



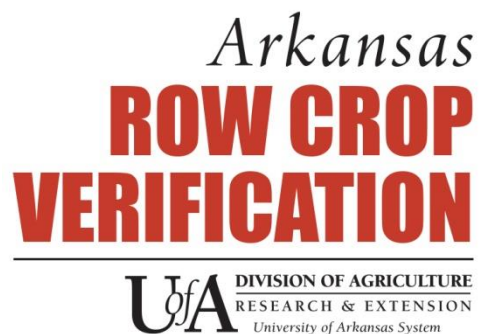
2018

University of Arkansas

Soybean Research Verification Program

The Soybean Research Verification Program is funded by Arkansas soybean producers through check-off monies administered by the Arkansas Soybean Promotion Board.

University of Arkansas Division of Agriculture
Cooperative Extension Service
Agriculture Experiment Station
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SOYBEAN RESEARCH VERIFICATION PROGRAM, 2018

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INTRODUCTION

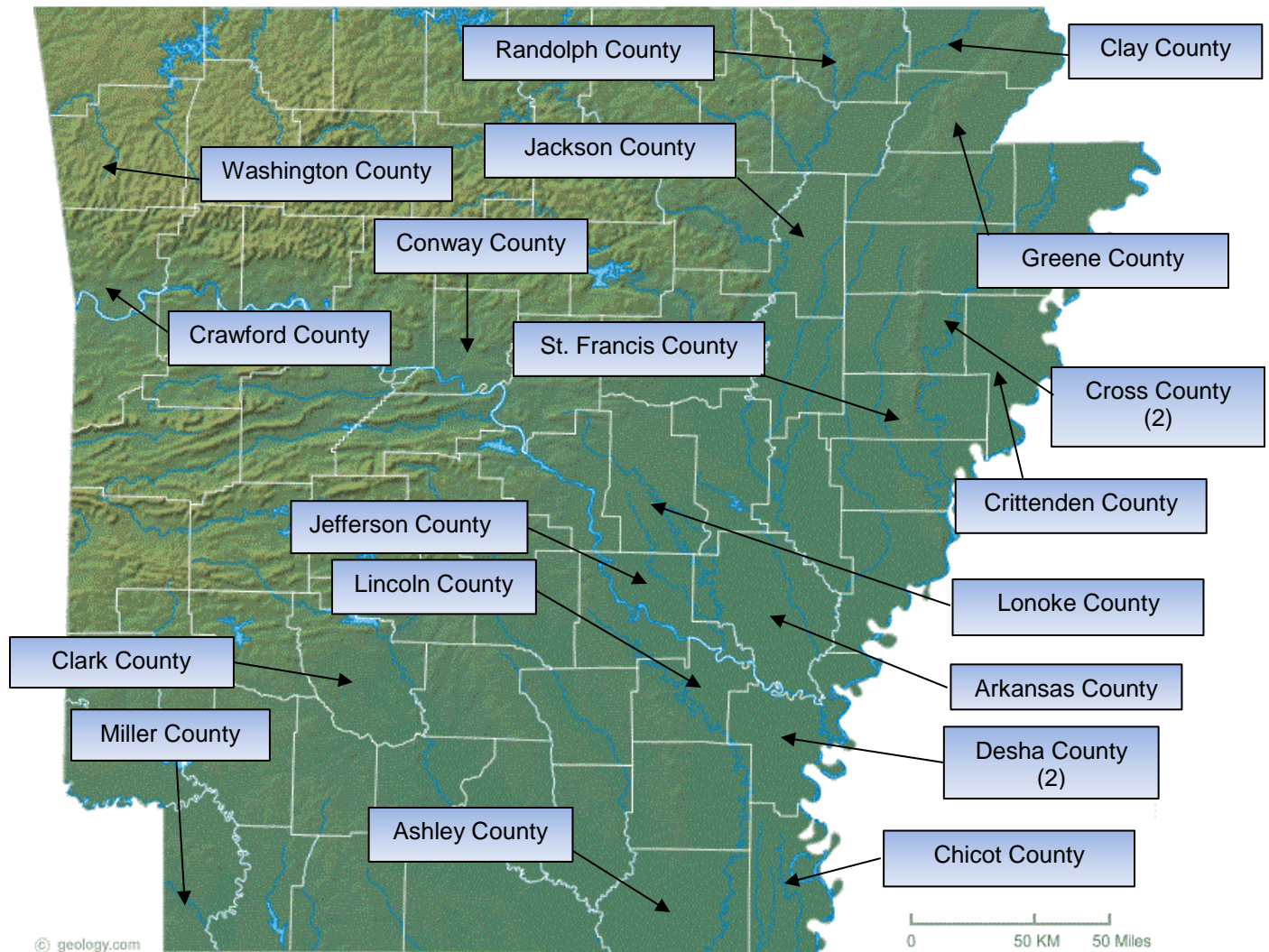
The 2018 growing season was the thirty fourth year for the Soybean Research Verification Program (SRVP). The SRVP is an interdisciplinary effort between growers, county Extension agents, Extension specialists, and researchers. The SRVP is an on-farm demonstration of all the research-based recommendations required to grow soybeans profitably in Arkansas. The specific objectives of the program are:

1. To verify research-based recommendations for profitable soybean production in all soybean producing areas of Arkansas.
2. To develop a database for economic analysis of all aspects of soybean production.
3. To demonstrate that consistently high yields of soybeans can be produced economically with the use of available technology and inputs.
4. To identify specific problems and opportunities in Arkansas soybeans for further investigation.
5. To promote timely implementation of cultural and management practices among soybean growers.
6. 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. Twenty one farms were enrolled in the SRVP in 2018. The fields were located on commercial farms ranging in size from 28 to 160 acres. The average field size was 61 acres.

The 2018 SRVP fields were conducted in Arkansas, Ashley, Chicot, Clark, Clay, Conway, Crawford, Crittenden, Cross (2), Desha (2), Greene, Jackson, Jefferson, Lincoln, Lonoke, Miller, Randolph, St. Francis and Washington counties. Two different Roundup Ready varieties (Pioneer P47T89R and Terral REV 48A26), six different Roundup Ready Extend varieties (Armor 46-D08, Armor 48-D24, Asgrow AG43X7, Asgrow AG46X6, Morsoy 4846RXT and Pioneer 54A54X) and eight Liberty Link varieties (Armor 44L21, Bayer CZ 4540LL, Bayer HBK LL4953, Cropland LC5215, Delta Grow 4967LL, Pioneer 50A78L, Progeny 4930LL, and Stine 41LF32) 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 2018 Soybean Research Verification Fields



FIELD REVIEWS

Northern Fields – Christopher Elkins

Clay County

The 40 acre field, soil type Falaya Silt Loam, was located west of Greenway and followed the previous year corn crop. Fall fertilizer application of 0-75-100 was applied. Early season burndown of 40 ounces/acre Gramoxone plus .25% surfactant was applied. Following land preparation, the field was planted on May 12 with Morsoy 4846 RXT, with Innovate seed treatment and Exceed inoculant, at 141,000 seeds/acre on 38" beds, along with a pre-emerge application of 6 ounces/acre Zidua Pro. A post emerge herbicide application of 1 quart/acre glyphosate plus 2 pints/acre Prefix plus 6 ounces/acre Flexstar was applied on June 9. On June 30 the field was cultivated to allow for more efficient irrigation. Disease and insect pressure remained below threshold and did not warrant treatment. Harvest aid of 1 pint/acre Gramoxone plus .25% surfactant was applied on October 8. The field was furrow irrigated 6 times and harvested on October 24 yielding 49.3 bushels/acre adjusted to 13% Moisture. Lodging in the field was 50%-75% making harvest difficult and unable to harvest several soybeans in the furrow.

Conway County

The 43 acre field, soil types Gallion and Roxana silt loam, was located south of Blackwell and followed the previous year corn crop. According to soil test recommendations, no fertilizer was applied. Early spring burndown of 1 quart/acre glyphosate plus 2 ounces/acre of Sharpen was applied. Following spring tillage the field was planted May 8 with Pioneer 50A78L, CruiserMaxx seed treatment, at 150,000 seeds/acre. On May 10, 1 pint/acre s-metolachlor plus .33 pounds/acre of metribuzin was applied for pre-emerge control. The field emerged May 15 to a plant population of 110,000 plants/acre. Post emerge applications of 1 quart/acre Liberty plus 2 ounces/acre Zidua on May 22 and 29 ounces/acre Liberty on June 6 were utilized for weed control. Disease and insect pressure remained below treatment thresholds and no application was warranted. This field was pivot irrigated 7 times and harvested October 8 yielding 66.8 bushels/acre adjusted to 13% moisture.

Crawford County

The 68 acre field, soil type Gallion Silt Loam, was located south of Alma and followed the previous year corn crop. A fertilizer application of 0-0-75 was applied according to soil sample recommendations. Following land preparation, the field was planted on May 19 with Pioneer 50A78L, Warden seed treatment, at 150,000 plants/acre on 30" beds. Light weed pressure was present at planting and an application of 1 pint/acre charger plus 5 ounces/acre metribuzin plus 3 pints/acre paraquat plus .25% surfactant was applied for weed control and residual. On June 7, 1 quart/acre Liberty plus 3.5 ounces/acre Anthem Max was applied for weed control. Disease and insect pressure remained below treatment thresholds and no application was warranted. This field was pivot irrigated 3 times and harvested November 13 yielding 56.9 bushels/acre adjusted to 13% moisture. Lodging in the field exceeded 50% and 5+" of rain after reaching R8 causing a delayed harvest contributed to an average damage of 9.8%.

Crittenden County

The 28 acre field, soil type Tunica Clay and Bowdre Silty Clay and Sharkey Silty Clay, was located south of West Memphis and followed the previous year soybean crop. Fertilizer application of 0-0-60 was applied. On April 4, 1 quart/acre glyphosate was applied to kill cereal rye cover crop. The field was planted on April 30 with Bayer HBK 4953, Cruiser Maxx seed treatment, at 151,000 seed/acre on 15" seed spacing. Pre-emerge herbicide application of 1 pint/acre s-metolachlor plus .5 pounds/acre metribuzin plus 40 ounces/acre Gramoxone plus .25% surfactant was applied May 1. The field emerged on May 9 to a plant population 138,500 plants/acre. On May 26, 1 quart/acre Liberty plus 1 pint/acre s-metolachlor plus 8 ounces/acre Select and June 6, 29 ounces/acre Liberty was applied for weed control. Disease and insect pressure remained below threshold and treatment was not recommended. The field was dryland and harvested on October 3 yielding 63.0 bushels/acre adjusted to 13% moisture.

Cross County 1

The 37 acre field, soil type Henry Silt Loam, was located east of Fair Oaks followed the previous year rice crop. Fertilizer application of 0-40-80 was applied according to soil test recommendations. Following land preparation, the field was planted on May 9 with Pioneer 47T89, Cruiser Maxx seed treatment, at 160,000 seed/acre on 38" beds on 7.5" seed spacing. The field emerged on May 15 to a plant population of 135,000 plants/acre. On May 14, 1.3 pints/acre s-metolachlor was applied for pre-emerge followed by 1 quart/acre glyphosate plus .25 ounces/acre Classic for post emerge control. Disease and insect pressure remained below threshold and did not warrant treatment. The field was furrow irrigated 4 times and harvested on October 14 yielding 62.5 bushels/acre adjusted to 13% moisture.

Cross County 2

The 85 acre field, soil type Alligator and Earle Clay, was located south of Parkin and followed the previous year soybean crop. No fertilizer was applied according to the soil test recommendation. Following land preparation, the field was planted on May 7 with Progeny 4930LL, Cruiser Maxx seed treatment, at 160,000 plants/acre on 15" seed spacing, along with 1 pint/acre metolachlor plus .33 pounds/acre metribuzin was applied for pre-emerge weed control. On May 11, 40 ounces/acre Gramoxone plus .25% surfactant was applied for escaped weeds prior to planting and pre-emerge application. The field emerged on May 16 to a plant population of 118,000 plants/acre. First post herbicide was applied on June 6 consisting of 1 quart/acre Liberty plus 2 ounces/acre Zidua followed by 29 ounces/acre Liberty on June 15. Disease and insect pressure remained below threshold and no treatment was recommended. The field was pivot irrigated 6 times and harvested on October 5 yielding 58.9 bushels/acre adjusted to 13% moisture.

Greene County

The 37 acre field, Foley-Bonn Complex, was located west of Walcott and followed the previous year soybean crop. Fertilizer application of 0-50-120 was applied according to soil test recommendation. Following land preparation, the field was planted on May 11 with Delta Grow 4967LL, Cruiser Maxx seed treatment, at 139,000 plants/acre on 30" seed spacing. The field emerged May 24 to a plant population of 85,000 seed/acre on the upper end. The lower end of

the field was replanted with Delta Grow 4967LL on June 6. Pre-emerge application of 1.3 pints/acre metolachlor was applied on May 12. On June 15, 36 ounces/acre Liberty plus 1.25 pints/acre metolachlor and 29 ounces/acre Liberty on July 2 for post emerge weed control. Disease and insect remained below threshold and no treatment was recommended. The field was furrow irrigated 5 times and harvested on October 18 yielding 53.5 bushels/acre adjusted to 13% moisture.

Jackson County

The 45 acre field, Egam Silt Loam, was located south of Oil Trough and followed the previous year soybean crop. Fall fertilizer application of 1.5 tons poultry litter was applied. Following land preparation and 2 pints/acre metolachlor incorporated, the field was planted on May 31 with Progeny 4930LL at 140,000 on 15" row. The field emerged on June 8 to a plant population of 89,000 plants/acre. On June 30, 1 quart/acre Liberty was applied for weed control. Corn earworm population fluctuated heavily during the season but stayed below economic threshold. Disease pressure remained below threshold and no treatment was recommended. The field was flood irrigated 1 time and harvested on October 12 yielding 34.2 bushels/acre adjusted to 13% moisture.

Randolph County

The 35 acre field, Jackport Silty Clay Loam, was located south of O'kean and followed the previous year rice crop. Fertilizer application of 0-60-50 was applied according to soil test recommendation. Following land preparation, the field was planted on May 10 with Asgrow 46X6, Cruiser Maxx seed treatment, at 145,000 plants/acre on 30" beds. The field emerged on May 21 to a plant population of 116,000 plants/acre. First herbicide application of 1 quart/acre glyphosate plus 1.3 pints/acre s-metolachlor was applied on May 30. Second application on June 30 of 1 quart/acre glyphosate was applied for weed control. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 4 times and harvested on October 24 yielding 40.6 bushels/acre adjusted to 13% moisture.

St. Francis County

The 135 acre field, soil type Loring and Calhoun Silt Loam, was located north of Palestine and followed the previous year corn crop. Fertilizer application of 0-60-75-.5B was applied according to soil test recommendations. Following land preparations, the field was planted on May 1 with Asgrow 46X6, Cruiser Maxx seed treatment, at 160,000 plants/acre drilled on 7.5" seed spacing. On May 3 an application of 1.3 pints/acre Dual Magnum for pre-emerge weed control was applied. The field emerged on May 9 to a plant population of 114,000 plants/acre. A post emerge herbicide application of 1 quart/acre glyphosate plus 2 pints/acre Prefix was applied on May 28. Disease and insect pressure remained below threshold and no treatment was recommended. The field was furrow irrigated 6 times and harvested on October 6 yielding 68.8 bushels/acre adjusted to 13% moisture.

Washington County

The 43.5 acre field, soil type Summit Silty Clay and Samba Silt Loam and Savannah Fine Sandy Loam, was located south of Prairie Grove and followed the previous year soybean crop. On June 6 an application of 1 quart/acre glyphosate was applied for burndown. Following tillage the field was planted on June 22 with Cropland LC5215, Warden seed treatment plus Vault inoculant, at 148,000 plants/acre on 30" seed spacing along with an application of 3

ounces/acre Fierce plus 4 ounces/acre Dimetric for residual weed control. The field emerged on June 26 to a plant population 125,000 plants/acre. On July 21 a fertilizer application of 0-0-60 was applied according to soil test recommendations. Post emerge application of 1 quart/acre Liberty plus 16 ounces/acre Select Max was applied on July 27. Neither insects nor disease reached treatment threshold, so no insecticide or fungicide applications were made. The field was dryland and harvested on November 16 yielding 61.2 bushels/acre adjusted to 13% moisture.

Southern Fields – Chad Norton

Arkansas County

The 37 acre field, soil types Stuttgart and Dewitt silt loam, was located south of Stuttgart and followed the previous year rice crop. After both fall and spring land preparation and fertilizer application of 0-60-120, according to soil test recommendations, the field was flat planted May 19 with Asgrow AG46X6, Cruiser Moly seed treatment, at 140,000 seeds/acre on 30" centers. The field emerged May 25 to a plant population of 105,000 plants/acre. A post-emergence application of 1 quart/acre RoundUp PowerMax was applied May 30 for weed control. After plowing middles, a second post-emergence application of 24 ounces/acre RoundUp PowerMax plus 1.33 pints/acre Charger Basic June 29 was also used for weed control. The field required a 1.6 ounce/acre Heligen plus 1% COC application July 22 for corn earworm control. Diseases remained below treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 5 times and harvested October 29 yielding 70.1 bushels/acre adjusted to 13% moisture.

Ashley County

The 67 acre field, soil types Calhoun and Calloway silt loam, was located west of Hamburg and followed the previous year corn crop. After fall disking, spring burndown of 25.6 ounces/acre RoundUp PowerMax plus 1 quart/acre 2,4-D, fertilizer application of 0-50-120, according to soil test recommendations, and land preparation, the field was planted April 20 with Terral REV 48A26, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 38" twin row beds. The field emerged April 30 to a plant population of 105,000 plants/acre. Post-emergence applications of 22 ounces/acre RoundUp PowerMax plus 2 ounces/acre Zidua on May 12 and 22 ounces/acre RoundUp PowerMax plus 1.33 pints/acre Charger Basic on June 6 were utilized for weed control. The field required a 6.4 ounce/acre Tundra plus 1% COC application August 10 for stink bug control. Diseases remained below treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 4 times and harvested September 17 yielding 68.8 bushels/acre adjusted to 13% moisture.

Chicot County

The 33 acre field, soil types Portland and Perry clay, was located east of Jerome and followed the previous year rice crop. Following fall 1.5 tons/acre poultry litter application and land preparation and spring burndown of 1 quart/acre Cornerstone plus 1 ounce/acre Sharpen plus 1% MSO the field was planted April 30 with Armor 48-D24, Cruiser Maxx seed treatment, at 140,000 seeds/acre on 38" twin row beds. Pre-emergence herbicide application of 40 ounces/acre generic paraquat plus 5 ounces/acre Verdict plus 1% MSO was applied May 1. The field emerged May 9 to a plant population of 96,000 plants/acre. Post-emergence applications of 22 ounces/acre RoundUp PowerMax plus 1.3 pints/acre Charger Basic on May 25 and, after

plowing middles, 1 quart/acre Cornerstone plus 1.2 pints/acre Charger Basic on June 29 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds so no insecticide or fungicide applications were warranted. The field was furrow irrigated 3 times and harvested October 6 yielding 63.8 bushels/acre adjusted to 13% moisture.

Clark County

The 73 acre dryland field, soil types Sardis silt loam and Marietta fine silt loam, was located southwest of Arkadelphia and followed the previous year corn crop. After fall tillage and spring poultry litter application of 1.5 tons/acre the field was flat planted May 9 on 18" centers with Pioneer P54A54X, Prevail seed treatment, at 141,000 seeds/acre. An application of 22 ounces/acre Mad Dog 5.4 plus 1 pint/acre Cinch on May 12 was utilized for emerged and residual weed control. The field emerged May 15 to a plant population of 115,000 plants/acre. Post-emergence applications of 22 ounces/acre Mad Dog 5.4 plus 2 ounces/acre Zidua on May 28 and 22 ounces/acre Mad Dog 5.4 plus 1.33 pints/acre Cinch on June 16 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds so no insecticide or fungicide applications were warranted. The field was harvested October 6 yielding 83.5 bushels/acre adjusted to 13% moisture.

Desha County 1

The 150 acre field, soil types Sharkey and Desha clays and Herbert silt loam, was located north of Dumas and followed the previous year soybean crop. Following fall land preparation, spring fertilizer application of 0-30-75, according to soil test recommendations, and rolling, the field was planted May 3 with Armor 46-D08, CruiserMaxx seed treatment, at 140,000 seeds/acre along with an application of 40 ounces/acre generic paraquat plus 2 ounces/acre Zidua for emerged and residual weed control. The field emerged May 8 to a plant population of 115,000 plants/acre. After plowing middles, a post-emergence application of 22 ounces/acre RoundUp PowerMax plus 1 quart/acre Prefix plus 6 ounces/acre Flexstar on June 1 was also used for weed control. The field required a 1.6 ounce/acre Heligen plus 1% COC application July 19 for corn earworm control. Diseases remained below treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 3 times and harvested October 3 yielding 83.2 bushels/acre adjusted to 13% moisture.

Desha County 2

The 85 acre field, soil type Sharkey and Desha clays, was located east of McArthur and followed the previous year soybean crop. Following spring fertilizer application of 0-50-0, according to soil test recommendations, and bedding the field was planted May 2 with Armor 48-D24, CruiserMaxx seed treatment, at 140,000 seeds/acre along with an application of 1 quart/acre generic paraquat plus 2.5 ounces/acre Enlite for emerged and residual weed control. The field emerged May 8 to a plant population of 118,000 plants/acre. RoundUp PowerMax at 22 ounces/acre plus 1 quart/acre Prefix plus 6 ounces/acre Flexstar plus 1.3 ounces/acre Pursuit May 18 was utilized for post-emergence weed control. After plowing, a second post-emergence application of 22 ounces/acre Mad Dog 5.4 plus 1.33 pints/acre Charger Basic June 11 was also used for weed control. Loyant drift symptomology, field wide, was noted during field scouting visit on June 14. The field required a 1.6 ounce/acre Heligen plus 1% COC application July 20 for corn earworm control. Diseases remained below treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 3 times and harvested September 29 yielding 61.3 bushels/acre adjusted to 13% moisture.

Jefferson County

The 74 acre field, soil types Coushatta and Roxana silt loam, was located south of Altheimer and followed the previous year corn crop. Following spring fertilizer application of 0-50-0, according to soil test recommendations, and land preparation, the field was planted March 21 with Stine 41LF32, ApronMaxMoly seed treatment, at 175,000 seeds/acre along with an application of 1 quart/acre Cornerstone plus 1.2 pints/acre Me-Too-Lachlor for emerged and residual weed control. The field emerged April 1 to a plant population of 148,000 plants/acre. Post emergence applications of 1 quart/acre Total plus 2.5 ounces/acre Zidua May 2 and 1 quart/acre Total plus 1.25 pints/acre Me-Too-Lachlor plus 7 ounces/acre Section Three June 3 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds so insecticide and fungicide applications were unwarranted. One pint/acre generic paraquat plus 1% NIS was applied August 7 as a harvest aid. The field was furrow irrigated 7 times and harvested August 23 yielding 76 bushels/acre adjusted to 13% moisture.

Lincoln County

The 60 acre field, soil types Rilla and Herbert silt loam, was located south of Grady and followed the previous year corn crop. Following fall land preparation and fertilizer application of 0-50-100, according to soil test recommendations, and spring burndown of 1 quart/acre RoundUp PowerMax plus 1 quart/acre 2,4-D, plus .5 ounce/acre Firstshot plus 1% MSO the field was planted April 19 along with an application of 1.5 pints/acre Boundary plus .5 pint/acre Me-Too-Lachlor for weed control. The field failed to emerge to an acceptable plant population and was replanted May 5 with Asgrow AG43X7, CruiserMaxx seed treatment, at 140,000 seed/acre. The replanted field emerged May 12 to a plant population of 118,000 plants/acre. A post-emergence application of 50 ounces/acre Warrant Ultra plus 6 ounces/acre Flexstar plus 22 ounces/acre RoundUp PowerMax May 30 was utilized for weed control. The field required a 1.6 ounce/acre Heligen plus 1% COC application July 19 for corn earworm control. Diseases remained below treatment thresholds so fungicide applications were unwarranted. The field was furrow irrigated 6 times and harvested October 2 yielding 64.7 bushels/acre adjusted to 13% moisture.

Lonoke County

The 42 acre field, soil type Calloway silt loam, was located northeast of Lonoke and followed the previous year rice crop. Following both fall and spring land preparation, fertilizer application of 0-60-90, according to soil test recommendations, and bedding, the field was planted April 21 with Armor 44L21, CruiserMaxx seed treatment, at 136,000 seeds/acre along with an application of 2 ounces/acre Zidua for residual weed control. The field emerged May 1 to a plant population of 110,000 plants/acre. Post-emergence application of 1 quart/acre Liberty plus 1.3 pints/acre Charger Basic May 18 and 1 quart/acre Liberty plus 1.2 pints/acre Charger Basic June 6 were also utilized for weed control. Neither insects nor diseases reached treatment thresholds so no insecticides or fungicides were used. The field was furrow irrigated 6 times and harvested September 20 yielding 69.2 bushels/acre adjusted to 13% moisture.

Miller County

The 65 acre dryland field, soil types Latanier and Billyhaw clay, was located north of Mandeville and followed the previous year soybean crop. Following fall land preparation and no fertilizer application, according to soil test recommendations, the field was flat planted on 20" centers April 30 with Bayer CZ 4540 LL, CruiserMaxx seed treatment, at 140,000 seeds/acre

along with an application of 40 ounces/acre generic paraquat plus 1.5 pints/acre Boundary for emerged and residual weed control. A post-emergence application of 36 ounces/acre Liberty plus 1 quart/acre Prefix plus 6 ounces/acre Flexstar June 4 was also used for weed control. Neither insects nor diseases reached treatment thresholds so no insecticides or fungicides were used. The field was ready to be harvested the last week of September but wasn't until October 29. Due to extreme harvest delay, ensuing abnormally high rainfall and unsuitable climate conditions, the field incurred 33% damage and were deemed un-marketable.

Table 1. Agronomic information for the 2018 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	Asgrow AG46X6	37	Corn	FSI	140K	105K	5/19	5/25	10/29	70.1
Ashley	Terral REV 48A26	67	Corn	ESI	140K	105K	4/20	4/30	9/17	68.8
Chicot	Armor 48-D24	33	Rice	FSI	140K	96K	4/30	5/9	10/6	63.8
Clark	Pioneer 54A54X	73	Corn	FSNI	141K	115K	5/9	5/15	10/6	83.5
Clay	Morsoy 4846RXT	40	Corn	FSI	141K	129K	5/12	5/21	10/24	49.3
Conway	Pioneer 50A78L	43	Corn	FSI	150K	110K	5/8	5/15	10/8	66.8
Crawford	Pioneer 50A78L	65	Corn	FSI	150K	114K	5/17	5/24	11/13	56.9
Crittenden	Bayer HBK LL4953	28	Soybeans	FSNI	151k	138.5K	4/30	5/9	10/3	63.0
Cross 1	Pioneer P47T89R	37	Rice	FSI	160K	135K	5/9	5/16	10/5	62.5
Cross 2	Progeny 4930LL	85	Soybeans	FSI	160K	118K	5/7	5/16	10/5	58.9
Desha 1	Armor 46-D08	150	Soybeans	FSI	140K	115K	5/3	5/8	10/3	83.2
Desha 2	Armor 48-D24	85	Soybeans	FSI	140K	118K	5/2	5/8	9/27	61.3
Greene	Delta Grow 4967LL	37	Soybeans	FSI	139K	85K	5/11 & 6/6	5/24	10/18	53.5
Jackson	Progeny 4930LL	45	Soybeans	FSI	140K	89K	5/31	6/8	10/12	34.2
Jefferson	Stine 41LF32	74	Corn	ESI	175K	148K	3/21	4/1	8/23	76
Lincoln	Asgrow AG43X7	60	Corn	FSI	140K	118K	5/5	5/12	10/2	64.7
Lonoke	Armor 44L21	40	Rice	ESI	136K	110K	4/21	4/30	9/20	69.2
Miller	Bayer CZ 4540LL	65	Soybeans	ESNI	140K	101K	4/30	5/7	10/29	Un-marketable
Randolph	Asgrow AG46X6	35	Rice	FSI	145K	116K	5/10	5/21	10/24	40.6
St. Francis	Asgrow AG46X6	135	Corn	FSI	160K	114K	5/1	5/9	10/6	68.8
Washington	Cropland LC5215	43	Soybeans	FSNI	148K	125K	6/22	6/26	11/16	61.2
Average		61			146.5K	114.5K	5/7	5/14	10/9	62.8

¹Production Systems: ESI = Early Planted Irrigated; FSI = Full Season Irrigated; FSNI = Full Season Non-irrigated; ESNI = Early Season Non-irrigated

State Avg. – 50 bu/ac

Table 2. Soil tests results, applied fertilizer and soil classification for the 2018 Soybean Research Verification Fields

County	Soil Test Results (ppm)			Applied Fertilize N-P-K (lb/acre)	Soil Classification
	pH	P	K	Pre-plant	
Arkansas	5.7	13	70	0-60-120	Stuttgart, Dewitt silt loam
Ashley	7.5	26	72	0-50-120	Calhoun, Calloway silt loam
Chicot	6.7	28	144	1.5 ton poultry litter	Calhoun, Henry silt loam
Clark	5.9	48	288	1.5 ton poultry litter	Portland, Perry clay
Clay	6.7	47	188	0-75-100	Sardis silt loam, Marietta fine silt loam
Conway	6.7	86	181	0-0-0	Falaya silt loam
Crawford	6.6	55	113	0-0-75	Gallion, Roxana silt loam
Crittenden	6.1	34	260	0-0-60	Gallion silt loam
Cross 1	8.0	20	113	0-50-75	Tunica clay, Bowdre silty clay
Cross 2	6	34	225	0-0-0	Henry, Calloway silt loam
Desha 1	7.9	31	225	0-30-75	Alligator, Earle Clay
Desha 2	7.5	22	329	0-50-0	Sharkey and Desha clays, Herbert silt loam
Greene	6.7	21	80	0-50-120	Sharkey and Desha clays
Jackson	6.6	14	97	1.5 ton poultry litter	Foley-Bonn complex, Calhoun silt loam
Jefferson	7.1	45	160	0-0-50	Egam silt loam
Lincoln	7.3	26	93	0-50-100	Coushatta, Roxana silt loam
Lonoke	5.9	18	92	0-60-90	Rilla, Herbert silt loam
Miller	7.2	21	308	0-50-0	Calloway silt loam
Randolph	7.0	10	150	0-60-50	Latanier, Billyhaw clay
St. Francis	7.3	9	121	0-60-75-.5B	Jackport silty clay loam
Washington	5.6	37	107	0-0-60	Loring, Calhoun silt loam
					Summit silty clay, Samba silt loam

Table 3. Herbicide rates and timings for 2018 Soybean Research Verification Program fields by county.

County	Herbicide	
	Burndown/Pre-emergence	Post-emergence
Arkansas		1 st ; 22 oz. RoundUp PowerMax 2 nd ; 22 oz. RoundUp PowerMax + 1.33 pt. Charger Basic
Ashley	Burndown; 25.6 oz. RoundUp PowerMax + 1 pt. 2,4-D	1 st ; 22 oz. RoundUp PowerMax + 2 oz. Zidua 2 nd ; 22 oz. RoundUp PowerMax + 1.33 pt. Charger Basic
Chicot	Burndown; 1 qt. Conerstone + 1 oz. Sharpen + 1% MSO Pre-emerge; 40 oz. generic paraquat + 5 oz. Verdict + 1% MSO	1 st ; 22 oz. RoundUp PowerMax + 1.3 pt. Charger Basic 2 nd ; 1 qt. Conerstone + 1.2 pt. Charger Basic
Clark	Pre-emerge; 22 oz. Mad Dog 5.4 + 1 pt. Cinch	1 st ; 22 oz. Mad Dog 5.4 + 2 oz. Zidua 2 nd ; 22 oz. Mad Dog 5.4 + 1.33 pt. Cinch
Clay	Burndown; 40 oz. Gramoxone + .25% surfactant Pre-emerge; 6 oz. Zidua Pro	1 st ; 1 qt. glyphosate + 1 qt. Prefix + 6 oz. Flexstar Pre-harvest; 1 pt. Gramoxone + .25% surfactant
Conway	Burndown; 1 qt. glyphosate + 2 oz. Sharpen Pre-emerge; 1 pt. s-metolachlor + .33 lbs. metribuzin	1 st ; 1 qt. Liberty + 2 oz. Zidua 2 nd ; 29 oz. Liberty
Crawford	Pre-emerge; 1 pt. Charger + 5 oz. metribuzin + 3 pt. Paraquat + .25% surfactant	1 st ; 1 qt. Liberty + 3.5 oz. Anthem Max
Crittenden	Burndown; 1 qt. glyphosate Pre-emerge; 1 pt. s-metolachlor + .5 lbs. metribuzin + 40 oz. Gramoxone + .25% surfactant	1 st ; 1 qt. Liberty + 1 pt. s-metolachlor + 8 oz. Select 2 nd ; 29 oz. Liberty
Cross 1	Pre-emerge; 1.3 pt. s-metolachlor	1 qt. generic glyphosate + .25 oz. Classic
Cross 2	Burndown; 40 oz. Gramoxone + .25 % surfactant Pre-emerge; 1 pt. metolachlor + .33 lbs Metribuzin	1 st ; 1 qt. Liberty + 2 oz. Zidua 2 nd ; 29 oz. Liberty
Desha 1	Pre-emerge; 40 oz. generic paraquat + 2 oz. Zidua	1 qt. Prefix + 6 oz. Flexstar + 22 oz. RoundUp PowerMax
Desha 2	Pre-emerge; 1 qt. generic paraquat + 2.5 oz. Enlite	1 st ; 1 qt. Prefix + 6 oz. Flexstar + 1.3 oz. Pursuit + 22 oz. RoundUp PowerMax 2 nd ; 22 oz. Mad Dog 5.4 + 1.33 pt. Charger Basic
Greene	Pre-emerge; 1.3 pt. metolachlor	1 st ; 36 oz. Liberty + 1.25 pt. metolachlor 2 nd ; 29 oz. Liberty
Jackson	Incorporated; 2 pt. metolachlor	1st; 1qt. Liberty
Jefferson	Pre-emerge; 1 qt. Cornerstone + 1.2 pt. Me-Too-Lachlor	1 st ; 1 qt. Total + 2.5 oz. Zidua 2 nd ; 1 qt. Total + 1.25 pt. Me-Too-Lachlor + 7 oz. Section Three Pre-harvest; 1 pt. generic paraquat + 1% NIS
Lincoln	Burndown; 1 qt. RoundUp PowerMax + 1 qt. 2,4-D, + .5 oz. Firstshot + 1% MSO Pre-emerge; 1.5 pt. Boundary + .5 pt. Me-Too-Lachlor	50 oz. Warrant Ultra + 6 oz. Flexstar + 22 oz. RoundUp PowerMax
Lonoke	Pre-emerge; 2 oz. Zidua	1 st ; 1 qt. Liberty + 1.3 pt. Charger Basic 2 nd ; 1qt. Liberty + 1.2 pt. Charger Basic
Miller	Pre-emerge; 40 oz. generic paraquat + 1.5 pt. Boundary	36 oz. Liberty + 1 qt. Prefix + 6 oz. Flexstar
Randolph		1 st ; 1 qt. glyphosate + 1.3 pt. s-metolachlor 2 nd ; 1 qt. glyphosate
St. Francis	Pre-emerge; 1.3 pt. Dual Magnum	1 st ; 1 qt. glyphosate + 1qt. Prefix
Washington	Burndown; 1 qt. glyphosate Pre-emerge; 3 oz. Fierce + 4 oz. Dimetric	1 st 1 qt. Liberty + 16 oz. Select Max

Table 4. Fungicide and insecticides applications in 2018 Soybean Research Verification fields by county.

County	Aerial Web Blight	Frogeye	Bollworm/Defoliators	Stink Bug
Arkansas			1.6 oz. Heligen + 1% COC	
Ashley				6.4oz. Tundra + 1% COC
Chicot				
Clark				
Clay				
Conway				
Crawford				
Crittenden				
Cross 1				
Cross 2				
Desha 1			1.6 oz. Heligen + 1% COC	
Desha 2			1.6 oz. Heligen + 1% COC	
Greene				
Jackson				
Jefferson				
Lincoln			1.6 oz. Heligen + 1% COC	
Lonoke				
Miller				
Randolph				
St. Francis				
Washington				

Table 5. Irrigation and rainfall information for the 2018 Soybean Research Verification Fields.

County	Irrigation Type	Number of Irrigations	Rainfall (in)
Arkansas	Furrow	5	11.3
Ashley	Furrow	4	13.2
Chicot	Furrow	3	23.3
Clark	Dryland	N/A	18.7
Clay	Furrow	6	19.2
Conway	Pivot	7	19.6
Crawford	Pivot	3	23.3
Crittenden	Dryland	N/A	10.9
Cross 1	Furrow	4	18.4
Cross 2	Pivot	6	19
Desha 1	Furrow	3	17
Desha 2	Furrow	3	18
Greene	Furrow	5	21.5
Jackson	Flood	1	11.5
Jefferson	Furrow	7	22.6
Lincoln	Furrow	6	15.5
Lonoke	Furrow	6	8.7
Miller	Dryland	N/A	9.2
Randolph	Furrow	4	20.9
St. Francis	Furrow	6	21.4
Washington	Dryland	N/A	16

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2018 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. Production data from the 20 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 2018 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 \$186.73/acre for Washington County to \$359.47/acre for Lincoln County, while operating costs per bushel range from \$3.05/bu. for Washington County to \$6.67/bu. for Jackson County. Total costs per acre (operating plus fixed) range from \$234.24/acre for Washington County to \$452.22/acre for Lincoln County, and total costs per bushel range from \$3.83/bu. for Washington County to \$7.90/bu. for Jackson County. Returns to operating costs range from \$91.99/acre for Jackson County to \$568.63/acre for Clark County, and returns to total costs range from \$49.91 for Jackson County to \$514.78/acre for Clark 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 2018 SRVP was 62.81 bushels, but ranged from 34.2 bushels/acre for Jackson County to 83.5 bushels/acre for Clark County. The Arkansas average cash price for the 2018 SRVP was estimated from January through October 31 daily price quotes of the cash market price or cash booking price to be \$9.36/bu., 30 cents less than for the same period in 2017. Arkansas producers set the price for portions of their crop throughout the year. The Little Rock office of the National Agriculture Statistics Service began reporting 2018 Arkansas crop booking prices on January 2 and switched to cash market quotes for the 2018 crop on October 1.

The average operating expense for the 20 SRVP fields in 2018 was \$254.59/acre (Table 7). Seed accounted for the largest share of operating expenses on average (25.92%) followed by herbicides (19.36 percent), fertilizers & nutrients (15.12 percent), post-harvest expenses (7.82%), irrigation energy costs (6.69%), repairs & maintenance (6.52%), diesel fuel for non-irrigation activities (5.84%), and custom applications (4.98%). The average return to operating expenses for the 20 fields was \$333.34/acre and ranged from \$61.99/acre for Jackson County to \$568.63/acre for Clark County. The average return to total specified expenses for the 20 fields was \$259.93/acre, and ranged from \$49.91 for Jackson County to \$514.78/acre for Clark County.

Table 6. Operating Costs, Total Costs, and Returns for Soybean Research Verification Program, 2018

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	298.41	6.05	163.04	86.56	384.97	76.48	7.81
Conway	236.06	3.53	389.19	116.70	352.78	272.47	5.28
Crawford	212.74	3.74	319.84	89.55	302.28	230.30	5.31
Crittenden	235.30	3.73	354.38	42.21	277.52	312.16	4.41
Cross-1	213.74	3.42	371.26	85.50	299.25	285.75	4.79
Cross-2	279.01	4.74	272.29	109.29	388.30	163.01	6.59
Greene	261.61	4.89	239.15	86.82	348.43	152.33	6.51
Jackson	228.12	6.67	91.99	42.09	270.20	49.91	7.90
Randolph	218.19	5.37	161.83	73.45	291.65	88.37	7.18
St. Francis	250.16	3.64	393.81	71.40	321.55	322.42	4.67
Washington	186.73	3.05	386.10	47.51	234.24	338.59	3.83
North Avrg.	238.19	4.44	285.72	77.37	315.56	208.34	5.84
Arkansas	267.90	3.82	388.23	114.36	382.26	273.88	5.45
Ashley	270.32	3.93	373.17	85.14	355.47	288.03	5.17
Chicot	274.09	4.30	323.07	100.00	374.10	223.06	5.86
Clark	212.91	2.55	568.63	53.86	266.78	514.78	3.19
Desha-1	254.85	3.06	523.91	93.31	348.15	430.60	4.18
Desha-2	240.12	3.92	333.66	75.46	315.57	258.19	5.15
Jefferson	268.54	3.53	442.83	73.19	341.72	369.64	4.50
Lincoln	359.47	5.56	246.12	92.75	452.22	153.37	6.99
Lonoke	323.50	4.67	324.21	112.45	435.95	211.76	6.30
South Avrg.	274.63	3.93	391.54	88.95	363.58	302.59	5.20
Statewide Average	254.59	4.21	333.34	82.58	337.17	250.76	5.55

Table 7. Summary of Revenue and Expenses per Acre, Soybean Research Verification Program, 2018 (1)							
	Arkansas	Ashley	Chicot	Clark	Clay	Conway	Crawford
Receipts							
Yield (bu.)	70.1	68.8	63.8	83.5	49.3	66.8	56.9
Price	9.36	9.36	9.36	9.36	9.36	9.36	9.36
Total Crop Revenue	656.14	643.50	597.17	781.56	461.45	625.25	532.58
Seed	60.00	60.00	60.00	60.43	60.00	65.40	64.20
Fertilizers & Nutrients	60.59	56.24	52.50	52.50	61.46	0.00	21.56
Herbicides (2)	22.61	46.17	63.19	37.35	45.04	75.28	56.15
Insecticides (2)	6.88	4.93	0.00	0.00	0.00	0.00	0.00
Fungicides (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom Applications	14.00	15.00	7.00	0.00	28.00	0.00	0.00
Diesel Fuel (3)	24.07	17.12	18.37	13.06	16.97	13.17	13.99
Repairs & Maintenance	19.66	17.67	18.77	12.71	17.85	21.25	17.17
Irrigation Energy Costs	15.28	12.22	15.59	0.00	31.18	27.63	9.87
Labor, Field Activities	13.55	10.08	9.24	6.49	12.46	7.65	7.67
Interest	5.17	5.23	5.34	3.92	5.95	4.52	4.10
Other Inputs & Fee, Pre-harvest	3.88	3.88	3.88	0.00	3.88	0.00	0.00
Post-harvest Expenses	22.21	21.78	20.21	26.45	15.62	21.16	18.03
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Operating Expenses	267.90	270.32	274.09	212.91	298.41	236.06	212.74
Returns to Operating Expenses	388.23	373.17	323.07	568.63	163.04	389.19	319.84
Capital Recovery & Fixed Costs	114.36	85.14	100.00	53.86	86.56	116.70	89.55
Total Specified Expenses	382.26	355.47	374.10	266.78	384.97	352.78	302.28
Returns to Specified Expenses	273.88	288.03	223.06	514.78	76.48	272.47	230.30
Operating Expenses/Yield Unit	3.82	3.93	4.30	2.55	6.05	3.53	3.74
Total Expenses/Yield Unit	5.45	5.17	5.86	3.19	7.81	5.28	5.31
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, 2017 (2) - CONTINUED							
	Crittenden	Cross-1	Cross-2	Desha-1	Desha-2	Greene	Jackson
Receipts							
Yield (bu.)	63.0	62.5	58.9	83.2	61.3	53.5	34.2
Price	9.36	9.36	9.36	9.36	9.36	9.36	9.36
Total Crop Revenue	589.68	585.00	551.30	778.75	573.77	500.76	320.11
Seed	65.40	68.40	68.40	60.00	60.00	60.00	60.00
Fertilizers & Nutrients	17.25	40.90	34.64	34.61	21.74	56.50	35.00
Herbicides ⁽²⁾	269.54	14.20	68.89	47.25	61.48	46.55	26.80
Insecticides ⁽²⁾	0.00	0.00	0.00	6.88	6.18	0.00	0.00
Fungicides ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom Applications	35.00	7.00	0.00	7.00	7.00	7.00	28.50
Diesel Fuel ⁽³⁾	7.36	17.03	8.81	17.46	15.44	13.78	9.22
Repairs & Maintenance	12.32	15.67	20.62	19.40	15.63	17.78	7.55
Irrigation Energy Costs	0.00	15.28	47.37	15.59	15.59	25.98	2.15
Labor, Field Activities	3.94	7.50	6.14	11.61	9.11	8.04	5.35
Interest	4.53	4.08	5.48	4.81	4.65	5.15	3.84
Other Inputs & Fee, Pre-harvest	0.00	3.88	0.00	3.88	3.88	3.88	3.88
Post-harvest Expenses	19.96	19.80	18.86	26.36	19.42	16.95	10.83
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	35.00
Total Operating Expenses	235.30	213.74	279.01	254.85	240.12	261.61	228.12
Returns to Operating Expenses	354.38	371.26	272.29	523.91	336.66	239.15	91.99
Capital Recovery & Fixed Costs	42.21	85.50	109.29	93.31	75.46	86.82	42.09
Total Specified Expenses	277.52	299.25	388.30	348.15	315.57	348.43	270.20
Returns to Specified Expenses	312.16	285.75	163.01	430.60	258.19	152.33	49.91
Operating Expenses/Yield Unit	3.73	3.42	4.74	3.06	3.92	4.89	6.67
Total Expenses/Yield Unit	4.41	4.79	6.59	4.18	5.15	6.51	7.90
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, 2017 (3) - CONTINUED									
	Jefferson	Lincoln	Lonoke	Randolph	St. Francis	Washington	North	South	State Average
Receipts									
Yield (bu.)	76.0	64.7	69.2	40.6	68.8	61.2	55.97	71.17	62.81
Price	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36
Total Crop Revenue	711.36	605.59	647.71	380.02	643.97	572.83	523.90	666.17	587.93
Seed	75.00	120.00	58.29	62.40	68.40	63.60	64.20	68.19	66.00
Fertilizers & Nutrients	14.38	50.49	51.96	39.66	50.90	17.25	34.10	43.89	38.51
Herbicides (2)	77.25	60.97	73.25	14.00	25.38	54.26	45.10	54.39	49.28
Insecticides (2)	0.00	6.74	0.00	0.00	0.00	0.00	0.00	3.51	1.58
Fungicides (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom Applications	14.00	14.00	28.00	21.00	21.00	0.00	13.41	11.78	12.68
Diesel Fuel (3)	13.66	13.63	25.77	13.94	14.35	10.41	12.64	17.62	14.88
Repairs & Maintenance	13.06	21.81	21.40	15.64	14.46	11.56	15.62	17.79	16.60
Irrigation Energy Costs	18.19	31.18	18.34	20.79	18.34	0.00	18.05	15.78	17.03
Labor, Field Activities	9.89	9.14	14.34	9.70	6.84	6.74	7.46	10.38	8.77
Interest	5.15	7.13	6.35	4.32	4.81	3.52	4.57	5.31	4.90
Other Inputs & Fee, Pre-harvest	3.88	3.88	3.88	3.88	3.88	0.00	2.12	3.45	2.72
Post-harvest Expenses	24.08	20.50	21.92	12.86	21.80	19.39	17.73	22.55	19.90
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	3.18	0.00	1.75
Total Operating Expenses	286.54	359.47	323.50	218.19	250.16	186.73	238.19	274.63	254.59
Returns to Operating Expenses	442.83	246.12	324.21	161.83	393.81	386.10	285.72	391.54	333.34
Capital Recovery & Fixed Costs	73.19	92.75	112.45	73.45	71.40	47.51	77.37	88.95	82.58
Total Specified Expenses	341.72	452.22	435.95	291.65	321.55	234.24	315.56	363.58	337.17
Returns to Specified Expenses	369.64	153.37	211.76	88.37	322.42	338.59	221.53	302.59	259.93
Operating Expenses/Yield Unit	3.53	5.56	4.67	5.37	3.64	3.05	4.44	3.93	4.21
Total Expenses/Yield Unit	4.50	6.99	6.30	7.18	4.67	3.83	5.84	5.20	5.55
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									