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Report of the Holly Springs Branch Experiment Station, 1931

Otis B. Casanova

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BY

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Annual Report of the Holly Springs Branch Experiment Station For 1931

By
OTIS B. CASANOVA*

Most of the experimental work treated in this report was begun in previous years. Special emphasis was given to cotton production with some work devoted to legumes and grains. Over twelve hundred experimental plots were used, five hundred dealing with soils and fertilizers and seven hundred dealing with crops and cultural methods.

Studies in soil erosion are in co-operation with the United States Department of Agriculture through the Southern Forest Experiment Station, New Orleans, Louisiana. The factors affecting soil erosion and the best method of its control are to be determined.

The work of this station was designed solely to assist the farmers in solving their farm problems, not to make money. The station can best serve the farmers if they visit the station frequently to inspect the work and discuss their problems. Several thousand visitors came to the station this year. On Field Day alone, September 17, there were about eleven hundred visitors present.

Seasonal conditions were not ideal for maximum crop yields. Abundant rainfall in April and May was conducive to excessive stalk development and the droughty condition during June and July caused cotton to shed considerably. Corn, sorghum, and soybean yields were highly satisfactory both for silage and grain. The light infestation of boll weevil in June was checked by the extremely dry weather. The cotton hopper destroyed all but the top crop on the rank valley cotton, designated as the Valley Varieties and Valley Fertilizer tests. Sorghum midge destroyed almost the entire crop of grohoma and atlas sorgo while adjoining plots of sagrain and Japanese seeded ribbon cane were slightly affected.

Cotton Varieties

The purpose of this test is to determine the varieties of cotton that are most productive and best adapted to the soil and climate of this section.

Cotton variety tests were conducted on both the hill and valley lands. Each variety was planted in single rows in four replications. Accurate weights of seed cotton were secured on each row at harvest time. One hundred boll samples were picked to ascertain yield, lint percentage, staple, and boll size. The

*Mr. T. F. McGhee, Assistant Director in Charge from September 1, 1930, to September 1, 1931.

value of lint in cents per pound was determined for each variety from the average value of its staple over a period of time as quoted by the leading cotton markets. Seed was valued at ten dollars per ton. The data from the Hill and the Valley Land tests are given in Table 1 as three and five-year averages. The

Table 1
Standard Varieties—Hill and Valley

	Hill Cotton Variety				Valley Cotton Variety			
	Average 1929-31		Average 1926-31		Average 1929-31		Average 1926-31	
Varieties	Lb. lint per acre	Value per acre	Lb. lint per acre	Value per acre	Lb. lint per acre	Value per acre	Lb. lint per acre	Value per acre
Stoneville 3	566	72.93			681	100.20		
Missdel 2	530	67.93			643	93.30		
Stoneville 2	503	64.83			610	90.10		
D. & P. L. 4-8	449	60.25	452	72.86	557	87.78	625	111.17
Lightning Express	419	58.82	426	76.44	530	83.58	537	107.00
Lone Star 561	446	58.28			530	79.95		
Missdel 1	429	58.14			548	88.91		
Cleveland 54	459	58.05	454	70.57	620	91.23	627	108.53
Deltatype Webber	398	57.15	384	74.15	433	74.15	472	105.38
Cleveland Wilson	468	56.96	449	68.34	551	77.58	555	93.56
Half & Half	522	55.58	528	74.17	599	76.15	622	96.43
Miller 589	355	55.16			544	88.04		
Acala	392	54.23	423	71.09	501	77.30	553	99.94
Cleveland Piedmont	431	52.88	430	64.74	501	71.46	546	91.79

Table 2
Main Cotton Variety Test—Valley

Varieties	Lb. lint per acre	Per cent lint	Staple	Cents per lb.	Value per acre	Bolls per lb.
Missdel 2	686	31.0	1 3/32	6.90	54.98	81
Delfos 531	600	31.0	1 1/8	7.35	50.75	78
Missdel 1	503	30.7	1 3/32	6.90	40.39	68
Stoneville 2	470	30.5	1	6.10	34.05	71
Stoneville 3	462	33.3	31/32	5.90	31.88	73
Lone Star 562	419	34.1	1	6.10	29.61	65
Light. Express	359	29.3	1 3/32	6.90	29.10	72
Farm Relief	361	31.9	1 3/32	6.90	28.78	61
Cleveland 884-4	379	31.1	1 1/32	6.40	28.46	65
Deltatype Webber 9	297	31.2	1 3/16	8.30	27.97	64
D. & P. L. 10	364	31.0	31/32	5.90	25.51	78
Cleveland 54	327	30.8	23/24	5.85	22.68	69
D. & P. L. 4-8	319	34.6	31/32	5.90	21.85	71
Acala 37	284	32.5	1	6.10	20.28	68
Rowden 2088	288	30.7	31/32	5.90	20.28	59
Lone Star 561	279	32.0	1	6.10	19.96	63
Wilson Type	277	30.0	29/32	5.60	18.75	70
Express 17	227	29.5	1 1/16	6.65	17.84	71
Cleveland Piedmont	236	30.9	7/8	5.50	15.63	68
Half & Half—Mahon	316	34.6	27/32	4.00	15.60	65
Miller 610	202	32.4	1	6.10	14.43	56
Miller 589	190	32.6	1	6.10	13.53	60

Table 3

Main Variety Test—Hill

Varieties	Lbs. lint per acre	Per cent lint	Staple	Cents per lb.	Value per acre	Bolls per lb.
Delfos 531	898	34.2	1 5/32	7.85	79.15	80
Missdel 2	892	36.3	1 3/32	6.90	69.38	85
Stoneville 3	814	37.6	1	6.10	56.41	76
Cleveland 884-4	798	35.3	1	6.10	56.02	72
Stoneville 2	743	36.0	1 1/32	6.40	54.19	70
Missdel 1	623	35.3	1 3/32	6.90	48.72	71
Deltatype Webber 9	577	33.6	1 1/8	7.35	48.12	71
D. & P. L. 10	687	38.0	31/32	5.90	46.12	77
Light. Express	571	32.6	1 1/16	6.65	43.88	78
Lone Star 561	605	36.6	1	6.10	42.13	66
Lone Star 562	598	37.0	1	6.10	41.61	64
Wilson Type	629	33.8	29/32	5.60	41.41	70
Cleveland 54	600	35.7	15/16	5.75	39.92	72
Farm Relief	515	36.2	1 1/16	6.65	39.66	70
Cleveland Piedmont	557	34.0	7/8	5.50	36.05	69
D. & P. L. 4-8	522	39.4	15/16	5.75	34,04	78
Acala 37	463	34.0	1	6.10	32.77	78
Express 17	424	34.4	1 1/16	6.65	32.23	77
Half & Half—Mahon	631	40.3	27/32	4.00	29.92	72
Rowden 2088	351	34.2	31/32	6.90	24.07	64
Miller 589	250	36.3	31/32	5.90	16.93	64
Miller 610	230	37.8	1	6.10	15.94	63

Hill test received 700 pounds of 4-8-8 fertilizer per acre, and the Valley test 600 pounds.

Nitrogen Sources Test

The purpose of this test it to determine the relative efficiency of the various sources of nitrogen in cotton production. The test was conducted on a uniform unimproved brown loam

Table 4

Main Nitrogen Sources Test with Cotton

Nitrogen sources	Average 1929-31			1931			
	Acre yield	No nitrogen check	Increase	Acre yield	No nitrogen check	Increase	Bolls per lb.
Leunasalpeter	829	309	520	952	157.5	794.4	79.2
Nitrate soda	829	313	516	972	325.0	647.0	75.6
Cal-Nitro	811	304	507	822	175.0	647.0	77.7
Ammonium sulphate	859	375	484	962	295.0	667.0	76.1
Calurea	808	354	454	876	265.0	611.5	77.6
Calcium nitrate	763	354	409	616	257.5	358.5	76.8
Cyanamid	738	334	404	762	235.0	527.0	77.2
Ammonium nitrate[1]				842	195.0	647.0	76.9
Amm. Sul. & Nit. Soda[2]	776	412	364				
No fertilizer	307	271	36	190	122.5	67.5	83.6
No nitrogen	313	313		190	190.0		84.1

1. One year (1931)
2. Two years (1929-30)

soil which had been continuously cropped to cotton for 75 years or more. All plots were one-twentieth acre in size, composed of four rows, and repeated three times.

A uniform application of 600 pounds of 0-12-6 fertilizer was made to all except the no fertilizer plots, and 36 pounds per acre of nitrogen from the various sources applied to the respective plots. The combination, ammonium sulfate-nitrate of soda application was discontinued this year and ammonium nitrate-calcium carbonate substituted. The data are given in Table 4 as one and three-year averages and arranged according to the three-year average yield.

Secondary Nitrogen Sources Test

The Secondary Nitrogen Sources test was conducted under the same conditions as the Main Nitrogen Sources test. Results for one year only are presented. The 1930 results were unsatisfactory due to poor stands and late plantings.

Table 5
Secondary Nitrogen Sources Test with Cotton

Nitrogen sources	Acre yield	No nitrogen check	Increase	Bolls per lb.
Arcadian nitrate soda	640	268	372	76.1
Chilean nitrate soda	572	284	288	77.9
Urea	544	272	272	76.0
Ammonium nitrate	476	245	231	78.8
Cal-Nitro	459	249	210	76.4
Cottonseed meal	448	265	183	78.4
Nitrophoska (12-24-12)	433	257	176	79.9
Ammophoska (12-24-12)	395	253	142	81.4
Nitrophoska (16-16-21)	352	241	111	79.0
No nitrogen	276	276		81.3
No fertilizer	181	280	-99	83.8

Phosphorus Sources Test

The purpose of this test is to determine the relative efficiency of the various phosphates in cotton production. The

Table 6
Phosphorus Sources Test with Cotton

	Average 1929-31			1931			
Sources	Lb. seed cotton per acre	No phosphorus check	Increase	Lb. seed cotton per acre	No phosphorus check	Increase	Bolls per lb.
Superphosphate	945	850	95	794	588	206	83.0
Ruhm's phosphate	893	834	59	626	561	65	76.7
Colloidal phosphate	848	842	6	578	553	25	79.2
No phosphate	826	826		570	570		77.4
No fertilizer	641	819	-178	304	579	-275	87.0

data are presented in Table 6 as one and three-year averages. Six hundred pounds per acre of 6-0-6 fertilizer was applied to all plots except the no fertilizer plots. The phosphatic materials were applied, irrespective of analysis, at the rate of 300 pounds per acre to their respective plots.

Potash Sources Test

This test was designed to test the relative efficiency of the potash in the various potash carriers in cotton production. The data are presented for 1931 and as an average of the result for three years, 1929-31. Plots used were similar in size, arrangement, and kind of soil to those used for the nitrogen sources tests.

Six hundred pounds of 6-12-0 fertilizer per acre was applied to all plots with the exception of the no fertilizer plots.

Table 7
Potash Sources Test with Cotton

	Average 1929-31			1931			
Sources	Lb. seed cotton per acre	No potash check	Increase	Lb. seed cotton per acre	No potash check	Increase	Bolls per lb.
Muriate	955	844	111	954	836	118	77.6
Kainit	926	816	109	976	863	113	71.8
Sulphate	876	809	67	944	843	101	77.1
Manure salt	852	811	41	834	828	6	74.1
Trona	836	808	28	822	857	-35	76.6
No potash	825	825		854	854		77.1
No fertilizer	387	834	-447	214	845	-631	84.1

Table 8
Potash Rates Test with Cotton

	1929-31			1931			
600 lb. per acre N-P-K	Lb. seed cotton per acre	No potash check	Increase	Lb. seed cotton per acre	No potash check	Increase	Bolls per lb.
8-12-6	744	657	87	693	666	27	74.4
No fertilizer	298	668	-370	244	658	-414	83.0
8-12-0	679	679		649	649		75.4
8-12-2	780	691	89	801	641	160	73.5
8-12-4	845	702	143	812	632	180	75.0
8-12-6	800	713	87	650	623	27	73.8
8-12-8	811	701	110	632	636	-4	73.5
8-12-10	796	690	106	674	648	26	74.2
8-12-12	806	678	128	649	660	-11	73.3
8-12-6	754	667	87	699	672	27	73.9

The potash materials were applied at the rate of thirty-six pounds of potash (K^2O) per acre. The results for 1931 and for a three-year average are given in Table 7.

Potash Rates Test

This test was conducted on the same kind of soil as used for the potash sources tests, unimproved brown loam. In addition to the results of 1931, Table 8 gives a three-year average for this test. All plots were one-twentieth acre in size, composed of four 40-inch rows, and repeated three times.

Hill Fertilizer Test

This test was designed to ascertain the most economical fertilizer combination as well as rate of application in cotton production. The plots were one-twentieth acre in size, composed of four 40-inch rows, and the test planted in four replications. The soil used was very poor brown loam which had grown cotton continuously for seventy-five years, or more.

All fertilizers were applied at the rate of 600 pounds per acre, except the 1200, 1800, and 2400-pound applications, and were made from 16% nitrate of soda costing $46.00 per ton, 16% superphosphate costing $16.00 per ton and 48% muriate of potash costing $44.00 per ton. These prices of fertilizers are used in making all calculations of gain or loss due to fertilizer treatment.

Table 9
Hill Fertilizer Test

	Average 1930-31			1931			
N-P-K	Lb. seed cotton per acre	Increase	Net gain	Lb. seed cotton per acre	Check	Increase	Net gain
Nitrogen variation							
8-8-4	910	581	3.42	1010	222	788	5.36
6-8-4	887	581	5.03	1018	202	816	7.63
4-8-4	823	426	3.14	875	281	594	4.93
2-8-4	554	236	-.50	554	318	236	-.50
0-8-4	339	-1	-3.48	339	340	-1	-3.48
Phosphorus variation							
4-10-4	696	330	.24	720	274	446	1.38
4-8-4	823	426	3.14	875	281	594	4.93
4-6-4	654	370	2.87	635	183	452	2.70
4-4-4	607	324	2.66	535	185	350	1.25
4-0-4	531	124	-1.02	371	296	75	-3.04
Potash variation							
4-8-8	802	360	0.20	848	320	528	2.50
4-8-6	789	370	1.05	837	300	536	3.25
4-8-4	823	426	3.14	875	281	594	4.93
4-8-2	717	343	1.47	765	261	504	3.67
4-8-0	694	343	2.10	734	242	492	4.00
4-8-4 variation							
600 lbs.	823	426	3.14	875	281	594	4.93
1200 lbs.	1057	753	3.65	1313	207	1106	8.22
1800 lbs.	1164	840	-2.00	1529	299	1230	5.14
2400 lbs.	1279	934	-7.24	1727	251	1476	1.71
No fertilizer	392			288	288		

Table 9 gives the results for 1931 and the average results for 1930-31. The increase represents the difference in pounds of seed cotton per acre between the fertilized and the unfertilized plots. The fertilizers under trial are grouped according to the variations of nitrogen, phosphorus, potash, and rate of application.

Valley Fertilizer Test

The purpose of this test is to ascertain the most profitable fertilizer combination and rate of application.

The soil is improved brown loam valley land. Each plot was one-twentieth acre in size, composed of four 40-inch rows, and the treatment repeated three times. All fertilizers were applied at the rate of 600 pounds per acre, except the 1200, 1800, and 2400-pound applications and were made from nitrate of soda, superphosphate and muriate of potash.

Table 10 presents the results for 1931 and the average results for seven years. The increase represents the difference, in pounds of seed cotton per acre, between the fertilized and the unfertilized plots. The fertilizers under trial are grouped according to their variations of nitrogen, phosphorus, potash, and rate of application. This is the first season in seven years that yields secured from every fertilizer application in this test failed to make a profit. We attribute this to hopper damage and unfavorable weather conditions.

Table 10

Valley Fertilizer Test

	Average 1925-1931			1931			
N-P-K	Lb. seed cotton per acre	In-crease	Net gain in dollars	Lb. seed cotton per acre	Check	In-crease	Net gain in dollars
Nitrogen variation							
8-8-4	1334	429	11.86	364	348	16	-10.09
6-8-4	1391	481	16.96	393	341	52	-7.44
4-8-4	1372	493	19.66	495	413	82	-5.32
Phosphorus variation							
4-8-4	1372	493	19.66	495	413	82	-5.32
4-6-4	1357	447	17.02	519	340	179	-2.78
4-4-4	1267	355	12.94	415	339	76	-4.23
Potash variation							
4-8-8	1545	661	26.51	682	508	174	-4.56
4-8-6	1431	550	21.52	521	461	60	-6.29
4-8-4	1372	493	19.66	495	413	82	-5.32
4-8-2	1205	319	10.44	360	360	0	-6.39
4-8-0	1026	129	1.42	307	354	-47	-4.90
4-8-4 variation							
600 lbs.	1372	493	19.66	495	413	82	-5.32
1200 lbs.	1522	618	19.16	388	340	48	-12.94
1800 lbs.	1548	651	13.00	295	343	-48	-19.90
2400 lbs.	1590	701	7.36	277	345	-68	-26.44
No fertilizer	893			390	390		

Corn Varieties

The purpose of this test is to determine the varieties of corn that are most productive and best adapted to the soil and

climate of this section. The test is composed of twenty varieties, each planted in single rows and repeated eight times. Highly improved brown loam valley land was used and 400 pounds of 4-8-6 (N-P-K) fertilizer applied per acre. The date of planting was April 28. Table 11 gives the results for 1931 and the average results for 5 years. The varieties are arranged in order of their grain production for 1931.

Table 11
Corn Variety Test

Varieties	1931		Average 1927-31	
	Bu. grain per acre	Per cent grain	Bu. grain per acre	Per cent grain
Hastings	84.2	86.8	73.4	83.2
Dixie White Dent	71.2	85.6	------	------
College G-4	67.7	80.9	------	------
Cocke's Prolific, Station	67.5	84.6	65.7	82.3
Jellicorse	65.8	84.3	------	------
Mosby, Delta	63.7	84.8	61.8	81.7
Mosby Station	62.9	86.0	63.1	81.3
Paymaster	62.1	83.5	64.3	81.0
College 47	60.1	81.3	------	------
College Y 4	59.9	84.4	------	------
Cocke's Prolific, Wood	48.8	82.6	------	------
Laguna	48.7	85.0	53.3	79.2
Mosby, Suttle	45.5	87.1	56.0	83.4
Golden Dent R. H.	44.8	84.5	------	------
Mexican June	44.7	84.6	47.3	79.4
Jarvis	43.4	84.9	------	------
Improved Golden Dent	31.5	82.8	48.2	76.4
Yellow Dent Ferguson	27.6	84.8	------	------
Reese's Drouth Resister	25.5	81.9	------	------

Silage and Grain Test

The purpose of this test is to determine the relative silage and grain productive values of corn, sagrain, sorghum, atlas sorgo and grohoma.

All plots were one-twentieth of an acre in size, composed of four 40-inch rows, and the treatments repeated four times. The soil used was unimproved brown loam table-land. Six hundred pounds of 4-8-6 (N-P-K) fertilizer was applied per acre, and the crops planted June 1. The two outside rows on each plot were harvested for silage yields and grain yields determined on the middle two rows.

Grohoma and atlas sorgo were severely damaged by the

Table 12
Silage and Grain Test

Crops	Tons silage	Bushels grain
Japanese seeded ribbon cane	15.0	7.3
Corn	8.4	65.9
Atlas sorgo	8.2	6.2
Grohoma	6.4	5.9
Sagrain	5.3	24.0

sorghum midge, while the sagrain and Japanese seeded ribbon cane were damaged very little. Corn is our safest feed grain crop. Japanese seeded ribbon cane has so far been unsurpassed at this station for silage production; a greater tonnage and a more satisfactory silage has always been secured from it.

Winter Cover Crops for Corn

This test is designed to study the effects of plowing under winter cover crops upon the yield of succeeding crops of corn over a period of several years. The test is composed of ten plots one-twentieth acre each and repeated four times. Fertilizer was applied under corn at the rate of 400 pounds per acre where designated.

Vetch, Austrian pea, crimson clover, and rye made growth that was highly satisfactory, but red clover made poor growth probably due to insufficient lime. The cover crops were planted October 2, 1930, plowed under May 1, 1931, and the land planted to Golden Jarvis corn May 23, 1931. Table 13 presents the results for 1931 in yield of corn per acre and the height of cover crop when plowed under.

Table 13
Winter Cover Crops for Corn

Treatment	Fertilizer	Bu. corn per acre	Bu. increase over 0-8-4	Height of cover crop
No cover	0-0-0	50.4	-16.2	
No cover	0-8-4	66.6		
No cover	6-8-4	78.0	11.4	
Red clover	0-8-4	69.3	2.7	20 in.
Austrian winter pea	0-8-4	85.0	18.4	32 in.
Hairy vetch	0-8-4	85.2	18.6	42 in.
Crimson clover	0-8-4	86.7	20.1	24 in.
Abruzzi rye	0-8-4	52.3	-14.3	5.5 ft.
Abruzzi rye	6-8-4	61.2	-5.4	6.0 ft.

Rotation Studies with Cotton, Corn, Sorghum, and Hairy Vetch

Two adjoining tracts of land, about six acres each, were built up to similar fertility by sixteen years of crop rotation, including legumes, which increased the organic matter and nitrogen content of the soil. In 1925 a cotton fertilizer test was started on one of these tracts and has been repeated annually without cover crops. The adjoining tract of six acres was divided into two, three-acre plots and continued in a rotation as follows: first year, cotton followed by vetch and the vetch allowed to mature; second year, corn or silage followed by a volunteer crop of vetch, occasionally cut for hay; and third year, cotton. The volunteer vetch was plowed under about the first week in April in time for planting cotton April 21. Cotton was alternated from one plot to the other with corn and soybeans, or sorghum. Each year the rotation plot received an application of 600 pounds of 4-8-8 fertilizer, which is the

same treatment given the continuous cotton plot. Table 14 presents the results of this study in pounds of seed cotton per acre extending over a period of seven years.

Table 14
The Effect of Rotation and Commercial Fertilizer on the Yield of Cotton

	Yields in pounds of seed cotton per acre							
	1925	1926	1927	1928	1929	1930	1931	Average
Cotton continuously without fertilizer	1561	1213	824	786	763	714	390	893
Cotton continuously and 600 lbs. 4-8-8	1996	2065	1238	1605	1814	1414	682	1545
Cotton in rotation and 600 lbs. 4-8-8	1550	1973	1637	2148	2401	1970	1061	1820

The trend of production on the two plots cropped continuously to cotton is downward, gradually downward on the plot receiving 600 pounds 4-8-8 fertilizer, and rapidly downward on the no fertilizer plot. Excepting the last two unfavorable years, the rotation tract shows an improvement in productivity. The average yield is 1820 pounds of seed cotton per acre.

Organic Matter and Nitrogen—The lack of organic matter and nitrogen are important causes of low crop yields on most soils of Mississippi. Their low content of organic matter is responsible for a great amount of erosion. In this section of the state soil erosion is removing many times more plant food from the soil than crops are. The organic matter in most soils must be increased in order to obtain the best results from the use of fertilizers and lime.

Crop residues, stable manures, and green manures are three important sources of organic matter for the soil. Of these, crop residues are the cheapest. Stable manure is a valuable source of organic matter but it furnishes less material than crop residues. Green manure crops which do not take the place of other crops in the rotation may be used to good advantage, but cover crops which replace regular crops are generally too expensive to use.

The nitrogen requirements for crop production can be supplied economically to soils in this section of the state from the use of summer and winter legumes. Since nitrogen is a limiting factor in most soils of the state, their productive power can be built up greatly by including leguminous crops in the cropping system. Soybeans, vetches, peas, and some clovers have proved their worth as soil builders.

Summary

In a test of 14 standard varieties of cotton, Stoneville 3, Missdel 2, Cleveland 54, Stoneville 2, and D. & P. L. 4-8 are the five leading varieties in a two-year average. In the Main Cotton Variety test on valley land, the five leading varieties are: Missdel 2, Delfos 531, Missdel 1, Stoneville 2, and Stone-

ville 3; and on the hill land, Delfos 531, Missdel 1, Stoneville 3, Cleveland 884-4, and Stoneville 2.

In the nitrogen sources test the nitrate form of nitrogen showed some superiority over the other forms of nitrogen, though not decidedly so except in the case of ammophoska and nitrophoska, which gave the lowest yield per acre.

When compared on the basis of 300 pounds of material per acre, superphosphate, Ruhm's phosphate and colloidal phosphate gave increases of 95, 59, and 6 pounds of seed cotton per acre, respectively, in a two-year average, and 206, 65, and 25 pounds per acre for 1931.

In a test with the different sources of potash at the rate of 36 pounds of potash per acre, muriate of potash and kainit showed a slight advantage in a two-year average with cotton. The potash rates test indicates that 24 pounds of potash per acre is perhaps the highest rate justified for cotton on an unimproved brown loam soil.

The result from the Hill Fertilizer test with cotton on an unimproved brown loam soil show the greatest gain from 600 pounds of 6-8-4 fertilizer.

The results of a three-year average in a test of 19 varieties of corn, Hastings, Station Cocke's Prolific, Paymaster, Station Mosby, and Delta Mosby are the five leading varieties in the order named.

In a test comparing Japanese seeded ribbon cane, corn, atlas sorgo, grohoma, and sagrain as sources of silage, Japanese seeded ribbon cane took first place with 15 tons per acre, and corn second place with 8.4 tons. As a producer of grain, however, corn yielded 66 bushels and sagrain 24 bushels per acre. Austrian winter pea, hairy vetch, and crimson clover grown as winter cover crops increased the yield of corn 18.4, 18.6, and 20.1 bushels, respectively, but rye alone reduced the yield 14.3 bushels.

A rotation including vetch showed a considerable improvement in yield of cotton over land continually grown to cotton alone.