

# Arkansas **ROW CROP VERIFICATION**



**UofA** DIVISION OF AGRICULTURE  
RESEARCH & EXTENSION  
*University of Arkansas System*



## Cotton Research Verification Program 2013 Annual Report

University of Arkansas, United States Department of Agriculture and County Governments Cooperating

# Table of Contents

Authors and Acknowledgements.....	3
Location of 2013 Cotton Research Verification Program Fields....	4
Introduction and Objectives.....	5
Methods and Materials and Field Information.....	6
2013 Growing Season.....	7
Individual Field Reviews.....	8-15
Economic Report .....	16
Appendix.....	17-26

# University of Arkansas Division of Agriculture Cotton Research Verification Program 2013 Annual Report

**Authors:** Blake McClelland, Program Associate -Cotton CRVP Coordinator  
Dr. Tom Barber, Extension Weed Scientist-Cotton CRVP Leader  
Dr. Archie Flanders, Agricultural Economist - Economic Analyst

## **Acknowledgements**

### Cooperating Producers

Tyler Kirklin  
Vance Austin  
David Davault  
Bill Benard  
Heath McGaughey  
Ramey Stiles  
Caleb Jones  
James Ruggeri

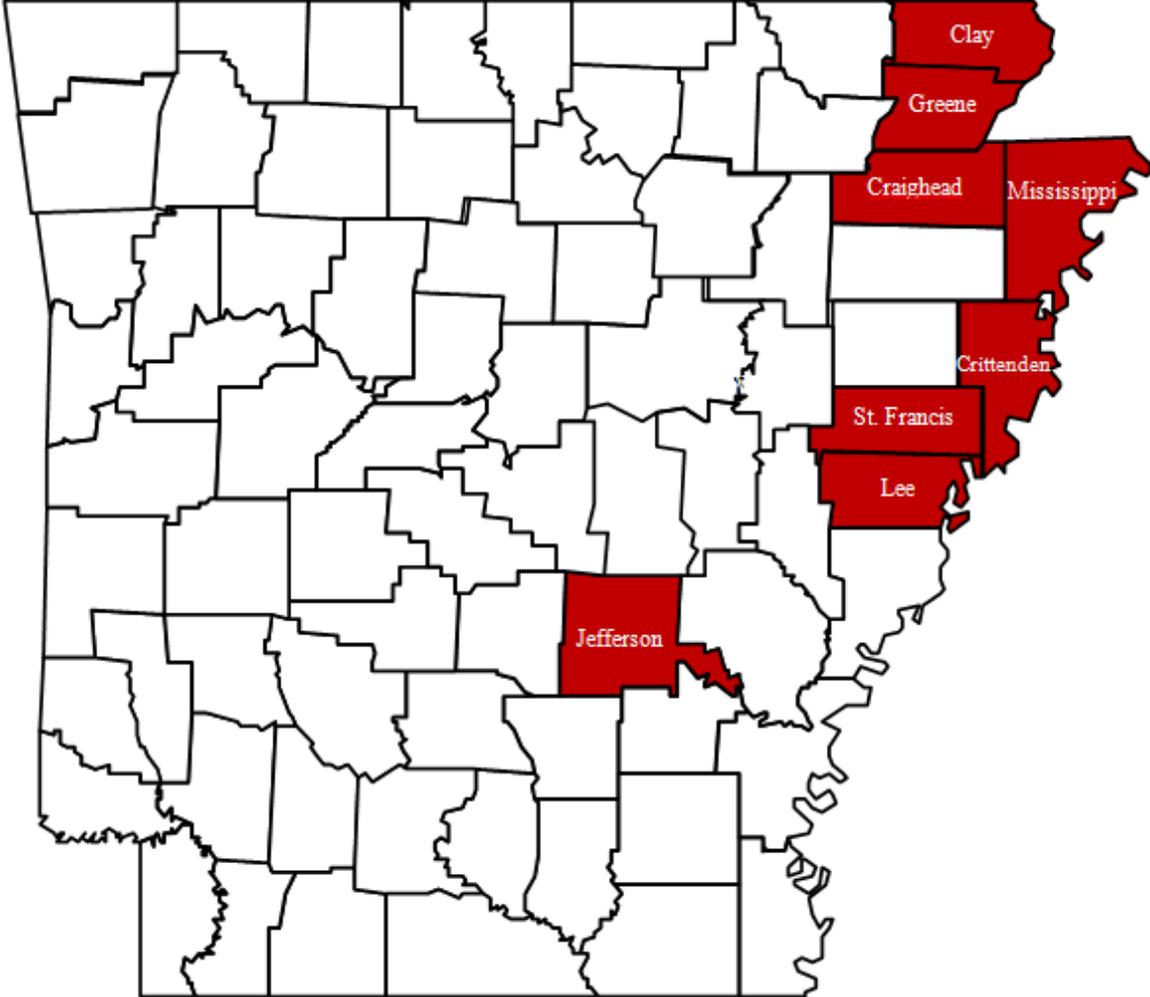
### Participating Extension Agents

Andy Vangilder- Clay County  
Ray Benson- Mississippi County  
Dave Freeze- Greene County  
Stan Baker- Lee Counties  
Branon Thiesse- Craighead County  
Mitch Crow and David Carwell- St. Francis County  
Anthony Wittington- Jefferson County

### Cooperative Extension Service

Tom Barber- Extension Weed Scientist  
Gus Lorenz- Associate Department Head/Extension Entomologist  
Glenn Studebaker- Extension Entomologist  
Travis Fasse- Extension Plant Pathologist  
Archie Flanders- Extension Economist  
Leo Espinoza- Extension Soil Scientist  
Chris Henry- University of Arkansas Irrigation Engineer  
Robert Bacon- Department Head Crop, Soil and Environmental Sciences  
Martha Sartor- Delta District Director

**Figure 1. Locations of the 2013 Cotton Verification Fields**



## **Introduction**

The University of Arkansas, Division of Agriculture has been conducting the Cotton Research Verification Program (CRVP) since 1980. This is an interdisciplinary effort in which recommended Best Management Practices and production technologies are applied in a timely manner to a specific farm field. Since the inception of the CRVP in 1980, there have been 255 irrigated fields entered into the program. Producers are asked what they would like to improve in their current operation then a field is chosen that fits a standard model of the producers operation and requires the necessary recommendations to improve the farm.

Once a field is chosen samples are taken to determine the nutrient levels of the field. The samples are taken in a grid pattern to achieve a more complete picture of the field's fertility requirements. Results are then provided to the producer who can choose to use the precision application method, if it is available in their respective areas. Nematode samples are also taken and problem spots in the field are noted so that they can be monitored more closely during the year for potential problems.

All of the recommendations made to the producers in the program are based on proven research by University of Arkansas Division of Agriculture researchers in their respective disciplines. The producer agrees to apply the necessary recommendations in a timely manner.

There were eight fields enrolled in the 2013 CRVP, all of the fields were furrow irrigated except the Crittenden County field. The fields were located from Jefferson County in the southeast part of the state to Clay County in the northeast part of the state.

## **Objectives**

The Cotton Research Verification Program objectives are:

1. Conduct on-farm field trials to verify the utility of research-based recommendations with the intent of optimizing potential for profits.
2. Educate cotton producers with timely management decisions through Best Management Practices and Integrated Pest Management.
3. Develop an on-farm database for use in economic analyses and computer assisted management programs.
4. To aid researchers in identifying areas of production requiring further study and improve or refine existing recommendations which contribute to profitable cotton production.
5. Increase county Extension agent's expertise in cotton production.
6. Utilize and incorporate data and findings from the CRVP program into Extension educational program at the county and state level.

The CRVP program is a highly successful demonstration of the importance of timely management decisions and incorporation of new technology into cotton production. It also serves as an excellent training tool for county Extension agents to learn more about cotton production. Contributing to the success of the program is the commitment of extension and research

personnel; grower cooperation; the program organization, planning and implementation; and the close attention to program objectives. The CRVP allows participants to manage field situations that are not always conducive to maximum economic yield. The program also allows demonstration of alternative production systems for problem or yield-limiting situations encountered in grower fields.

## **Methods and Materials**

Annually, a committee comprised of University of Arkansas Research and Extension, personnel meet and agree on recommended programs and management options to be used in the current program. The committee is broad based with Research and Extension each having at least one representative from each subject matter area. The committee members also serve as advisors during the growing season. The CRVP coordinator is responsible for implementing recommendations on the CRVP demonstrations in-season.

Cooperators are chosen by the county Extension staff and approved by the CRVP coordinator. The cooperator agrees to manage the field for two years using research-based recommendations as directed by the CRVP coordinator and county Extension agent. Field visits are conducted weekly by the verification coordinator and the county agent during the production and harvest period. A designated county Extension agent in each county collects field data twice weekly and maintains regular contact with the CRVP coordinator and cooperator. An Area Farm Management Specialist summarizes the economic analysis on each field through use of field operations data collected during the season.

Twice weekly insect scouting is performed during the season using the Cooperative Extension Service whole plant search method. Irrigation scheduling and plant monitoring data are collected and updated at least once a week. Plant monitoring is evaluated through the use of COTMAN.

## **2013 Field Information**

General Information regarding location, variety, soil series, planting date, previous crop, acres per field, and yield is included in the table below. The average field size was 52 acres over the eight fields in the 2013 verification project.

Soil type varied across all seven locations. Three locations (Craighead, Greene and Jefferson) had lighter silt and sandy loam type soils while the other six locations (Clay, Crittenden, Lee, Mississippi, and St. Francis) had heavier soils with increased clay content. Soil analysis was performed for each location to gain information about the fertility program needed for each field. Nematode analysis was also performed to gather information on the species and number of nematodes in each field.

**Table 1**

**Variety, Soil Series, Previous Crop, Acreage, Lint Yield in the 2013 Cotton Verification Program by County**

<b>County</b>	<b>Variety</b>	<b>Soil Series</b>	<b>Previous Crop</b>	<b>Acreage</b>	<b>Lint Yield</b>
<b>Clay</b>	FM 1944 GLB2	Falaya-Amagon	Cotton	74	1112
<b>Craighead</b>	FM 1944 GLB2	Fountain	Cotton	64	1160
<b>Crittenden</b>	FM 1944 GLB2	Tunica	Cotton	55	1111
<b>Greene</b>	DPL 0912 B2RF	Dundee	Cotton	46	1262
<b>Jefferson</b>	ST 4946 GLB2	Roxana	Cotton	45	906
<b>Lee</b>	DPL 1311 B2RF	Alligator-Sharkey	Cotton	42	1530
<b>Mississippi</b>	FM 1944 GLB2	Rilla-Herbert	Cotton	35	1128
<b>St. Francis</b>	NG 1511 B2RF	Callowy-Grenada	Cotton	53	1643
<b>Average</b>				<b>52</b>	<b>1232</b>

### **2013 Growing Season**

The 2013 growing season began with a rocky start as a cooler than normal April delayed planting across the state. Late cool snaps on April 20<sup>th</sup>, 25<sup>th</sup>, and May 4<sup>th</sup> and 5<sup>th</sup> kept producers from planting. Warmer weather returned on May 6<sup>th</sup> and the season began. Although the weather returned to normal, most of the state's cotton was planted during the period of May 13<sup>th</sup>-May 24<sup>th</sup>. As the season progressed, normal temperatures prevailed through July. In August, a weather system moved into the northern Mid-South that caused cloudy, wet conditions. Temperatures in Northeast Arkansas dropped into the mid and upper 80's. Several cloudy days were recorded and fruit shed was noticed in the mid and upper canopy of the plant. South Arkansas was not affected by the weather system and normal temperatures and dry conditions prevailed. The entire state was affected by a cool front that entered the state on August 15<sup>th</sup>. After this period, normal August temperatures returned to the state for the rest of the growing season.

Plant bug numbers were moderate this year and insecticide applications were made starting around June 20<sup>th</sup>. Fields in the verification program were treated an average of three times for plant bugs. Bollworm pressure was light and no additional treatments had to be made for control. The hot dry conditions were favorable for spider mite colonies to develop. Glyphosate resistant pigweed pressure was present throughout the state again this year. The Greene County field had the heaviest pigweed pressure of all the verification fields. Residual herbicides were used to deter pigweed germination and escapes were hand weeded to reduce the amount of viable pigweed seed in the soil seed bank. Glyphosate resistant horseweed (aka Marestalk) was not a problem in any off the verification fields this year due to an appropriate burndown program with the use of residual herbicides.

# Results and Discussion

## Clay County

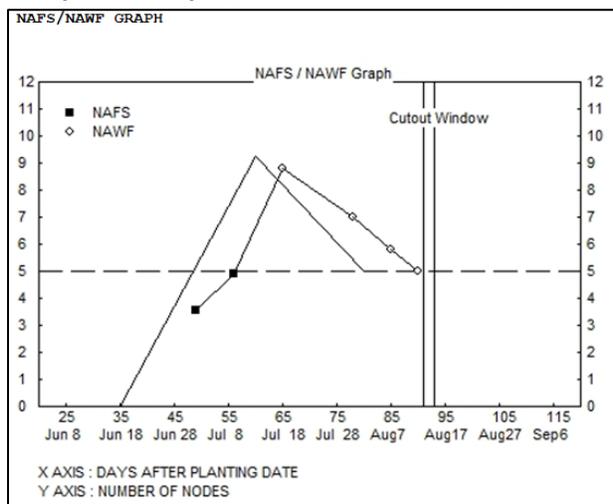
The Clay County field entered the second year of the program. It combined an experienced county agent with a young cotton producer. The success of the 2012 season encouraged the young producer to continue to incorporate University of Arkansas recommendations to his production practices. The second goal of improving a field that was phosphorus and potassium deficient continued this season.

Field work was completed the previous fall and new rows were pulled up. 180 lbs of 0-0-60 was applied during the fall. In the early spring soil samples were taken to check fertility levels. 150 lbs of 0-18-36-1 (27 units of P<sub>2</sub>O<sub>5</sub>, 54 units of K<sub>2</sub>O, 1.5 units of Sulfur) was added. 102.5 lbs of nitrogen and 12 lbs of sulfur were applied at the 5<sup>th</sup> leaf stage.

Roundup Powermax and Banvel were applied as a Burndown. Reflex was applied after the rows were knocked down. The field was planted on May 14<sup>th</sup> in Fibermax 1944 GLB2. The final plant population was 36,000 plants per acre. Cotoran was applied at planting and two applications of Liberty and Dual were applied to the field. The field stayed clean throughout the growing season. Insect pressure was moderate and 4 applications were made mainly for plant bugs. A total of 20 ounces of plant growth regulator were applied during the season.

A cool wet start to the growing season suppressed early season plant growth. Two heavy rains after planting caused some seedling disease that reduced the plant stand. Weather more conducive to plant growth returned and the field grew normally. The field reached cut-out (NAWF-5) on August 12<sup>th</sup>. The field yielded 1112 lbs/ac which was 120 lbs/ac less than the CRVP average. Although the yield was less than the CRVP average there was an increase of 58 lbs/ac over the previous year.

## Clay County (COTMAN Curve)



## Craighead County

The Craighead County field was in the third year of the program. The producer was making a shift to planting more acres of Liberty Link tolerant cotton and wanted to add the University's Liberty Link recommendations to his production practices.

Pre-plant fertilizer was applied at a variable rate and new rows were put up. Roundup was applied as a burndown and Treflan was applied for a residual. Direx was applied at planting for broadleaf weed control. Fibermax 1944 GLB2 was planted. This variety contains traits that make it tolerant to both glyphosate and glufosiate (Liberty). The field was fully emerged by May 15<sup>th</sup>.

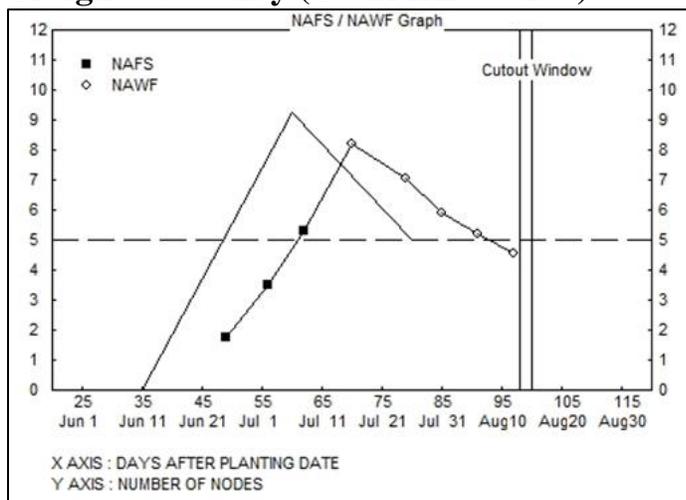
Two weeks after emergence the plants were affected by a sand storm that damaged the young leaf tissue. 110 units of nitrogen were applied and the field grew normally the rest of the season.

Morningglory was the dominant weed in this field. Liberty was applied early to suppress morningglories that had already emerged. The first Dual application was applied a week later to give the cotton a chance to recover from the sand damage. Roundup was tank mixed with the Dual for grass control and extra morningglory control. Insect pressure was mild in this field. A total of three treatments for plant bugs were required based on threshold levels.

A new disease to Arkansas was found in this field. Target Leaf Spot (*Corynespora* leaf spot) was noticed in the state for the first time this season. Rainy, cloudy weather is conducive for development of this disease. The northern part of Arkansas had cloudy, wet weather for the first several days of August. The disease can cause premature defoliation. The Craighead County field was the most affected of all the 2013 CRVP fields. However, the infection occurred close to cut-out so yield loss was minimal.

Even though the inputs were applied in a timely manner, the cloudy weather in August caused fruit loss to occur. The field yielded 1160 lbs/acre, which was 72 lbs less than the mean in the 2013 verification program.

### Craighead County (COTMAN Curve)



## Crittenden County

A non-irrigated field was chosen for the verification in Crittenden County in 2013. The field was chosen due to its close proximity to other fields that the producer had in that area and the pigweed issue that the producer had in the field. The producer wanted to incorporate the Liberty Link system into his farming operation and asked the university to help him work on a weed control plan for his farm.

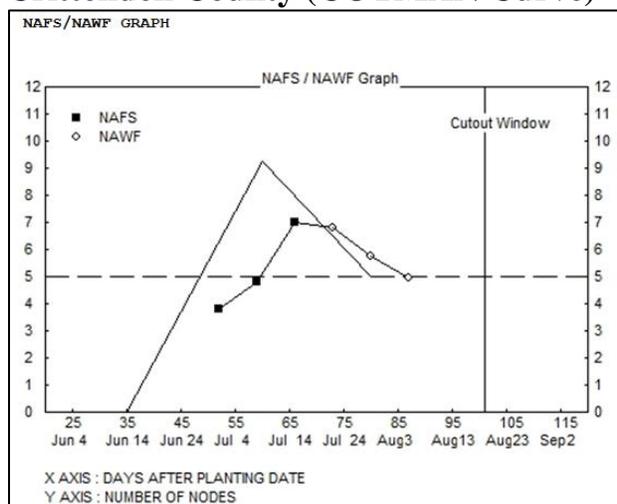
Heavy spring rains delayed field work. A field cultivator was used to smooth the field and provide better conditions for planting. Soil samples were taken and results indicated no phosphorus or potassium was needed in this field. The field was planted into FM 1944 GLB2. 110 units of nitrogen were applied in the form of 32% liquid UAN.

Diuron and Liberty was applied at planting for broadleaf weed control. Another application of Liberty was applied later in the season for post emergence pigweed control. A lay-by application of Direx and Liberty was applied to the field. Excellent weed control was noted in this field.

This field was affected by heavy plant bug infestations early in the season. The field was sprayed 4 weeks in a row to control plant bugs. However, after the fourth application plant bug numbers were reduced in the field below economic thresholds (an average of 3 plant bugs per 5 row feet). Centric was applied for control before bloom. Acephate and Bidrin were used after bloom.

Timely input applications and rainfall made for a successful season and the field yielded well at 1,111 lbs/A. This is 121 lbs/ac below the CRVP average, however, it is a very good average for a non-irrigated field.

### Crittenden County (COTMAN Curve)



## Greene County

The Greene County field was an opportunity to work with a veteran county agent and a farm family that had been out of cotton for several years. The producer's father had hosted grain verification fields on his farm and wanted his son's to get experience in cotton production through the Cotton Research Verification Program. The producer wanted to work on incorporating university recommendations into his production practices.

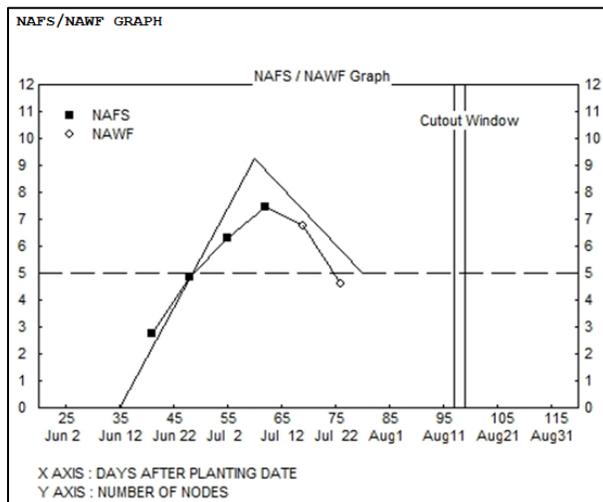
Rows were pulled and knocked down. Burndown herbicide was applied. Valor was used in the burndown for residual control until planting. Even though glyphosate resistant pigweed is the prevalent weed in the area and there would be little options for post-emergence weed control, Deltapine 0912 B2RF was chosen for the variety's success on sandy soil. A weed control plan that relied on residual herbicides was developed.

At planting, Gramoxone was applied for post-emergence weed control and Caporal was added for residual weed control. Roundup and Dual was applied a few weeks later for post-emergence grass control as well as adding another layer of residual control. A lay-by application of Gramoxone was applied to the middles using row hoods for control of pigweed that had emerged since the last residual application. Valor was included in this application for long term residual control. The weed control plan worked well; however, some escapes were noticed and were hand weeded to prevent them from going to seed.

Insect pressure was mild. Three applications were made for plant bug control and no other insect pressure was noticed during the season.

Inputs were made on a timely basis and the field responded well with a yield of 1262 lbs/A which was 30 lbs/A higher than the average of the program.

### Greene County (COTMAN Curve)



## Jefferson County

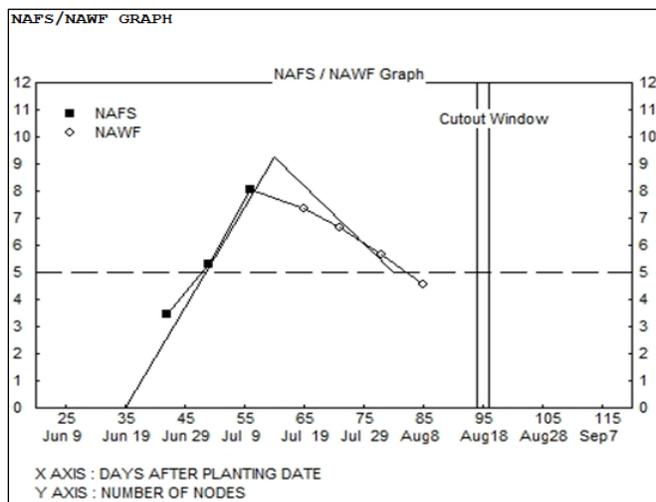
Fall tillage was conducted to bury the residue from the previous crop. The field was disked again in the spring and Treflan was applied and incorporated. Beds were pulled up and knocked down prior to planting to produce a fine seedbed. The field was planted in ST 4946 GLB2. Cotoran was applied as a pre-emerge application to add residual control of weeds. Liberty and Dual was applied for early weed control. A total of 95 units of nitrogen were applied and the water furrows were then plowed. Liberty and Dual were applied again after plowing.

During the first Liberty/Dual application, the cotton in half the field was injured by some carryover of a previous chemical application. The producer had been using Fierce herbicide on some soybean fields for residual weed control. Although the producer used clean water and ammonia to clean the tank before changing herbicides, enough residue was left in the tank and hoses that the Liberty dissolved it into the solution. The carryover herbicide caused leaf damage and even killed some of the small cotton. Most of the plants eventually recovered, however, a significant difference was noticed in the plant height and vigor for most of the season.

Insect pressure was mild. An application of 1/3 lb. of acephate was applied after the chemical damage. This application was used to protect the damaged cotton from further setback by thrips that were in the field at the time. The field had to be sprayed 3 times for plant bugs. An application of Transform and Diamond was applied to the field. Plant bug numbers were low enough to prevent further sprays for several weeks. After the neighboring corn fields started to dry down a flush of plant bugs invaded the field. An application of 3/4 lb. of acephate and bifenthrin was used to control the insects before the field reached the point that insecticide applications could be terminated.

The field was slightly ahead of schedule when it began squaring. Soon after the first irrigation the weather turned hot which kept the field on schedule (shown in the COTMAN graph). This field yielded 906 lbs/acre which was 326 lbs below the mean of the program. This field was the lowest yielding field in the Cotton Research Verification Program. The chemical damage to the cotton early may have contributed to the lower yield.

### Jefferson County (COTMAN Curve)



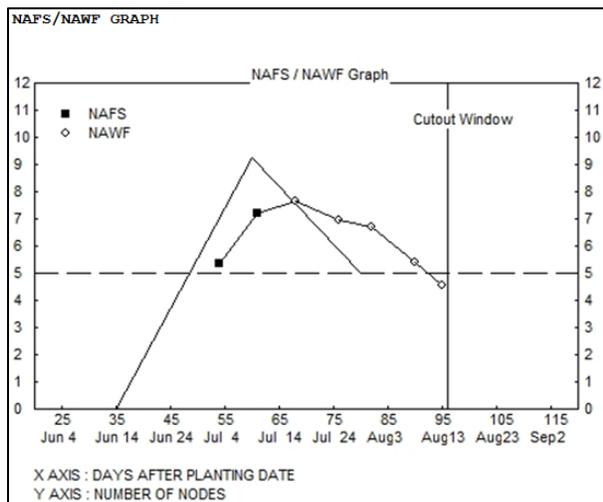
## Lee County

Early spring tillage was performed and new beds were put up and knocked down. Reflex was applied, after the beds were conditioned, for pre-emergence pigweed control. Deltapine 1311 B2RF was planted. Although this field had a history of resistant pigweed, weed control was obtained using residuals and non-selective herbicides with row hooded sprayers. After cotton emergence, the field was sprayed with Roundup for early season post-emergence grass control. A week later an application using a row hooded sprayer was made. MSMA and Dual were applied underneath the cotton while the middles of were sprayed with Gramoxone and Caporal. This application worked well and the residuals held for several weeks. A lay-by application of Gramoxone and Warrant were applied. The field reached canopy closer soon after and stayed weed free.

Insect pressure in this field was mild and only three applications were needed for insect control. As the field grew during the season, the plants started to show a yellowing in color. The season's nitrogen had been applied before planting and a considerable amount had leached out prior to uptake by the plant. 100 lbs/A of ammonium sulfate was applied to the field to alleviate the stress from the lower nitrogen. The field recovered quickly and was in good shape the rest of the season. However, the additional nitrogen caused the field to take longer to cut-out. The best way to prevent nitrogen loss in the future is to split the nitrogen applications into two applications of one a few weeks before planting and the balance of the nitrogen being applied before squaring.

The field responded well to the inputs and yielded well. The field yielded 1530 lbs/acre which was 298 lbs/acre higher than the CRVP average.

### Lee County (COTMAN Curve)



## Mississippi County

The Mississippi County field paired an experienced cotton farmer with a county agent who also had extensive cotton experience. The agent, a former consultant, wanted to continue to familiarize himself with the University of Arkansas recommendations for cotton production. The producer expressed that he wanted to expand on the work of irrigation efficiency and timing of irrigations.

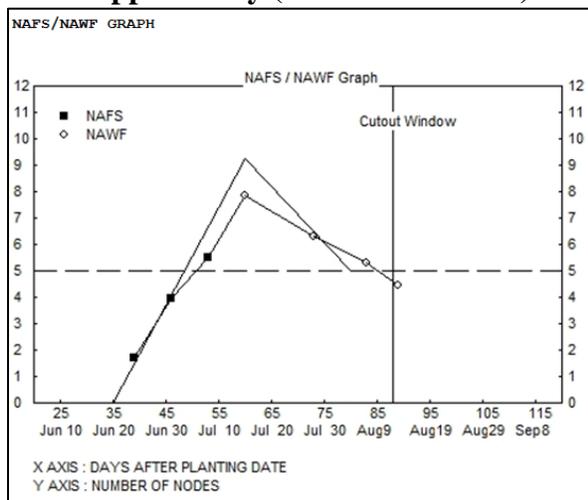
Rows were pulled and knocked down in preparation for planting. Reflex and Gramoxone were applied to the field for residual pigweed control and post-emergence broadleaf weed control. The field was planted in Fibermax 1944 GLB2. Due to the length of time between the Reflex application and planting the Reflex may have started to breakdown. To prevent any pigweed escapes Direx was applied for pre-emergence control. Some pigweed escapes emerged between planting and the time the Direx was activated by a rain. Liberty and Dual were applied to control these escapes and add another level of residual control the field received a rain a few days later which activated the Dual.

Insect pressure was very mild in this field and it was only treated three times for plant bug control. An application of Centric and Diamond was made first. Two weeks later an application of Bidrin and Diamond was made. After the second application was made, the number of plant bugs stayed below the economic threshold for several weeks.

The producer wanted to work on irrigation efficiency and timing of irrigation applications. This work was even more important in a year that was very dry. To improve irrigation efficiency the PHAUCET program was used to indicate the proper whole size to enable every row to be watered. Irrigating every row improved water infiltration and uptake by the plants. An atmometer (ET gauge) was used to indicate when irrigation applications needed to be made. A surge valve was also added. A surge valve alternates the flow from one side of the field to the other in regular increments. Increased saturation was noticed and the field watered well.

The field responded well to the inputs and timely irrigations. As fall arrived the field was in good condition. It yielded 1128 lbs/acre, which was 104 lbs less than the mean in the 2013 verification program.

### Mississippi County (COTMAN Curve)



## St. Francis County

The St. Francis County field combined a young cotton producer with good experience in cotton production with an experienced county agent. A new county agent with little cotton experience was also part of the program to train him in cotton production and University of Arkansas recommendations. The producer was interested in using recommendations in his production system.

A pre-plant application of 300 lbs/acre of 0-18-36 was applied and rows were pulled. The field was planted in NexGen 1511 B2RF. Diuron was applied pre-emerge for weed control. The field received a rain soon after planting which activated the diuron and gave enough moisture for the field to emerge to a good stand. 200 lbs of Urea were applied to the field.

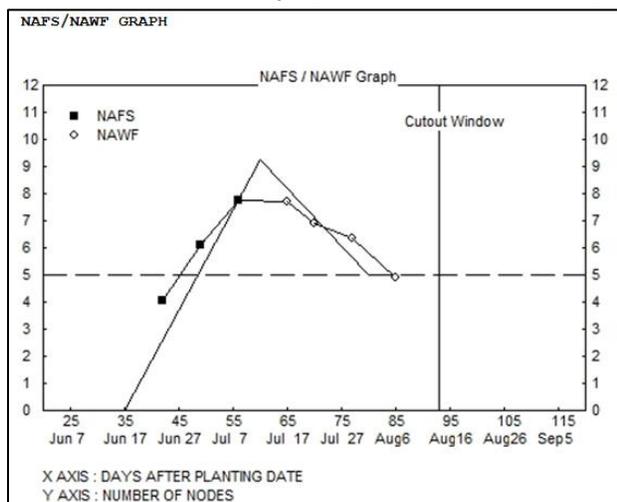
This field grew well and started fruiting early. The field grew well the rest of the season and reached cut-out a few days after the COTMAN graph indicated it should. This variety is a mid-maturing variety and will fruit longer than some early maturing varieties that are more determinate.

The field stayed incredibly clean throughout the season. Not disturbing the field once the diuron was activated helped to keep the field clean for several weeks. Roundup and Warrant were applied twice. The Roundup was applied for post-emergence grass control and some small broadleaf weeds that emerged.

Insect pressure in this field was very mild and only two applications were made to control plant bugs. 2 oz. of Centric was applied before bloom for plant bug control. Bidrin and Diamond was applied later in the season.

The field responded well to the inputs. The combination of the right variety and timely input applications rewarded the producer well. The field had a yield of 1643 lbs/acre which was 411 lbs/acre greater than the average of the verification program.

### St Francis County (COTMAN Curve)



# Economic Report

This section provides information on production costs for the 2013 CRVP. Records of field operations on each field provide the basis for estimating these costs. The field records were compiled by the CRVP coordinator, county Extension agents, and cooperators. Production data from the 8 fields were applied to determine costs and returns above operating costs, as well as total specified costs. Operating costs and total costs per pound indicate the commodity price needed to meet each costs type.

Operating expenses are those expenditures that would generally require annual cash outlays and would be included on an annual operating loan application. Actual quantities of all operating inputs as reported by the cooperators are used in this analysis. Input prices are determined by data from the 2013 Crop Enterprise Budgets published by the Cooperative Extension Service and information provided by the producer cooperators. Fuel and repair costs for machinery are calculated using a budget calculator based on parameters and standards established by the American Society of Agricultural and Biological Engineers. Machinery repair costs should be regarded as estimated values for full service repairs, and actual cash outlays could differ as producers provide unpaid labor for equipment maintenance.

Ownership costs of machinery are determined by a capital recovery method which determines the amount of money that should be set aside each year to replace the value of equipment used in production. Machinery costs are estimated by applying engineering formulas to representative prices of new equipment. This measure differs from typical depreciation methods, as well as actual annual cash expenses for machinery.

Operating costs, total costs, costs per pound, and returns are presented in Table 1. Costs in this report do not include land costs, management, or other expenses and fees not associated with production. Budget summaries for cotton are presented in Table 2. Price received for cotton of \$0.70/lb. is the estimated Arkansas annual average. Average cotton yield for all verification fields is 1,232 lb./acre.

Average operating costs for cotton in Table 1 and Table 2 are \$462.03 per acre. Table 2 indicates that chemicals are the largest expense category at \$117.56/acre. Fertilizers and nutrients are the second largest expense category at \$103.43/acre. Seeds and associated technology fees average \$88.21/acre.

With average yield of 1,232 lb./acre, average operating costs are \$0.39/lb. in Table 1. Operating costs range from a low of \$315.94 in Crittenden County to a high of \$527.09 in Clay County. Returns to operating costs average \$400.02 per acre. The range is from a low of \$107.38 in Jefferson County to a high of \$657.31 in Lee County. Average fixed costs are \$95.40 which leads to average total costs of \$558.67 per acre. The average returns to total specified costs is \$304.62 per acre. The low is \$28.84 in Jefferson County and the high is \$565.65 in Lee County. Total specified costs average \$0.47/lb.

# Appendix



**Table 1. Summary of Revenue and Expenses per Acre, Cotton Research Verification Program, 2013**

Receipts	Field								Average
	Clay	Craighead	Crittenden	Green	Jefferson	Lee	Mississippi	St. Francis	
Yield (lb)	1112	1160	1111	1262	906	1530	1128	1643	1232
Price (\$/lb)	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
<b>Total Crop Revenue</b>	<b>778.40</b>	<b>812.00</b>	<b>777.70</b>	<b>883.40</b>	<b>634.20</b>	<b>1071.00</b>	<b>789.60</b>	<b>1150.10</b>	<b>862.05</b>
<b>Cottonseed Value</b>	<b>134.44</b>	<b>140.24</b>	<b>134.32</b>	<b>152.58</b>	<b>109.54</b>	<b>184.98</b>	<b>136.38</b>	<b>198.64</b>	<b>148.89</b>
<b>Operating Expenses</b>									
Seed	79.80	79.80	95.00	100.59	95.00	85.50	76.00	103.68	89.42
Fertilizers & Nutrients	162.31	60.57	20.79	101.58	137.04	84.72	117.90	142.52	103.43
Herbicides	65.48	60.16	43.59	58.48	57.59	56.18	65.66	28.48	54.45
Insecticides	29.53	28.20	33.59	22.80	42.64	29.01	32.06	46.18	33.00
Other Chemicals	26.54	26.39	18.60	44.89	30.12	35.69	32.31	26.38	30.11
Custom Applications	13.00	13.00	0.00	30.23	12.00	12.00	6.00	6.00	11.53
Diesel Fuel	30.02	45.86	32.24	37.23	24.74	22.08	32.99	30.45	31.95
Repairs & Maintenance	32.78	31.84	27.60	29.85	23.54	28.38	30.86	31.97	29.60
Irrigation Energy Costs	42.52	42.52	0.00	18.97	51.02	18.97	15.81	51.02	30.10
Labor, Field Activities	7.38	22.68	14.59	15.02	15.41	5.93	14.27	14.59	13.73
Other Inputs & Fees, Pre-harvest	37.73	35.97	29.95	37.06	37.72	35.23	36.25	37.55	35.93
Post-harvest Expenses	134.44	140.24	134.32	152.58	109.54	184.98	136.38	198.64	148.89
Custom Harvest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Net Operating Expenses</b>	<b>527.09</b>	<b>446.98</b>	<b>315.94</b>	<b>496.70</b>	<b>526.82</b>	<b>413.69</b>	<b>460.10</b>	<b>518.81</b>	<b>463.27</b>
<b>Returns to Operating Expenses</b>	<b>251.31</b>	<b>365.02</b>	<b>461.76</b>	<b>386.70</b>	<b>107.38</b>	<b>657.31</b>	<b>329.50</b>	<b>631.29</b>	<b>398.78</b>
Land Rent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capital Recovery & Fixed Costs	107.03	104.60	80.98	96.88	78.54	91.66	99.35	104.15	95.40
<b>Total Specified Expenses<sup>1</sup></b>	<b>634.12</b>	<b>551.59</b>	<b>396.92</b>	<b>593.58</b>	<b>605.36</b>	<b>505.35</b>	<b>559.45</b>	<b>622.97</b>	<b>558.67</b>
<b>Returns to Specified Expenses</b>	<b>144.28</b>	<b>260.41</b>	<b>380.78</b>	<b>289.82</b>	<b>28.84</b>	<b>565.65</b>	<b>230.15</b>	<b>527.13</b>	<b>303.38</b>
Operating Expenses/lb	0.47	0.39	0.28	0.39	0.58	0.27	0.41	0.32	0.39
Total Expenses/lb	0.57	0.48	0.36	0.47	0.67	0.33	0.50	0.38	0.47

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

**Table 2.**  
**Operating Costs, Total Costs, and Returns for Cotton Research Verification Program, 2013**

<b>Field</b>	<b>Operating Costs</b>	<b>Operating Costs /pound</b>	<b>Returns to Operating Costs</b>	<b>Total Fixed Costs</b>	<b>Total Costs</b>	<b>Returns to Total Costs</b>	<b>Total Costs/Pound</b>
<b>Clay</b>	527.09	0.47	251.31	107.03	634.12	144.28	0.57
<b>Craighead</b>	446.98	0.39	365.02	104.60	551.59	260.41	0.48
<b>Crittenden</b>	315.94	0.28	461.76	80.98	396.92	380.78	0.36
<b>Green</b>	496.70	0.39	386.70	96.88	593.58	289.82	0.47
<b>Jefferson</b>	526.82	0.58	107.38	78.54	605.36	28.84	0.67
<b>Lee</b>	413.69	0.27	657.31	91.66	505.35	565.65	0.33
<b>Mississippi</b>	460.10	0.41	329.50	99.35	559.45	230.15	0.50
<b>St. Francis</b>	518.81	0.32	631.29	104.15	622.97	527.13	0.38
<b>Average</b>	<b>463.27</b>	<b>0.39</b>	<b>398.78</b>	<b>95.4</b>	<b>558.67</b>	<b>303.38</b>	<b>0.47</b>

**Table 3**  
**Variety, Soil Series, Previous Crop, Acreage, Lint Yield in the 2013 Cotton Verification Program by County**

<b>County</b>	<b>Variety</b>	<b>Soil Series</b>	<b>Previous Crop</b>	<b>Acreage</b>	<b>Lint Yield</b>
<b>Clay</b>	FM 1944 GLB2	Falaya-Amagon	Cotton	74	1112
<b>Craighead</b>	FM 1944 GLB2	Fountain	Cotton	64	1160
<b>Crittenden</b>	FM 1944 GLB2	Tunica	Cotton	55	1111
<b>Greene</b>	DPL 0912 B2RF	Dundee	Cotton	46	1262
<b>Jefferson</b>	ST 4946 GLB2	Roxana	Cotton	45	906
<b>Lee</b>	DPI 1311 B2RF	Alligator-Sharkey	Cotton	42	1530
<b>Mississippi</b>	FM 1944 GLB2	Rilla-Herbert	Cotton	35	1128
<b>St. Francis</b>	NG 1511 B2RF	Callowy-Grenada	Cotton	53	1643
<b>Average</b>				<b>52</b>	<b>1232</b>

**Table 4****Stand Density, Seeding Rate, Planting Date, Emergence Date Cut-Out Date in the 2013 Cotton Research Verification Program by County**

<b>County</b>	<b>Stand Density (plants/row foot)</b>	<b>Plants/acre</b>	<b>Planting Date</b>	<b>Emergence Date</b>	<b>Cut-Out Date</b>
<b>Clay</b>	3.00	41267	5/14	5/22	8/12
<b>Craighead</b>	2.70	37828	5/7	5/15	8/8
<b>Crittenden</b>	3.30	45279	5/10	5/17	8/5
<b>Greene</b>	2.50	34962	5/7	5/14	7/22
<b>Jefferson</b>	2.20	29947	5/15	5/22	8/6
<b>Lee</b>	2.50	34733	5/14	5/23	8/11
<b>Mississippi</b>	2.80	37943	5/16	5/24	8/10
<b>St. Francis</b>	2.60	35976	5/13	5/19	8/6
<b>Average</b>	<b>2.70</b>	<b>37241.88</b>	<b>5/12</b>	<b>5/19</b>	<b>8/6</b>

**Table 5****Soil Test Results and Total Applied Fertilizer in the 2013 Cotton Research Verification Program by County**

<b>County</b>	<b>pH</b>	<b>P</b>	<b>K</b>	<b>S</b>	<b>Total Applied Fertilizer</b>
		<b>Lbs/Acre</b>			<b>N-P-K-S-B<sup>1</sup></b>
<b>Clay</b>	5.7	31	85	7	94.5-27-54-13.5
<b>Craighead</b>	6.5	59*	138*	7	110-0-43
<b>Crittenden</b>	6.1	86*	632*	16	110-0-0
<b>Greene</b>	7.0	58*	199*	8	103-18-70-24
<b>Jefferson</b>	7.0	147*	431*	17	98-70-60
<b>Lee</b>	7	76*	153*	10	120-0-0-24
<b>Mississippi</b>	6.0	73*	136*	10	95-0-0
<b>St. Francis</b>	7.0	58*	159*	10	92-54-106

<sup>1</sup> Nitrogen-Phosphorus-Potassium-Sulfur-Boron

\*Denotes an optimum level according to soil tests.

**Table 6**  
**Herbicide, Rates and Timings in the 2013 Cotton Research Verification**  
**Program by County**

<b>County</b>	<b>Herbicide</b>	<b>Rate oz/acre</b>	<b>Timing</b>
<b>Clay</b>	Dicamba	8 oz.	Burndown
	Roundup PMX	22 oz.	Burndown
	Reflex	16 oz.	Pre-Plant
	Cotoran	28 oz.	Pre-Emerge
	Liberty	32 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
<b>Craighead</b>	Roundup PMX	22 oz.	Burndown
	Treflan	32 oz.	Pre-Plant
	Diuron	16 oz.	Pre-Plant
	Liberty	29 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Roundup PMX	22 oz.	In-Season
	Liberty	29 oz.	In-Season
<b>Crittenden</b>	Liberty	29 oz.	Pre-Emerge
	Diuron	16 oz.	Pre-Emerge
	Liberty	29 oz.	In-Season
	Direx	16 oz.	Lay-By
<b>Greene</b>	Rifle	10 oz.	Burndown
	Valor	2 oz.	Burndown
	Gramoxone	48 oz.	Pre-Emerge
	Caporal	32 oz.	Pre-Emerge
	Roundup PMX	22 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Gramoxone	32 oz.	Lay-By
	Valor	2 oz.	Lay-By

**Table 6 cont'd**  
**Herbicide, Rates and Timings in the 2013 Cotton Research**  
**Verification Program by County**

<b>County</b>	<b>Herbicide</b>	<b>Rate oz/acre</b>	<b>Timing</b>
<b>Jefferson</b>	Treflan	24 oz.	Pre-Plant
	Cotoran	28 oz.	Pre-Emerge
	Liberty	29 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Liberty	29 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
<b>Lee</b>	Reflex	16 oz.	Pre-Plant
	Roundup PMX	22 oz.	In-Season
	MSMA	16 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Gramoxone	24 oz.	In-Season
	Caporal	8 oz.	In-Season
	Gramoxone	24 oz.	Lay-By
	Warrant	48 oz.	Lay-By
<b>Mississippi</b>	Reflex	16 oz.	Pre-Plant
	Paraquat	32 oz.	Pre-Plant
	Direx	16 oz.	Pre-Emerge
	Liberty	29 oz.	In-Season
	Dual Magnum	16 oz.	In-Season
	Liberty	29 oz.	In-Season
<b>St. Francis</b>	Reflex	16 oz.	Pre-Plant
	Direx	16 oz.	Pre-Emerge
	Roundup PMX	22 oz.	In-Season
	Warrant	48 oz.	In-Season
	Roundup PMX	22 oz.	In-Season
	Warrant	48 oz.	In-Season

**Table 7  
Insecticides, Rates and Timings in the 2013 Cotton Research Verification  
Program by County**

County	Insecticide	Rate lbs/oz/acre
Clay	Asana	2 oz.
	Acephate	0.3 lbs
	Acephate	1 lb
	Bifenthrin	6 oz.
	Transform	1.5 oz.
	Bidrin	6 oz.
	Bifenthrin	5.12 oz.
Craighead	Centric	2 oz.
	Transform*	1.5 oz.*
	Acephate	1 lb.
	Bifenthrin	5.12 oz.
Crittenden	Imidacloprid 4F	1.5 oz.
	Centric	2 oz.
	Bidrin	6 oz.
	Diamond	6 oz.
	Acephate	0.75 lb.
	Bifenthrin	5.12 oz.
Greene	Centric	2 oz.
	Acephate	0.75 lb.
	Bifenthrin	5.12 oz.
	Bidrin	6 oz.
	Bifenthrin	5.12 oz.

**Table 7 cont'd**  
**Insecticides, Rates and Timings in the 2013 Cotton Research Verification**  
**Program by County**

<b>County</b>	<b>Insecticide</b>	<b>Rate lbs/oz/acre</b>
<b>Jefferson</b>	Acephate	0.3 lbs
	Vydate	17 oz.
	Transform	1.5 oz.
	Diamond	6 oz.
	Acephate	0.75 lbs
	Brigade	5.5 oz.
<b>Lee</b>	Acephate	0.3 lbs
	Acephate	0.5 lbs
	Amigo	10 oz.
	Bidrin	6 oz.
	Diamond	6 oz.
	Acephate	0.5 lb.
	Sniper	5.5 oz.
<b>Mississippi</b>	Centric	2 oz.
	Diamond	6 oz.
	Bidrin	6 oz.
	Diamond	6 oz.
<b>St. Francis</b>	Centric	2 oz.
	Bidrin	6 oz.
	Diamond	6 oz.

**Table 8**  
**Defoliation, and Rates in the 2013 Cotton Research Verification Program**  
**by County**

<b>County</b>	<b>Defoliant</b>	<b>Rates</b>
<b>Clay</b>	Takedown	2 oz.
	Bollbuster	8 oz.
	Folex	10 oz.
	Folex	8 oz.
	Bollbuster	32 oz.
<b>Craighead</b>	Dropp	1.5 oz.
	Prep	6 oz.
	Folex	6 oz.
	Folex	16 oz.
	Prep	32 oz.
<b>Crittenden</b>	Display	0.5 oz.
	Prep	6 oz.
	Folex	10 oz.
	Prep	32 oz.
<b>Greene</b>	Dropp	1.5 oz.
	Prep	6 oz.
	Folex	6 oz.
	Folex	16 oz.
	Prep	32 oz.
<b>Jefferson</b>	Free Fall	1.5 oz.
	Folex	16 oz.
	Super Boll	16 oz.
	Super Boll	32 oz.
	Folex	8 oz.
<b>Lee</b>	Dropp	2.13 oz.
	Folex	6.4 oz.
	Finish	5.33 oz.
	Folex	8 oz.
	Prep	42 oz.
<b>Mississippi</b>	Dropp	1.5 oz.
	Prep	6 oz.
	Folex	6 oz.
	Folex	16 oz.
	Prep	32 oz.
<b>St. Francis</b>	Dropp	2 oz.
	Prep	6 oz.
	Folex	16 oz.
	Prep	32 oz.

The Arkansas Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, national origin, religion, gender, age, disability, marital, or veteran status, or any other legally protected status, and is an Affirmative Action/Equal Opportunity Employer.