76	77.60
Fertilizers & Nutrients	17.40	17.40	0.00	46.95	26.10	50.85	0.00
Herbicides (2)	30.74	49.37	37.26	20.32	48.16	38.81	53.91
Insecticides (2)	6.40	0.00	0.00	0.00	0.00	0.00	6.40
Fungicides (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals (2)	2.40	0.00	0.00	0.00	0.00	0.00	0.00
Custom Applications	15.50	15.00	0.00	22.50	7.50	0.00	31.00
Diesel Fuel (3)	29.48	10.48	22.53	29.24	15.88	23.63	11.65
Repairs & Maintenance	23.24	13.24	19.72	20.58	16.54	19.38	11.77
Irrigation Energy Costs	13.17	17.72	29.53	21.98	10.54	5.27	0.00
Labor, Field Activities	12.47	7.82	8.57	11.65	7.26	9.46	4.78
Interest	6.52	5.81	5.47	7.84	6.13	6.69	5.81
Other Inputs & Fee, Pre-harvest	18.09	18.09	18.09	18.09	18.09	18.09	14.21
Post-harvest Expenses	16.58	23.74	20.62	15.31	22.73	17.05	10.74
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	**260.03**	**240.83**	**225.07**	**308.01**	**251.83**	**266.99**	**227.87**
Returns to Operating Expenses	**220.35**	**447.25**	**372.43**	**135.77**	**406.97**	**227.11**	**83.23**
Capital Recovery & Fixed Costs	129.98	65.43	106.26	117.43	76.70	104.21	50.61
Total Specified Expenses	**390.00**	**306.26**	**331.32**	**425.42**	**328.54**	**371.20**	**278.54**
Returns to Specified Expenses	**90.38**	**381.82**	**266.17**	**18.37**	**330.26**	**122.90**	**32.56**
Operating Expenses/Yield Unit	4.95	3.20	3.45	6.35	3.50	4.94	6.70
Total Expenses/Yield Unit	7.43	4.07	5.07	8.77	4.56	6.87	8.19

1. Does not include land costs, management, or other expenses and fees not associated with production.
2. Combined as Chemicals in some previous year reports
3. Listed as Fuel & Lube in previous year reports

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2020 (2) - CONTINUED							
	Jackson	Jefferson	Lafayette	Lee	Monroe	Perry	Poinsett
Receipts							
Yield (bu.)	59.6	74.0	64.3	62.0	67.0	59.4	64.5
Price	9.15	9.15	9.15	9.15	9.15	9.15	9.15
Total Crop Revenue	**545.34**	**677.10**	**588.35**	**567.30**	**613.05**	**543.51**	**590.18**
Seed	72.52	84.09	58.32	68.04	68.04	68.04	46.44
Fertilizers & Nutrients	35.00	0.00	0.00	54.00	26.10	0.00	47.10
Herbicides (2)	28.46	51.44	78.32	62.34	35.33	41.71	28.31
Insecticides (2)	0.00	0.00	9.83	0.00	0.00	2.07	0.00
Fungicides (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals (2)	0.00	6.72	0.00	0.00	0.00	0.00	0.00
Custom Applications	7.50	16.00	8.00	22.50	7.50	8.00	16.00
Diesel Fuel (3)	13.50	20.13	24.67	13.98	24.72	15.21	18.78
Repairs & Maintenance	15.22	19.09	20.31	17.27	20.95	16.98	17.36
Irrigation Energy Costs	23.62	15.81	5.27	4.67	13.17	6.26	5.27
Labor, Field Activities	5.72	9.52	9.62	7.44	9.82	8.82	6.59
Interest	6.04	6.62	6.39	7.38	6.15	5.00	5.52
Other Inputs & Fee, Pre-harvest	18.09	18.09	18.09	18.09	18.09	14.73	14.91
Post-harvest Expenses	18.82	23.37	20.30	19.58	21.16	18.76	20.37
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	**244.49**	**270.88**	**259.12**	**295.29**	**251.03**	**205.58**	**226.65**
Returns to Operating Expenses	**300.85**	**406.22**	**329.23**	**272.01**	**362.02**	**337.93**	**363.53**
Capital Recovery & Fixed Costs	77.81	101.53	104.40	77.08	118.50	113.76	90.63
Total Specified Expenses	**322.30**	**372.40**	**363.52**	**372.35**	**369.53**	**319.34**	**317.27**
Returns to Specified Expenses	**223.04**	**304.70**	**224.82**	**194.95**	**243.52**	**224.17**	**272.90**
Operating Expenses/Yield Unit	4.10	3.66	4.03	4.76	3.75	3.46	3.51
Total Expenses/Yield Unit	5.41	5.03	5.65	6.01	5.52	5.38	4.92
1. Does not include land costs, management, or other expenses and fees not associated with production.							
2. Combined as Chemicals in some previous year reports							
3. Listed as Fuel & Lube in previous year reports							