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# Mississippi Agricultural Experiment Station.

BULLETIN NO. 110.

JANUARY, 1908.

# REPORT OF THE WORK AT THE HOLLY SPRINGS STATION FOR 1907.

By C. T. AMES.

#### INTRODUCTION.

This Bulletin contains fertilizer results under cotton, corn, and cowpeas; also the information so far obtained with grasses and forage crops.

#### FERTILIZER TEST WITH CORN.

Thirty plats and thirty duplicate plats of one twentieth of an acre each (Six rows four feet wide and ninety-two feet long) were fertilized as shown in the following table, and planted to Mosby's Prolific Seed Corn, April twenty-seventh.

Weather conditions necessitated a second planting, May twentieth.

Soil.—The soil used was a brownish loam rolling upland which varied somewhat in fertility.

An attempt was made by the use of stable manure to equalize the soil's productiveness as far as possible.

The soil on which the thirty plats were planted, also the first fifteen plats in duplicate plats, grew a good crop of cowpeas the year before.

The remaining fifteen plats were on soil which was planted in corn the year before.

Following is a table giving results, and a calculated yield per acre:

Amount of Fertilizers Calculated in Pounds Per Acre.         200 Lass, PER Acre.       200 Lass, PER Acre.         200 Lass, Cottonseed Meal       23, 21, 20, 20, 51, 21, 20, 20, 51, 21, 20, 20, 23, 21, 21, 20, 20, 23, 23, 20, 20, 20, 20, 23, 23, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20		Duplicate Plats Yield in Bushels per Acre	5 29.44 1 28.05	0 29.72	3 16.94	5 13.88	6 5.55	5 2.22	3.61	2 12.22	0 21.11	8 21.38	4 21.66	6 26.94	52
Amount of Fertilizers Calculated in Pounds Per Acre.Amount of Fertilizer $200$ Las, PER ACRE, $\frac{1}{200}$ $\frac{1}{200}$ $\frac{1}{10}$ $1$		Vield in Bushels Per Acre	28.0 33.6	37.5	25.8	18.0	21.6	23.0	21.3	17.2	12.5	26.3	29.4	29.1	27.2
Amount of Fertilizer       200 LBs, FER ACRE,         200 LBs, FER ACRE,       200 LBs, FER ACRE,         200 Dis, Cottonseed Meal       34.16         2200 Dis, Cottonseed Meal       32.00         4200 Dis, Cottonseed Meal       32.00         5 No Fertilizer       34.16         7 100 Dis, Cottonseed Meal       32.00         7 100 Dis, Cottonseed Meal       32.00         8 100 Dis, Cottonseed Meal       32.00         9 120 Dis, Kainit       29.72         9 120 Dis, Kainit       29.16         9 120 Dis, Kainit       29.16         9 120 Dis, Cottonseed Meal       30.55         8 100 Dis, Cottonseed Meal       29.72         9 120 Dis, Cottonseed Meal       29.61         9 120 Dis, Cottonseed Meal       23.61         100 Dis, Cott	Calculated in Pounds Per Acre.	Yield in Bushels per Acre Number of Plat 400 Las, PER Acre	00.55 11 No Fertilizer 22.5 12 400 lbs. Cottonseed Meal	81.38 13 400 lbs. Acid Phosphate	81.66 15 No Fertilizer	06.38 16 200 lbs, Acid Phosphate 20.38 200 lbs, Cottonseed Meal	20.00 200 lbs, Cottonseed Meal	06.66 2200 lbs. Kainit	29.72 [19]240 lbs. Acid Phosphate	3.61 20 No Fertilizer	1.11 2100 lbs. Acid Phosphate.	2.77 2.00 lbs. Cottoneed Meal	2.50 20 los, Acid Phosphate	2.22 [29155 1-5 Ibs. Cottonseed Meal	31 800 lbs. Ground Phosphate Rock
Amount of Ferth200 LBS, FER ACRE,200 LBS, FER ACRE,200 LBS, FER ACRE,200 LBS, FER ACRE,200 DS, Cottonseed Meal334.12200 DS, Cottonseed Meal332.63200 DS, Acid Phosphate320.55 No Fertilizer320.57 100 DS, Cottonseed Meal332.5100 DS, Cottonseed Meal332.57 100 DS, Cottonseed Meal30.5100 DS, Cottonseed Meal30.5100 DS, Cottonseed Meal30.5100 DS, Cottonseed Meal30.52010 DS, Acid Phosphate29.12010 DS, Acid Phosphate29.12010 DS, Acid Phosphate23.6100 DS, Cottonseed Meal23.6100 DS, Cottonseed Meal23.6100 DS, Acid Phosphate23.6100 DS, Cottonseed Meal23.6100 DS, Cottonseed Meal23.6100 DS, Cottonseed Meal23.6150 DS, Acid Phosphate23.6150 DS, Acid Phosphate23.6	lizers	Duplicate Plats	0.0		- CO	2	20	0				-9		4	<u> </u>
Amount       200 LBS, FER ACRE,       200 LBS, FER ACRE,       200 DS, Cottonseed Meal       200 DS, Cottonseed Meal       200 DS, Acid Phosphate       200 DS, Acid Phosphate       100 DS, Cottonseed Meal       100 DS, Acid Phosphate       150 DS, Acid Phosphate	of Ferti	Yield in Bushels Per Acre	34.1 38.0	32.5 30.0	29.7	35.2	30.5	29.1	23.6	21.6	23.6	21.6	23.6	26.9	32.0
	Amount e	Number of Plat. 200 LBS. PER ACRE.	1 No Fertilizer 2 200 lbs, Cottonseed Meal	3 200 lbs. Acid Phosphate.	5 No Fertilizer	6 100 lbs. Acid Phosphate 100 lbs. Cottonseed Meal	/ 100 lbs, Coutonseed Meat 100 lbs, Kainit	o 100 lbs. Kaint	9 120 Ibs, Acid Phosphate	10 No Fertilizer	50 lbs. Acid Phosphate 3100 lbs. Cattonseed Meal	100 lbs. Acid Phosphate	150 lbs. Acid Phosphate	25 No Fertilizer	30 400 lbs. Ground Phosphate Rock

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**RESULTS WITH FERTILIZERS UNDER CORN.** 

## MISSISSIPPI EXPERIMENT STATION.

#### REPORT OF WORK AT HOLLY SPRINGS STATION.

**Remarks.**—During continued heavy rains following shortly after fertilizing and planting the plats, a portion of the fertilizer may have been lost by soil washing. All plats on soil after cowpeas, which were fertilized with acid phosphate, or cottonseed meal, or a mixture of the two, were very promising until checked by drought. At no stage of growth in plats Nos. 10, 15 to 20, and 22 to 25, in duplicate plats, was there any prospect for fruit. These plats mentioned were on soil after corn the year before. Two months protracted drought, before and during the fruiting season; also, variation in soil, affected results very materially.

**Conclusions.**—Both available phosphorous and nitrogen are deficient.

With the assistance of field notes it would appear, that a mixture 100 pounds Acid Phosphate and 100 pounds cottonseed meal, per acre, will give good results.

On more fertile soils, Acid Phosphate alone 200 pounds to 400 pounds per acre, as the soils' fertility increases, will give good results.

More profitable results from the use of fertilizers can be obtained on land grown in cowpeas the year before.

It is not profitable to grow corn on thin uplands.

## FERTILIZER TEST WITH COTTON.

Thirty plats of one twentieth of an cre each, containing six rows, four feet wide and ninety-two feet long, were fertilized as shown in the following table, and planted to Cook's Improved Cotton Seed, April 27th.

Weather conditions necessitated a second planting May 20th.

Soil.—Brownish loam, slightly rolling table land.

The following table gives the quantity and kind of fertilizers used; also dates of each picking, and a calculated yield per acre. It also contains an estimate value of crop per acre, on basis of three cents per pound for seed cotton:

	acre.
ŐN.	per
COTT	pounds
	in
TEST W	calculated
ERTILIZER	of Fertilizer
1	Amount

tor seed Cotton	7.40	8 8 7 7	.4	4.0(	4.8(	2.4	9.0	8.10	55	1		5.4(	1.80	3.60	) ) )	7.6(
	<u>80</u> \$1	0 0 0 0		00	30-	3 0 30	00 30	3 .0	-0 0			ణ 	30 30 3	3	2	202
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IATOT	29	39	39	40	58	10	00	$631'_{c}$	491%		8	29	53	56	> 	46
Picked Jan. 21	9	00 H	10	÷	~~~		4		4	୍ କ୍	<u> </u>	_	0		·	0
Picked Nov. 9-16	13	14	181	$\frac{18}{18}$	26	25	23	26	20	2 2	1	24	31	33	)	24
Picked Oct. 17	5	o x	1-	6	10	11	12	111%	) 9	) o	<b>)</b>	<b>5</b>	2	x	)	12
Picked Oct. 3	e		9	ŗ,	10	6	11	10	21%	10		10	7	10	5	×
Picked Sept. 21	3	9 0	00	<del></del>	6	r.	10	12	ĿĊ,	, yiti		15	×	13	)	2
400 pounds per acre.	No Fertilizer	400 lbs, Cottonseed Meal 400 lbs, Acid Phosphate	400 lbs. Kainit	No Fertilizer	200 lbs, Cottonseed Meal 200 lbs, Acid Phosphate	200 lbs. C-S. Meal 200 lbs. Kainit	200 lbs, Acid Phosphate. 200 lbs, Kainit.	240 lbs. Acid Phosphate. 80 lbs. C-S. Meal	80 lbs. Kainit No Fertilizer	300 lbs. C-S. Meal 100 lbs Acid Phosnhate	200 lbs. C-S. Meal	200 lbs, Acid Phosphate. 100 lbs, Cottonsood Meal	300 lbs, Acid Phosphate.	133 1-3 lbs. C-S. Meal 133 1-3 lbs. Acid Phos	133 1-3 lbs. Kainit	Phosphate Rock
					-											
Number of Plats	11	<u>े ल</u>	14	15	16	17	$\frac{18}{18}$	19	20	26 - 26	27	00	2 2	29	Ċ	ς Γ
VALUE at 3c per lb. for Seed Cotton Number of Plats	\$25.80 11	34.2012 36.0013	28.20 14	25.80 15	34.20	26.40	29.40	30.90	22 80 20	26	27	24.60	33.60	20.70		16.80
Yield per Acre VALUE at 3c per lb. for Seed Cotton Xumber of Plats	860 \$25.80 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	940 28.20 14	860 25.80 15	1140 34.20 16	8801-26.40	980 29.40	1030 30.90	760 22 80 20	ann 27 00	27	820 24.60	1120 33.60	690 20 70 29		560 16.80
Torat Yield per Acre Value at 3c per lb. for Seed Cotton Xumber of Plats	43 860 \$25.80 11	$57  1140  34.20  12 \\ 60  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  36.00  13 \\ 61  1200  13 \\ 61  1200  1200  13 \\ 61  1200  1200  13 \\ 61  1200  1200  13 \\ 61  1200  1200  13 \\ 61  1200  1200  1200  1200  13 \\ 61  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  1200  12000  1200  1200  1200  1200  120000  12000  12000  120000  12000  12000  120000  12000  12000  120000  120000  120000  120000  120000  120000  120000  120000  120000  1200000  1200000  1200000  120000000  1200000000  120000000000$	47 940 28.20 14	43 860 25.80 15	57 1140 34.20 16	44 880 26.40	49 980 29.40 18	$51 \frac{1}{6} 1030 30.90$	38 760 22 80 20	15 900 97 00 26	27	41 820 24.60	56 1120 33.60	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		28 560 16.80 <sup>31</sup>
Picked Jan. 21 Torat Yield per Acre for Seed Cotton Xumber of Plats	6 43 860 \$25.80 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7 47 940 28.20 14	5 43 860 25.80 15	4.57 1140 34.20 16	5 44 1 8801 26.40	4 49 980 29 40 18	2511 1030 30.90	3 38 760 22 80 20	9 15 900 97 00 26	27	1 41 820 24.60	0 56 1120 33.60	0341% 690 20 70		0 28 560 16.80
Picked Xov, 9-16 Picked Jan. 21 Torat Yatur at 3c per Ib. for Seed Cotton Xumber of Plats	19 6 43 860 \$25.80 11	22 7 57 1140 34.20 12 23 4 60 1200 36.00 13	21 7 47 940 28.20 14	20 5 43 860 25.80 15	25 4 57 1140 34.20 16	17 19 5 44 1 8801 26.40	21 4 49 980 29.40	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6 3 38 760 22 80 20	s 9 15 900 97 00 26	27	$\begin{bmatrix} 6 & 1 & 41 \\ 820 & 24.60 \\ 96 \end{bmatrix}$	35 056 1120 33.60	27 0 341% 690 20 70 29		20 0 28 560 16.80 31
Picked Nov, 9-16 Picked Nov, 9-16 Picked Jan. 21 Torat Yatur at 3c per lb. for Seed Cotton Xumber of Plats	8 19 6 43 860 \$25.80 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	8 21 7 47 940 28.20 14	8 20 5 43 860 25.80 15	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8 19 5 44 1 880 26 40	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{bmatrix} 0 & 21 & 2 & 51 & 1 & 0 \\ 0 & 21 & 2 & 51 & 5 & 1030 \\ \end{bmatrix} \begin{bmatrix} 19 & 30 & 90 \\ 0 & 0 & 0 \end{bmatrix}$	6 16 338 760 22 80 20	8 18 9 15 900 97 00 26	27	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	935 056 1120 33.60	$7\ 27\ 0\ 341\%\ 690\ 20\ 70\ 29$		$7 20 0 28 560 16.80 ^{31}$
Picked Oct. 3 Picked Oct. 17 Picked Jan. 21 Torat Yatur at 3c per lb. for Seed Cotton Yumber of Plats	6 8 19 6 43 860 \$25.80 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6 821 747 940 28.20 14	6 8 20 5 43 860 25.80 15	$11 \qquad 9 \ 25 \ 4 \ 57 \qquad 1140  34 \ 20 \\ 11 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\$	7 8 19 5 44 880 26.40	8 921 449 980 29.40 18	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6 616 338 760 22 80 20	8 8 18 9 15 000 97 00 26	27	8 6 16 1 41 820 24.60 38	7 935 056 1120 33.60 20	$1_{\%}$ 7 27 0 341 $_{\%}$ 690 20 70		1   720   028   560   16.80   31
Picked Sept. 21 Picked Oct. 3 Picked Oct. 17 Picked Jan. 21 Torat	4         6         8         19         6         43         860         \$25.80         11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5 6 8 21 7 47 940 28.20 14	$4 \ 6 \ 8 \ 20 \ 5 \ 43 \ 860 \ 25 . 80 \ 15$	$8 11 \qquad 9 25 4 57 1140 34.20 16$	5 7 819 544 880 26.40 17	7 8 921 449 980 29.40 18	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7 6 6 16 3 38 760 22 80 20	Q 8 8 18 9 15 Q00 97 00 26	27	$10 \ 8 \ 6 \ 16 \ 1 \ 41 \ 820 \ 24.60 \ 98$	5 7 935 056 1120 33.60 20	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
100 роша. Бекед Sept. 21 Ріскед Осt. 3 Ріскед Осt. 3 Ріскед Лот. 9-16 Ріскед Лот. 21 Тот.л. Тот.л. Тот.л. Тот.л. Тот.л.	To Fertilizer 4 6 8 19 6 43 860 \$25.80 11	00 lbs, Cottonseed Meal 9 9 10 22 757 1140 34 20 12 00 lbs Acid Phosphate 1011 12 23 4 60 1200 36 00 13	00 lbs. Kainit 5 6 8 21 7 47 940 28.20 14	To Fertilizer 4 6 8 20 5 43 860 25.80 15	00 lbs. Cottonseed Meal 8 11 9 25 4 57 1140 34.20 16	00 lbs. Cottonseed Meal 5 7 8 19 5 44 8800 26 40	00 lbs. Acid Phosphate	20 lbs. Acid Phosphate. 9 91, 10 21 2 51 1, 1030 30 90 19	40 lbs. Kainit a Fertilizer  7 6 6 16 3 38 760 22 80 20	50 lbs. Cottonseed Meal	00 lbs. Cottonseed Meal	00 lbs. Acid Phosphate 10 8 6 16 1 41 820 24.60	50 lbs. Acid Phosphate 5 7 9 35 0 56 1120 33.60	o Fertilizer 0 16 7.27 0.341% 690 20 70 29		Phosphate Rock

**Remarks.**—With plats located in the field, as indicated in the table, and using the results on blank plats as a basis, soil variations can easily be traced.

The soil on which plats thirty and thirty-one were located is below the average. The continued drought during August and September caused some shedding of bolls.

**Conclusions.**—Results plainly indicate that available Phosphorous is deficient, and that an application of Acid Phosphate can be made very profitable, when a sufficient quantity of Nitrogen is present.

It appears that a mixture of fifty pounds of Cottonseed Meal and one hundred and fifty pounds of Acid Phosphate is the safest and best fertilizer for cotton, for this class of soil.

Indications are, that available Potash is present in sufficient quantities in these soils, and that it would be a waste of funds to add more.

#### FERTILIZER TESTS WITH COWPEAS.

Five plats and five duplicate plats of one twentieth of an acre each, were planted, in rows, June 17th. The soil was a thin upland yellowish loam.

The following table gives the quantity and kind of fertilizer used, and yield of vine in pounds per acre:

No.Plats		Pounds of Vines Per Acre.	Duplicate Plats, Yield Vines Per Acre.
1	No Fertilizer	576	1044
2	200 lbs. Acid Phosphate	1656	1440
3	400 lbs. Ground Phosphate Rock	1572	1452
4	200 lbs. Kainit	852	963
5	100 lbs. Acid Phosphate 100 lbs. Kainit	1464	1380

Remarks .- Soil on plat No. 1 below the average.

Conclusion .- Available Phosphorous is deficient.

An application of from one hundred to two hundred pounds of Acid Phosphate will increase the yield very materially.

Available Potash is present in sufficient quantities for all practical purposes.

## GRASSES AND FORAGE CROPS.

On March 29th, 1907, the following grasses and forage crops were planted on brownish loam upland, viz.: Red Clover, Alsyke Clover, White Clover, Crimson Clover, Alfalfa, Melilotus, Lespedeza, Spring Vetch, Johnson Grass, Bermuda Grass, Orchard Grass, Kentucky Blue Grass, Rye Grass, Red Top, or Herds' Grass, and Sanfoin.

Forty-eight plats were employed in this test. Fertilizers were used on some plantings, and various seed mixtures were planted.

An excellent stand was secured on all plantings. At the end of the summer season but few plats remained.

Bermuda Grass made a perfect sod, but was of slow growth.

Lespedeza, or Japan Clover, did well. This plant makes a profitable growth on almost any soil in this section. Its growth should be encouraged on all waste lands as a soil improver, and for pasture, and on better classes of land as a hay crop.

A mixture of Bermuda and Lespedeza makes a most excellent pasture.

**Red Top.**—Better results were obtained in fall planting for pasture than results in plats would indicate. On thin land it was an absolute failure; on low lands and land of ordinary fertility, fair results were obtained.

Hairy Vetch.—In fall planting with oats on fertile spots, a magnificent growth was obtained. On thin land it proved a failure. No inoculation of soil was made.

Red Clover.-On plat where ten tons of barnyard manure and 1,000

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pounds of lime per acre, were used, one cutting fourteen inches high was secured. On plats not so treated, the growth was poor.

Alfalfa.—Out of sixteen plats, only two plats which were cultivated survived the season. These two plats were cultivated after each rain and while a perfect stand now remains, but little growth was made.

Melilotus.—Slow growth was made during the entire season. Indications are that lime is beneficial.

Orchard Grass, Kentucky Blue Grass, and Crimson Clover, with a little encouragement would grow.

White Clover, Alsyke Clover, Rye Grass, Spring Vetch (Spring planting) and Sanfoin made a failure.

Johnson Grass made but poor growth.