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Local Feritlizer Experiments With Sweet Potatoes

BY
J. F. DUGGAR
Director
and
J. T. WILLIAMSON
Field Agent in Agriculture

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**In cooperation with Alabama Girl's Technical Institute.

LOCAL FERTILIZER EXPERIMENTS WITH SWEET POTATOES.

By
J. F. DUGGAR, Director.
and
J. T. WILLIAMSON, Field Agent in Agriculture.

SUMMARY.

(1) Of nine conclusive experiments made on various soils the largest increase in yield was afforded by phosphoric acid in five experiments, and by nitrogen in two experiments. In none was kainit more effective than acid phosphate.

(2) In five experiments cotton seed meal was more effective than an equal weight of kainit, and in only one was kainit notably more effective than meal.

(3) Taken as a whole these experiments seem to indicate that the popular idea that potash is the most important constituent in a fertilizer for sweet potatoes is incorrect, at least as to practically all of the soils here represented. On the other hand, these tests show that phosphate and nitrogen were much more important than potash.

(4) These experiments also seem to discredit the notion that the use of a fertilizer containing nitrogen causes the sweet potato plant to run to vines to an injurious extent. In our experience this danger does not occur where reasonable amounts of nitrogen are used in combination with acid phosphate.

(5) The following general fertilizer formulas are suggested where the conditions justify rather high fertilization:

(a) For sweet potatoes growing on fresh land, or on sandy land in rather high state of fertility, a fertilizer consisting of

200 pounds cotton seed meal per acre,
400 pounds acid phosphate and
200 pounds of kainit.

This would analyze about 1.6 per cent nitrogen, 8.7 per cent available phosphoric acid, and 3.5 per cent potash.

(b) For sandy land long in cultivation, and not in a high state of fertility it would seem advisable to increase the proportion of nitrogen, using for example, a formula somewhat like the following:

300 pounds cotton seed meal per acre,
400 pounds acid phosphate, and
200 pounds kainit.

This would analyze about 2.2 per cent nitrogen, (equivalent to 2.7 per cent ammonia,) 8 per cent available phosphoric acid, and 3.3 per cent potash.

LOCATION OF EXPERIMENTS.

These experiments were made by farmers in Mobile, Baldwin, Cullman and Sumter Counties. The Exepriment Station furnished the plans, weighed and sacked the fertilizer, measured the plots, and sent a representative to inspect the plots as often as practicable.

The following list gives the name and address of each experimenter who carried the experiment to a satisfactory conclusion.

County	P. O.	Name
Baldwin	Foley	A. Friskhorn
Baldwin	Robertsdale	A. N. Hayselden
Cullman	Cullman	I. O. O. F. Home
Mobile	Irvington	Irvington Land Co.
Mobile	Mobile	Mobile Farm Land Co.
Sumter	Cuba	W. H. Stephens

The Fertilizers Used.

The following prices are used, as representing a rather high average cash price in local markets during the last few years 1911, 1912, 1913 and 1914:

	Per Ton
Acid Phosphate (16 per cent available)	$14.00
Cotton Seed Meal	$30.00
Kainit	$14.00
Nitrate of Soda ($50 in 1911 and 1912)	$60.00

Prices naturally vary in different localities. Any one can substitute the cost of fertilizers in his locality for the prices given above.

In each experiment, except that conducted by A. W. Hayselden, three plots were left unfertilized, these being Plots 3, 7 and 11. When these yields differed widely the experiment was classed as inconclusive. The increase on plots 4 to 6 is calculated on the assumption that the gradation in fertility is uniform from plots 3 to 7; likewise the increase is calculated for plots 8 to 10 inclusive.*

Prices Assumed for Sweet Potatoes.

The price assumed per bushel of sweet potatoes is 60 cents in each of the four years.

*For the standard method employed in this bulletin for calculating the increased yield, see Alabama Station Bulletin 160 or 162.

POUNDS PER ACRE OF FERTILIZERS; NITROGEN, PHOSPHORIC ACID AND POTASH USED, AND A COMPOSITION OF EACH MIXTURE.

Plot No.	FERTILIZERS: Amount per acre.	FERTILIZERS: KIND OF FERTILIZER	CONTAINS MIXTURE: Nitrogen	CONTAINS MIXTURE: **Available phosphoric acid	CONTAINS MIXTURE: Potash	Cost of Fertilizers 1913-14: Per to.1	Cost of Fertilizers 1913-14: per acre
	Lbs.		Lbs	Lbs.	Lbs.		
1	200	Cotton seed meal	13.58	5.76	3.54	$30.00	$6.00
		*In 100 lbs. c. s. meal**	6.79	2.88	1.77		
2	240	Acid phosphate	.....	38.40	.....	14.00	3.36
		In 100 lbs. acid phos	.....	16.00	.....		
4	200	Kainit	.....	.....	24.60	14.00	2.80
		In 100 lbs. kainit	.....	.....	12.30		
5	200	Cotton seed meal	13.58	44.16	3.54	21.27	9.36
	240	Acid phosphate					
		In 100 lbs. above mixt	3.09	10.04	0.80		
6	200	Cotton seed meal	13.58	5.76	28.14	22.00	8.80
	200	Kainit					
		In 100 lbs. above mixt	3.39	1.44	7.03		
8	240	Acid phosphate	.....	.....	.....	13.99	6.16
	200	Kainit					
		In 100 lbs. above mixt	.....	8.73	5.59		
9	240	Cotton seed meal	13.58	44.16	28.14	19.00	12.16
	200	Acid phosphate					
	200	Kainit					
		In 100 lbs. above mixt	2.12	6.90	4.40		
10	200	Cotton seed meal	13.58	44.16	15.84	20.13	10.76
	240	Acid phosphate					
	100	Kainit					
		In 100 lbs. above mixt	2.59	8.18	2.93		
12	240	Acid phosphate	14.00	16.00	12.30	***	****
	100	Kainit					
	100	Nitrate of soda				24.45	10.76
		In 100 lbs. above mixt	3.18	8.73	2.80		

*Average of many analyses.

**Counting all the phosphoric acid in cotton seed meal as available.

***Only $22.17 in 1911 and 1912.

****Only $4.88 in 1911 and 1912.

Those farmers who are more accustomed to the word ammonia than to the term nitrogen, can change the figures for nitrogen into ammonia equivalents by multiplying by 1 3-14.

BALDWIN COUNTY, NEAR FOLEY,

A. FRISKHORN—1911.

Sandy Soil, Not Long in Cultivation.

The largest average increase, 57 bushels per acre, was due to 240 pounds of acid phosphate. The second largest increase, 30 bushels per acre, was attributable to 200 pounds of cotton seed meal. Kainit was not only useless, but apparently somewhat harmful when used at the rate of 200 pounds per acre. At the rate of 100 pounds per acre it slightly increased the yield.

By noting the figures in the table on page 23 the reader may note the yield afforded by each fertilizer formula, and its increase in potatoes and in profit over the unfertilized plots, calculated as before mentioned.

Then by carefully reading the data as dissected or analyzed on page 24 one may note the extent to which any increase in any particular fertilizer formula was apparently due to each separate fertilizing material, namely, cotton seed meal, acid phosphate, or potash.

FERTILIZER EXPERIMENTS WITH SWEET POTATOES IN BALDWIN AND MOBILE COUNTIES IN 1911.

			FOLEY—1911			MOBILE—1911		
Plot No.	Amt. fertilizer per acre.	KIND OF FERTILIZER.	Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.	Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.
	Lbs.		Bus.	Bus.		Bus.	Bus.	
1	200	C. S. Meal	82.2	43.7	$23.22	74.7	49.8	$26.88
2	240	Acid phosphate	96.0	57.5	32.82	104.9	80.0	46.32
3		No fertilizer	38.5			24.9		
4	200	Kainit	20.5	—20.5	—13.70	23.9	—3.6	—3.56
5	200	C. S. Meal	131.0	87.6	47.88	137.1	107.0	59.52
	200	Kainit						
6	200	C. S. Meal	38.5	—7.5	—8.90	90.9	58.2	30.52
	200	Kainit						
7		No fertilizer	48.3			35.3		
8	240	Acid phosphate	81.9	32.1	16.18	116.3	81.9	46.06
	200	Kainit						
9	200	C. S. Meal	115.6	64.3	32.50	156.6	123.2	67.84
	240	Acid phosphate						
	200	Kainit						
10	200	C. S. Meal	145.8	93.1	50.48	104.1	71.6	37.58
	240	Acid phosphate						
	100	Kainit						
11		No fertilizer	54.2			31.6		
12	240	Acid phosphate	82.6	28.4	12.16	92.6	61.0	31.72
	100	Kainit						
	100	Nitrate of soda						

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot	43.7 bus.
To acid phosphate plot	30.1 bus
To kainit plot	13.0 bus.
To acid phosphate and kainit plot	32.2 bus.
Average increase with cotton seed meal	29.8 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot	57.5 bus.
To cotton seed meal plot	43.9 bus.
To kainit plot	52.6 bus.
To cotton seed meal and kainit plot	71.8 bus.
Average increase with acid phosphate	56.5 bus.

Increase of sweet potatoes per acre when kainit was added.

To unfertilized plot	—20.5 bus.
To cotton seed meal plot	—51.2 bus.
To acid phosphate plot	—45.4 bus.
To cotton seed meal and acid phosphate plot	—23.3 bus.
Average increase with kainit	—35.1 bus.

MOBILE COUNTY, NEAR MOBILE.

Mobile Farm Land Co.—1911.

Sandy Soil, Recently Cleared.

For yields and increase and profit due to each fertilizer formula see the table on page 23.

The most effective fertilizer constituent was acid phosphate. The average increase due to 240 pounds of acid phosphate in four different combinations was 72 bushels per acre. The largest increase, 107 bushels per acre, was obtained on Plot 5, fertilized with cotton seed meal and acid phosphate.

The fertilizer constituent second in importance was cotton seed meal, which afforded an average increase of 45 bushels per acre. On the other hand, kainit gave a very slight increase.

The following analysis shows the apparent effect of each fertilizer constituent, considered separately:

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot	49.8 bus.
To acid phosphate plot	27.0 bus.
To kainit plot	61.8 bus.
To acid phosphate and kainit plot	41.3 bus.
Average increase with cotton seed meal	45.0 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot	80.0 bus.
To cotton seed meal plot	57.2 bus.
To kainit plot	85.5 bus.
To cotton seed meal and kainit plot	65.0 bus.
Average increase with acid phosphate	71.9 bus.

Increase of sweet potatoes per acre when kainit was added:

To unfertilized plot	—3.6 bus.
To cotton seed meal plot	8.4 bus.
To acid phosphate plot	1.9 bus.
To cotton seed meal and acid phosphate plot	16.2 bus.
Average increase with kainit	5.7 bus.

BALDWIN COUNTY, ¼ MILE EAST OF ROBERTSDALE

H. W. HAYSELDEN—1912.

Gray sandy loam with yellow subsoil; recently cleared.

It should be noted that in all experiments in this bulletin hereafter described, the rate per acre at which each fertilizer is used is double the rate employed in all the experiments made in 1911, and already detailed.

This experiment was made on fresh land. The largest average increase, 90 bushels per acre, resulted from the use of 480 pounds of acid phosphate. The next largest increase, 82 bushels per acre, was due to cotton seed meal. Kainit ranked third in importance, but afforded a larger increase than did kainit in any other experiment reported in 1911 or 1912—namely, in the complete fertilizer containing 400 pounds of kainit, an increase of 40 bushels; and in the complete fertilizer containing 200 pounds of kainit, an increase of 24 bushels per acre attributable to kainit.

In this experiment the complete fertilizer afforded the largest increase, namely 240 bushels per acre. Note that the unfertilized plot was exceedingly unproductive, yielding only 32 bushels per acre.

FERTILIZER EXPERIMENTS WITH SWEET POTATOES IN BALDWIN AND MOBILE COUNTIES, IN 1912.

Plot No.	Amt. Fert. per acre.	KIND OF FERTILIZER.	ROBERTSDALE—1912. Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.	MOBILE—1912. Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.
	Lbs.		Bus.	Bus.				
1	400	C. S. Meal	128.0	96.0	$51.60	63.1	41.4	18.84
2	480	Acid phosphate	128.0	96.0	54.24	161.1	139.4	80.28
3		No fertilizer	32.0			21.7		
4	400	Kainit	128.0	96.0	54.80	18.3	—5.5	—6.10
5	400	C. S. Meal	232.0	200.0	110.64	146.0	120.0	62.64
	280	Acid phosphate						
6	400	C. S. Meal	176.0	144.0	77.60	60.0	31.9	10.34
	400	Kainit						
7		No fertilizer				30.3		
8	480	Acid phosphate	192.0	160.0	89.84	191.1	162.4	91.28
	200	Kainit						
9	400	C. S. Meal	272.0	240.0	131.84	181.1	154.0	80.24
	480	Acid phosphate						
	400	Kainit						
10	400	C. S. Meal	256.0	224.0	123.64	184.0	158.4	84.28
	480	Acid phosphate						
	200	Kainit						
11		No fertilizer				24.0		
12	480	Acid phosphate				141.7	117.7	59.86
	200	Kainit						
	200	Nitrate of soda						

The following analysis attempts to show the increase in yield per acre apparently due to each separate fertilizer constituent when each was used in various combinations:

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot	96.0 bus.
To acid phosphate plot	104.0 bus.
To kainit plot	48.0 bus.
To acid phosphate and kainit plot	80.0 bus.
Average increase with cotton seed meal	82.0 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot	96.0 bus.
To cotton seed meal plot	104.0 bus.
To kainit plot	64.0 bus.
To cotton seed meal and kainit plot	96.0 bus.
Average increase with acid phosphate	90.0 bus.

Increase of sweet potatoes per acre when kainit was added:

To unfertilized plot	96.0 bus.
To cotton seed meal plot	48.0 bus.
To acid phosphate plot	64.0 bus.
To cotton seed meal and acid phosphate plot	40.0 bus.
Average increase with kainit	62.0 bus.

MOBILE COUNTY, NEAR MOBILE

Mobile Farm Land Co.—1912.

Gray sandy loam with stiffer yellowish subsoil; new ground.

For yields see table on page 26.

This is new or second-year land, following a poor crop of cowpeas. The largest average increase, 127 bushels per acre, again resulted from the use of acid phosphate,—this time applied at the rate of 480 pounds per acre. This large increase was obtained by taking the average increase attributable to acid phosphate applied in four different combinations,—a method which is used for getting the average increase of all fertilizers.

The average increase due to 400 pounds of cotton seed meal was only 12.8 bushels, probably because of the newness of the land and the growing of a preceding crop of cowpeas.

Kainit afforded only a slight increase, namely, an average of 10.4 bushels. However, kainit gave a better account of itself in the complete fertilizer, affording on Plot 9, an increase of 34 bushels per acre attributable to 400 pounds of kainit, and on Plot 10 an increase of 28.4 bushels attributable to 200 pounds of kainit.

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot	41.4 bus.
To acid phosphate plot	—19.4 bus.
To kainit plot	37.4 bus.
To acid phosphate and kainit plot	—8.4 bus.
Average increase with cotton seed meal	12.8 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot	139.4 bus.
To cotton seed meal plot	78.6 bus.
To kainit plot	167.9 bus.
To cotton seed meal and kainit plot	122.1 bus.
Average increase with acid phosphate	127.1 bus.

Increase of sweet potatoes per acre when kainit was added:

To unfertilized plot	— 5.5 bus.
To cotton seed meal plot	— 9.5 bus.
To acid phosphate plot	23.0 bus.
To cotton seed meal and acid phosphate plot	34.0 bus.
Average increase with kainit	10.5 bus.

MOBILE COUNTY, ¼ MILE NORTH OF IRVINGTON.

IRVINGTON LAND COMPANY—1912.

Dark gray sandy loam, with stiffer reddish subsoil.

For yields, see table on page 29.

This field had been in cultivation about 14 years. Here we find that acid phosphate and kainit were equally effective, each affording an average increase, for four different conditions, of 34 bushels per acre. In the complete fertilizer on Plot 9, both kainit and acid phosphate were even more effective, the increase attributable to each one here being 89 bushels per acre.

While this land has been in cultivation for 14 years, it was in fairly good condition as shown by a yield of more than 100 bushels per acre on one of the unfertilized plots. Under these conditions cotton seed meal was only effective in the complete fertilizer, in which, on Plot 9, there was an increase of 34 bushels per acre attributable to 400 pounds of cotton seed meal.

FERTILIZER EXPERIMENTS WITH SWEET POTATOES IN MOBILE AND SUMTER COUNTIES, IN 1912 AND 1914.

Plot No.	Amt. Fert. per acre.	KIND OF FERTILIZER.	IRVINGTON LAND CO., MOBILE. Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.	IRVINGTON LAND CO., SUMTER. Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.
	Lbs.		Bus.	Bus.		Bus.	Bus.	
1	400	C. S. Meal	80.6	—33.1	—$25.86	158.9	—32.5	—$25.50
2	480	Acid phosphate	124.3	10.6	3.00	201.7	10.3	2.82
3		No fertilizer	113.7			191.4		
4	400	Kainit	120.9	11.0	3.80	206.0	23.5	11.30
5	400	C. S. Meal	90.6	—15.4	—18.60	214.3	40.7	15.06
	480	Acid phosphate						
6	400	C. S. Meal	86.9	—15.4	—18.04	214.3	49.7	21.02
	400	Kainit						
7		No fertilizer	98.3			155.7		
8	480	Acid phosphate	132.6	34.2	14.36	157.1		
	400	Kainit						
9	400	C. S. Meal	166.3	67.8	28.52	162.9		
	480	Acid phosphate						
	400	Kainit						
10	400	C. S. Meal	173.7	75.2	34.36			
	480	Acid phosphate						
	200	Kainit						
11		No fertilizer	98.6					
12	480	Acid phosphate	124.6	26.0	4.84			
	200	Kainit						
	200	Nitrate of soda						

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot ..... —33.1 bus.
To acid phosphate plot ..... —26.0 bus.
To kainit plot ..... —26.4 bus.
To acid phosphate and kainit plot ..... 33.6 bus.
Average increase with cotton seed meal ..... —13.0 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot ..... 10.6 bus.
To cotton seed meal plot ..... 17.7 bus.
To kainit plot ..... 23.2 bus.
To cotton seed meal and kainit plot ..... 83.2 bus.
Average increase with acid phosphate ..... 33.7 bus.

Increase of sweet potatoes per acre when kainit was added:

To unfertilized plot ..... 11.0 bus.
To cotton seed meal plot ..... 17.7 bus.
To acid phosphate plot ..... 23.6 bus.
To cotton seed meal and acid phosphate plot ..... 83.2 bus.
Average increase with kainit ..... 33.8 bus.

SUMTER COUNTY, 1 MILE NORTH OF CUBA.

W. H. Stephens.

Gray sandy soil, with yellowish sandy subsoil.

This upland field had been in cultivation for many years. The three preceding crops were cotton.

Plot No.	Amt. Fert. per acre.	KIND OF FERTILIZER.	Yield Sweet Potatoes per acre.	Increase over unfertilized plot	Profit from fertilizer.
	Lbs.		Bus.	Bus.	
1	200	C. S. Meal	158.9	32.5	$ 25.50
2	240	Acid phosphate	201.7	10.3	2.82
3		No fertilizer	191.4	.....	.....
4	200	Kainit	206.0	23.5	11.30
5	200	C. S. Meal			
	240	Acid phosphate	214.3	40.7	15.06
6	200	C. S. Meal			
	200	Kainit	214.3	49.7	21.02
7		No fertilizer	155.7	.....	.....
8	240	Acid phosphate			
	200	Kainit	157.1	.....	.....
	200	C. S. Meal			
9	240	Acid phosphate	162.9	.....	.....
	200	Kainit			

The following analysis is made in order to indicate the apparent increase in yield attributable to fertilizer constituent, considered separately:

Increase of sweet potatoes per acre when cotton seed meal was added:

To unfertilized plot	—32.5 bus.
To acid phosphate plot	30.4 bus.
To kainit plot	26.2 bus.
Average increase with cotton seed meal	8.0 bus.

Increase of sweet potatoes per acre when acid phosphate was added:

To unfertilized plot	10. 3 bus
To cotton seed meal plot	73.2 bus.
Average increase with acid phosphate	41.8 bus.

Increase of sweet potatoes per acre when kainit was added:

To unfertilized plot	23.5 bus.
To cotton seed meal plot	82.2 bus.
Average increase with kainit	52.8 bus.

CULLMAN COUNTY, 1-½ MILES NORTH OF CULLMAN

I. O. O. F. Home (Ed. B. Miller, Supt.)

A gray sandy loam, with stiffer yellowish subsoil.

The soil on which the tests were made in each of three years is apparently that designated by the Bureau of Soils as "DeKalb Fine Sandy Loam."

In 1912, this upland field had been in cultivation for about 5 years. A preceding crop of peas and beets in 1911, well fertilized, had left the land in good condition, as shown by a yield of above 150 bushels of sweet potatoes per acre without any fertilizer whatsoever.

Acid phosphate was this year the most effective fertilizer, affording an average increase of 47.8 bushels per acre.

Under these conditions cotton seed meal was but slightly effective; the average increase was only 5.5 bushels per acre, which is explained by the fairly fertile condition of the land. Kainit was of but little value.

The largest increase, 92.9 bushels per acre, was obtained on Plot 10, fertilized per acre as follows:

400 pounds cotton seed meal,
480 pounds acid phosphate,
200 pounds kainit.

FERTILIZER EXPERIMENT WITH SWEET POTATOES IN CULLMAN COUNTY.

			CULLMAN—1912.			CULLMAN—1913.			CULLMAN—1914.			AVERAGE,3 YRS	
Plot No.	Amt. fertilizer per acre.	KIND OF FERTILIZER.	Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.	Yield Sweet Potatoes per acre.	Increase over unfertilized plots.	Profit from fertilizer.	Yield Sweet Potatoes per acre.	Increase over unfertilized plot.	Profit from fertilizer.	Increase over unfertilized plots.	Profit from fertilizer.
	Lbs.		Bus.	Bus.		Bus.	Bus.		Bus.	Bus.		Bus.	
1	400	C. S. Meal	141.1	1.7	—$4.98	395.7	118.6	$65.16	401.4	119.4	$65.64	79.9	$41.94
2	480	Acid phosphate	210.3	70.9	39.18	354.3	77.2	42.96	360.0	78.0	43.44	75.4	41.86
3		No fertilizer	139.4			277.1			282.0				
4	400	Kainit	185.4	41.7	22.22	377.1	80.3	45.38	384.6	84.8	48.08	68.9	38.56
5	400	C. S. Meal	225.4	77.4	37.08	440.0	123.6	64.80	454.3	136.7	72.66	112.6	58.18
	480	Acid phosphate											
6	400	C. S. Meal	198.6	46.3	18.98	404.9	68.8	32.48	417.1	81.8	40.28	69.0	30.58
	400	Kainit											
		No fertilizer	156.6			355.7			353.1				
8	480	Acid phosphate	226.6	61.9	30.98	445.7	67.2	34.16	458.3	83.2	43.76	70.8	36.30
	400	Kainit											
9	400	C. S. Meal	243.7	70.9	30.38	518.5	117.2	58.16	545.7	148.7	77.06	112.3	55.20
	480	Acid phosphate											
	400	Kainit											
10	400	C. S. Meal	273.7	92.9	44.98	527.1	103.0	51.04	532.0	113.0	57.04	103.0	51.02
	480	Acid phosphate											
	200	Kainit											
11		No fertilizer	188.9			446.9			440.9				
12	480	Acid phosphate	250.6	61.7	26.26	574.3	127.4	65.68	608.6	167.7	89.86	118.9	60.60
	400	Kainit											
	200	Nitrate of soda											

Increase in bushels of Sweet Potatoes per acre due to 400 pounds per acre of Cotton Seed Meal, or 480 pounds Acid Phosphate, or 400 pounds Kainit:

	1912	1913	1914	AVERAGE INCREASE 3 YRS.
Increase of sweet potatoes per acre when cotton seed meal was added;				
To unfertilized plot	1.7	118.6	119.4	79.9
To acid phosphate plot	6.5	46.4	58.7	37.2
To kainit plot	4.6	—11.5	—3.0	—3.3
To acid phosphate and kainit plot	9.0	50.0	65.5	41.5
Average increase with cotton seed meal	5.5	50.9	60.2	38.9
Increase of sweet potatoes per acre when acid phosphate was added;				
To unfertilized plot	70.9	77.2	78.0	75.4
To cotton seed meal plot	75.7	5.0	17.3	32.7
To kainit plot	20.2	—13.1	—1.6	1.8
To cotton seed meal and kainit plot	24.6	48.4	66.9	46.6
Average increase with acid phosphate	47.8	29.4	40.2	39.1
Increase of sweet potatoes per acre when kainit was added;				
To unfertilized plot	41.7	80.3	84.8	68.9
To cotton seed meal plot	44.6	—49.8	—37.6	—14.3
To acid phosphate plot	—9.0	—10.0	5.2	—4.6
To cotton seed meal and acid phosphate plot	—6.5	—6.4	12.0	—0.3
Average increase with kainit	17.7	3.5	16.1	12.4

Average increase due to nitrogen, phosphoric acid and potash. Special attention is called to the column of figures on page 33 showing the average increase due to each fertilizer in each of four different combinations. This shows that on the whole nitrogen and phosphoric acid were uniformly profitable and about equally effective. The figures also show that kainit at the rate of 400 pounds per acre was on the whole of little or no advantage in increasing the yield.

In all three of the experiments near Cullman, nitrate of soda, applied after the slips were set, was more effective than double its weight of cotton seed meal applied before the slips were set.

In 1913. This year the experiment was on the same character of soil, but on a different field. The yields were large on all plots. The largest yield, 574.3 bushels per acre was obtained on plot 12, fertilized as follows per acre:

480 pounds acid phosphate,
400 pounds kainit,
200 pounds nitrate of soda (the latter applied after growth began.)

The largest increase due to fertilizer, 127.4 bushels

per acre, was obtained on the same plot, as was also the largest net profit from fertilizers, $65.68.

In 1914. This experiment was again on similar soil, but in a different field. Again the largest yield, 608.6 bushels, the largest increase from fertilizers, 167.7 bushels, and the largest profit from fertilizers, $89.86 per acre, were obtained on plot 12, fertilized as mentioned above.

Attention is called to the large yields in all three years, and especially in 1913 and 1914. In both of the years last mentioned the yields on all three of the plots receiving complete fertilizers (Plots 9, 10, and 12) exceeded 500 bushels per acre. Even on the unfertilized plots the average yield for each of these two years was above 300 bushels per acre.

The largest average increase due to fertilizers at Cullman, 118.9 bushels per acre, was obtained on Plot 12. The plot also afforded the largest average profit from fertilizers, namely, $60.00 per acre.

This plot was fertilized as follows:

480 pounds acid phosphate per acre,
400 pounds kainit per acre,
200 pounds nitrate of soda per acre (the latter after growth began.)

1080 pounds total per acre.

However Plot 12 was very closely followed in increase and profit by Plot 5, which afforded a larger profit than any other plot that received cotton seed meal.