12-1-1928

Report of Holly Springs Branch Experiment Station, 1928

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Bulletin No. 264 December, 1928

REPORT OF HOLLY SPRINGS BRANCH EXPERIMENT STATION, 1928.

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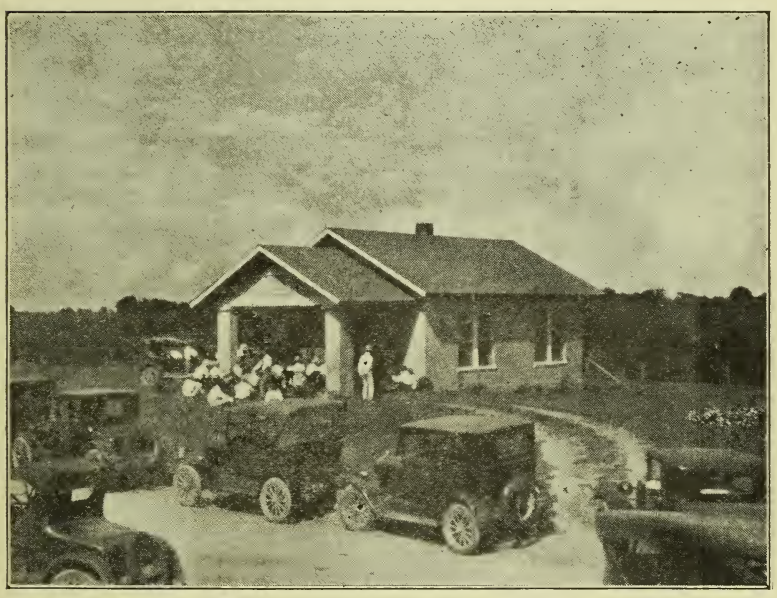


Station Office

Mississippi Agricultural Experiment Station
A. and M. College, Mississippi.
J. R. Ricks, Director.

REPORT OF HOLLY SPRINGS BRANCH EXPERIMENT STATION, 1928.

The work of the Holly Springs Branch Station has been conducted along the lines towards the development of successful and progressive agriculture for this section of the state. While this station is located only about twenty miles south of the Tennessee line, the soils are very similar for more than two hundred miles south of this place. Results obtained from cooperative experiments with fertilizers conducted for a number of years over the northern hill section of the state indicates very similar soil requirements. More work has been done this season than any time within the past history of the station. The effect of the work done here can be seen on many farms in the state in the use of fertilizers, varieties of farm crops, spacing of cotton, cultural methods of farm crops and in dairying and other farm work. The seasons the past year were unfavorable for all farm crops due to too much rain during the early Spring and Summer and then followed by extreme dry weather in the fall.

The results of these unfavorable growing seasons can be seen in the low yields of cotton, corn, hays, pastures, grasses, sweet potato and other farm crops over a greater part of the hill section of the state.

Additional Land Purchase—The Mississippi Legislature at the regular Session of 1928 appropriated $8000.00 for the purchase of additional lands for station purposes. At this writing 188.4 acres of thin but very uniform land has been purchased. This land is slightly rolling with ½-mile frontage on a state highway; and within operating distance from the station. As much of this land will be used for experiment work next year as the support fund will allow. This will remove one of the greatest handicaps of the station. Land of uniform fertility whether rich or poor is necessary to secure reliable results in any form of experiment work. In the past our experiment fields have of a ne-

cessity been located here and there over the farm, the size of each field being determined only by the amount of land suited for experiment work. It has in the past been necessary to rent suitable land in two directions from the station in order to secure enough for experiment work.

Insect and Disease Damage—The boll weevil did considerable damage to the cotton crop in this section the past year. The red spider, cotton hopper, plant lice, rust, cotton wilt, and pink boll rot (anthracnose) all played a part in reducing the yield of cotton. The cotton hopper did less damage than usual. An unusual large number of boll weevils went into winter quarters in the fall of 1927. The extreme cold weather during the winter killed many of these weevils in this section so that the emergence the past spring was below normal. The wet spring weather favored rapid development of the weevil, which were finally brought under control by hot, dry weather. Far less weevils went into hybernation this fall than in 1927. The growing season for cotton was from two to three weeks later than usual this year. The cotton crop will about equal that of the year 1927. The corn and hay crops are very short this year in this section of the state.

Drainage—The controlling of the surface water especially on the cultivated lands of the South is of first importance. The growing of legumes and the use of farm manures will avail but little if the soils are allowed to wash with heavy rains. After fencing the farm the first work should be to control surface water on all lands that are clean cultivated. In many instances it will pay to terrace the pasture lands. County agents are ready to assist at all times in this work. Hill soils will rapidly decrease in fertility when cultivated, regardless of the care used in running off the rows, if terraces with a slight fall are not used to conduct the excessive water slowly to the main drain during heavy rains. This work is inexpensive if done at the proper time and should supersede all other farm work. The cost of terracing an acre of land before it is badly broken is not more than one dollar per acre for the labor, if the labor is to be hired to do the work. If the work is to be done by the landlord, the cost will be about one day's work per man for each acre terraced. Any land in the

state can be terraced between the time the crops are gathered in the fall and the time to plant the next crop in the spring with the labor and teams used in cultivating the land.

Soil Improvement—The soils on the station farm were very thin and in a badly eroded condition when they were deeded to the state to be used as an experiment station. If every land owner or farmer in the state had gone through with what it means to try to redeem poor washed gullied lands and bring them back to where they are fairly productive, no time would now be lost in seeing that every acre grew either a summer or winter legume each year. This class of work is awaiting most of the farms of the state today. There is far more profit in the type of farming when soil fertility is maintained than there is in the system of digging every dollar out of the land that can be had and returning nothing to the soil year after year. One ton of legume hay of almost any kind turned into the soil would add about $12.00 worth of nitrogen and about the same money value in organic matter. On the station farm soy beans are grown in all plantings of corn and either winter vetch, crimson clover, or Austrian winter peas are grown with small grain in all cotton middles and after hay crops. It is not the best method for any man to try to remove the soy bean hay that is grown in corn. Graze the crop after removing the corn or turn it under to improve the soil. The solution of one of the greatest farm problems today lies in rich fertile soils that will grow almost any kind of crop. When land improperly cultivated gets too thin for growing corn profitably, fertilizers are used and the land planted to cotton. The introduction of livestock, preferably the dairy cow in most instances, would aid greatly in the solution of farm problems.

Special attention has been given to the use of fertilizers under cotton, corn, sweet potatoes, and other crops, also a cotton spacing test, varieties of cotton, corn, sweet potatoes, sorghum, lespedeza, vetch, soy beans, fruits, pecans, grapes and other crops. Fertilizer tests with alfalfa, including both spring and fall plantings have also been made. Dairying, poultry and pasture making have had their places in the year's work. All calls for institute work were filled.

COTTON

One of the most prominent cotton growers of the South has said the way to grow cotton is to plant on rich land and keep the grass out of it. To be a little more explicit,—the requirements for growing cotton successfully are: a fertile soil, the judicious use of fertilizer, proper cultural methods adapted to the several cotton growing sections and insect control. Never within the past history of the South has the public been in a more receptive mood to use improved methods as can be seen in increased crop yields. The tendency now is to replace labor to a great extent with improved farm machinery. Two and four row cultivators operated by one man are attracting much attention in sections where such machinery can be worked to advantage. More cotton per acre at less cost is vital to the industry.

Hill or rolling land should not be broken in the fall unless seeded to a winter cover crop of some kind. When a cover crop is not to be planted, it is advisable to leave all of the vegetable matter on the surface during the winter to check soil washing during heavy rains. Sod land should be turned in the fall and kept rough. A disk harrow will put this land in excellent condition, the following spring. Valley land may be broken in the fall if the surface water is properly controlled. Deep plowing on hill sides in the fall will not prevent soil washing in this section. A winter cover crop planted in cotton middles in late September gives the best protection for all kinds of land during the winter months. Livestock such as sheep, beef cattle or the dairy cow can be grazed on such crops when the condition of the soil will permit. This method will add greatly to the pasture grazing season.

Preparation of Land—There are several ways land may be prepared for cotton in this section. One way is to run a furrow down the water furrow of the old rows and throw two furrows together on this furrow, or list the land. Where this method is practiced the fertilizer should be applied in or on this list about ten days or two weeks before planting time. Then break the middles out with a buster and allow the land to remain in this condition until planting time. At planting time harrow down to slightly elevat-

ed rows ahead of the planter. This method is very satisfactory when the rows are not to be changed and most of the work is to be done with small plows.

A second method is to break the land broadcast in the spring. About two weeks before planting time, lay off the rows and apply the fertilizer, which may be done with the same machine. The row is completed by throwing out the middles with a buster. Harrow and plant as given above. The only objection we find to this method is that land flat broken in the spring may remain too wet to plow longer an unfavorable spring and delay planting.

The third way suggested is to put the land in rows at any time before planting time, harrow down and apply the fertilizer in the top of the row about three inches below the surface, cover with a harrow and allow to remain until planting time.

The method used on the station is a little different from any suggested on account of having to use the same plots year after year in experiment work. The old row is split open with a middle breaker, a shovel plow is run in the bottom of this buster furrow and the land listed on this furrow with a single horse plow. This method puts the row in the same position of the old row. Fertilizer is applied in this list and the row completed with a middle breaker. When very heavy applications of fertilizer are used the fertilizer is mixed with the soil by running a shovel plow furrow before the middles are broken out. A section harrow prepares the land ahead of the planter.

We have never had ill effect with fertilizers even when as high as one ton or more is used per acre when the above method is used. Fertilizer applied about three inches below the seed gives satisfactory results.

An ideal seed bed is one prepared and fertilized two weeks before seed planting time and settled by a rain. In practice it is frequently the case that preparation, fertilization, and planting is, of a necessity, done at very short intervals.

Cotton Planting Time—In this latitude the time to plant cotton is usually between April 25th and May 10th. Cotton should be planted when the ground is warm enough to cause quick germination. A good stand and earliness are

very great factors in the amount produced. It is better to plant medium early and secure a good stand than to plant early and get a poor stand. One of the cheapest and best ways to increase the yield of cotton per acre is to get a good stand of cotton. One of the ways to get a good stand is to plant enough seed.

A good stand on hill land is from three to four stalks in bunches per foot. A good stand on valley land is two to three stalks in bunches per foot.

A properly balanced fertilizer is necessary to secure the best results with the above spacing. From our past results, with the exception of this year's results, blocking the cotton and having the blocks about twelve inches apart is not far from good spacing.

Depth of Planting—Cotton seed should be planted very shallow in a medium elevated row. It is advisable to use from one and one-half to two bushels of seed per acre, or use the hill dropper. The eariler the planting is made the more seed should be used. A good practice is to run the planter twice down each row using half the quantity of seed each way. The first trip will plant the seed a little deeper than the second. A good stand is the most important factor in growing cotton.

Cultivation—As soon as the plants are established sufficiently not to be injured, cultivation should begin. We find a side harrow does splendid work for first cultivation. The Rotary hoe gives promise of a most valued tool. Some use the section harrow to advantage. Others use the double cultivator. Regardless of the method used, thin or block the cotton as soon as possible and give shallow, frequent cultivation.

We find it a good practice to cultivate as soon as possible after each rain but if the rains are far apart, it may be necessary to cultivate more often,—something like once every ten days or two weeks.

Boll Weevil Control—If any weevils can be found just as the first squares are about half grown, calcium arsenate should be applied in the bud of the cotton in any form desired by the operator. The past two years have convinced us that this is the correct method. Use either calcium arsenate dust or the sweet poison. (The association of

Southern Agriculturalist suggest the finding of twenty weevils per acre before poison is used.) A second application about ten days later should be made if any weevils can be found.

Results from this station indicate that in this latitude this second application is usually due about the time most of the weevils are out of hibernation, which means most of the weevils are destroyed. Should the weevils become plentiful later in the season, poisoning should begin with calcium arsenate dust as soon as 10 per cent squares infestation is found. Mr. B. R. Coad of the U. S. Department of insect control, recommends three applications four days apart, beginning with about 10 per cent infestation. After the three applications, the weevils should be held down to about 20 per cent infestation by later dustings.

Rust—Some times known as Poatsh hunger. According to Dr. D. C. Neal, Plant Pathologist, Mississippi Experiment Station in bulletin No. 248, "The Most Common Causes of rust are the lack of humus or vegetable matter in the soil, lack of potash, and lack of drainage." He recommends for the control of rust a system of rotation that will build up the humus or vegetable matter, or the use of farm manures. Kainit at the rate of 200 pounds per acre or muriate of potash 50 pounds per acre, or potash in other forms used as a fertilizer gives good results. In our results at this station it appears that a complete fertilizer containing a high percent of potash such as 8-4-6 and 8-4-8 used at the rate of 600 pounds per acre gives splendid results. See four year average, table No. 5.

Wilt—Cotton wilt and rust are often confounded. Rust appears to be unsatisfactory soil condition, whereas wilt is a disease. Quite frequently both wilt and rust are found together in the same field. Cotton wilt is doing untold damage on many farms. Symptoms,—according to Dr. D. C. Neal, "cotton wilt may be suspected when plants wilt and die without any apparent reason. Such plants are usually stunted early in the season as compared with healthy plants and the leaves turn yellow at their margins and between the veins. The chief symptom of a plant infected with wilt is the characteristic internal appearance of effected stalks. If the stem of a freshly wilted plant is cut across

near the ground and the tissue in the region of the water—conducting vessel shows brown or blackened area, there is strong evidence of the disease."

Control of Wilt—Plant wilt resistant varieties of cotton according to Mississippi Bulletin No. 248 by Dr. Neal, the following varieties are the most promising wilt resistant: Staple cotton—Super Seven, Lightening Express, Watson, and D. and P. L. No. 6. The most promising wilt resistant short cottons as indicated from these tests are Thyne's Cook, Dixie Triumph, Miller, and Cleveland 54. Wilt is not transmitted by the seed. The disease is in the soil and it requires eight or more years to free the land from the disease even when no cotton is grown on the land during this period.

Pink Boll Rot—Anthracnose. This disease is widely known over the entire cotton growing area. It was very prevalent in this section during this year. Under favorable weather conditions the disease may effect young plants. The final stages are bolls with gray to brown water-soaked spots, which later enlarge, becoming redish-brown in color, finally destroying the boll.

Causes—A fungus disease which may live over winter on diseased plants and infect the following crop. The disease is also transmitted by infected seed.

Control—Plant some other crop on the infected land the following year. Plant disease free seed on clean land. The planting of two year old seed is recommended. Rotation is good for the land as well as for the cotton. Such varieties as Cook and Half and Half are rather susceptible to the disease.

Variety Test—Two variety tests were made, one on valley land and one on hill land. The soil used in the valley land test was improved brown loam. The hill test was on brown loam table land of ordinary fertility. Each variety was planted in one row plots and repeated four times. The rows in the valley test were 108 feet long and on hill test 200 feet long. Twenty nine varieties were used in each test. Poor stands were secured on Miss'dell No. 1 and No. 2. Miss'del No. 2 was discarded from the test on account of failure to secure a stand.

Plantings were made April 25th and 26th. Some va-

rieties were replanted with a hoe May 14th. The seasons were very unfavorable up to this time for cotton.

Fertilizers—The valley variety test was fertilized with 840 pounds per acre of 8-4-4 home mixed fertilizer.

The hill test was fertilized with 760 pounds of the same mixture.

Two series of both valley and hill land tests had heavy additional applications of potash. Two hundred pounds per acre of muriate of potash were added by hand ahead of the fertilizer distributor to series 1 and 3 of the valley land

Table 1.—Cotton Variety Test, Valley Land

Variety	Pounds per Acre		Lint Data		Value			Per Ct.
	Seed cot.	Lint	Per Cent	Leng-th	Cents per lb	Per acre	RANK	Seed cot. 1st. pick
Cleve. 54	2148.0	704.5	32.8	15-16 f	18.20	154.20	4	49.5
Cleve. 884	1528.1	504.3	33.0	1 1-32	19.05	114.50	28	50.2
Cleve Wilson	1702.3	529.4	31.1	7-8 f	17.70	114.81	27	55.1
Cleve. Piedm't	1769.3	559.1	31.6	7-8 f	17.70	120.74	26	51.1
H. & H., Mahon	1735.8	642.3	37.0	13-16f	17.20	130.16	20	44.1
Cook 1010	1705.7	644.8	37.8	13-16f	17.20	130.00	21	51.3
Acala 37	1799.5	583.0	32.4	1 1-32	19.05	132.96	16	45.3
D. & P. L. 8	1799.5	674.8	37.5	1	18.45	144.74	6	58.7
Rowden 40	1866.5	604.7	32.4	1	18.45	134.28	14	48.5
Miller	2003.9	623.2	31.1	1 1-32	19.05	143.57	8	50.8
D. & P. L. 4	1883.3	638.4	33.9	1	18.45	140.19	11	48.9
Deltatype Web.	1745.9	536.0	30.7	1 3-16	20.60	132.20	17	52.8
Delfos 910	1890.0	565.9	30.1	1 1-8	19.80	135.88	13	46.8
Missdel 1	1561.6	509.1	32.6	1 5-32	20.00	120.77	25	39.9
Delfos 911	2245.2	698.3	30.1	1 5-32	20.00	167.50	1	40.5
Delfos 6102	2017.3	607.2	30.1	1 3-32	19.65	144.69	7	50.2
D. & P. L. 6	1688.9	569.2	33.7	1 3-32	19.65	132.00	18	44.2
Express 121	1946.9	626.9	32.2	1 3-32	19.65	146.95	5	48.7
Lone Star 168	1846.4	600.1	32.5	1 3-32	19.65	140.35	10	40.1
Lone Star 284	1705.7	581.6	34.1	1 1-16	19.40	133.06	15	32.4
Lone Star 65	1890.0	606.7	32.1	1 1-16	19.40	140.80	9	36.9
Miss. Sta. Trice	1732.5	521.5	30.1	1 1-32	19.65	124.27	24	28.3
Trice 322	1631.9	538.5	33.0	1 1-32	19.65	125.50	22	18.7
Rowden 2119	1745.9	563.9	32.3	1	18.45	125.32	23	52.2
Rowden 3053	2134.6	706.6	33.1	1	18.45	156.07	3	47.6
Express 116	1883.3	585.7	31.1	1 3-32	19.65	138.45	12	41.5
Stoneville 1	1709.0	562.3	32.9	1 3-32	19.65	131.13	19	38.6
Stoneville 2	2057.5	685.1	33.3	1 3-32	19.65	159.32	2	34.2

test and the same amount was added to series 2 and 4 of the hill land test. The results were as follows: on valley land, series 1 and 3, yield of seed cotton per acre, 2047.3; on series 2 and 4 where no additional potash was used, 1592.6.

The difference of 454.7 pounds of seed cotton per acre is the increase from the additional amount of potash used. We feel sure a smaller amount of potash would have given equally as good results. This land produced 27.2 tons of sorghum silage in 1927. Vetch hay was also removed nearly every other year for the past fifteen years.

Table 2.—Cotton Variety Test, Hill Land

Variety	Pounds per Acre		Lint Data		Value		RANK	Per Ct. Seed cot. 1st. pick
	Seed cot.	Lint	Per Cent	Length	Cents per lb	Per acre		
Cleve. 54	939.7	355.2	37.8	15-16	17.95	74.28	20	88.2
Cleve. 884	857.6	313.0	36.5	1	18.45	67.55	23	61.1
Cleve. Wilson	1043.5	374.6	35.9	13-16f	17.20	76.47	16	72.7
Cleve. Piedm't.	894.5	329.2	36.8	13-16f	17.20	66.80	24	72.5
H. & H. Mahon	998.3	434.3	43.5	3-4f	17.20	84.85	5	77.5
Cook 1010	887.8	380.0	42.8	13-16	17.20	74.50	19	77.5
Acala 37	973.2	346.5	35.6	1	18.45	75.21	17	74.0
D. & P. L. 8	802.3	333.8	41.6	15-16	17.95	68.35	22	57.8
Rowden 40	1095.5	399.9	36.5	15-16f	18.20	85.30	3	67.1
Miller	1016.7	370.1	36.4	1	18.45	79.92	12	68.4
D. & P. L. 4	996.6	388.7	39.0	15-16	17.95	80.71	11	73.3
Deltatype Web.	824.1	281.0	34.1	1 1-8	19.80	65.42	26	75.2
Delfos 910	966.5	336.3	34.8	1 3-32	19.65	77.42	13	66.7
Missdel 1	773.9	280.9	36.3	1 1-16	19.40	63.36	27	63.0
Delfos 911	1149.1	401.0	34.9	1 3-32	19.65	92.27	2	69.8
Delfos 6102	959.8	341.7	35.6	1 1-16	19.40	77.42	13	60.9
D. & P. L. 6	820.8	320.1	39.0	1 1-32	19.05	60.98	28	55.7
Express 121	1031.8	381.8	37.0	1 1-32	19.05	84.43	7	69.6
Lone Star 168	973.2	360.1	37.0	1 1-16	19.40	80.90	10	78.1
Lone Star 284	1051.9	382.9	36.4	1 1-32	19.05	84.98	4	78.7
Lone Star 65	922.9	330.4	35.8	1 1-16	19.40	74.77	18	75.3
Miss. Sta. Trice	991.6	340.1	34.3	1 1-32	19.05	76.52	15	83.8
Trice 322	924.6	339.3	36.7	1	18.45	73.14	21	91.1
Rowden 2119	844.2	309.8	36.7	15-16f	18.20	66.00	25	67.5
Rowden 3053	1070.3	398.2	37.2	15-16f	18.20	84.57	6	65.6
Express 116	1062.0	370.6	34.9	1 1-32	19.05	83.05	9	76.0
Stoneville 1	1021.8	381.1	37.3	1 1-32	19.05	84.13	8	66.9
Stoneville 2	1185.9	454.2	38.3	1	18.45	96.97	1	81.8

COTTON VARIETY TEST, SIX YEAR AVERAGE

There is no doubt but that the careful selection of varieties of cotton to meet existing conditions, and the judicious use of the proper fertilizer, will add to the profit of the growers more than anything else under their control. There is a great need of a change in the basis of production from the planting of mixed "Gin-run" seed to the planting of uniform select varieties.

There are but few real cotton markets in this section for the above reasons. Under the usual local marketing conditions there is very little inducement to the grower using improved varieties because the price paid for this improved cotton is about the same as that paid for cotton from mixed Gin-run seed. The cotton buyer takes the profit in place of the grower. The only remedy suggested is to organize Community Cotton Growers Clubs and limit its members to one standard variety.

In as much as the mixing occurs principally at the gins, it will be necessary for these Community Clubs to control the gin or gins to prevent this mixing of seed. Such communities will find a ready demand for all cotton grown at one to two cents premium per pound above the average cotton prices. The only other method that we can suggest is to use proper care in cleaning the Gin in order to secure pure seed for planting purposes. The lint should be sold through standard cotton markets.

Table 3.—Cotton Variety Test 6 Year Average

Variety	Valley		Hill	
	Lint Yield	Value Lint and Seed	Lint Yield	Value Lint and Seed
Delfos 6102	554.8	148.92	419.8	107.0
Delfos 631*	516.6	147.61	400.3	113.26
Lone Star 65	586.3	143.89	432.7	101.40
Miss. Sta. Trice	536.0	134.67	413.9	98.41
Willis*	585.5	131.30	452.5	104.06
Deltatype Webber	449.9	130.08	316.1	90.82
Cleve. Wann.*	496.6	129.15	401.9	86.04
Express, Light.*	359.5	129.15	387.1	106.12
D. & P. L. 4	618.5	127.14	480.0	107.40
Cleve. 54	545.7	128.85	402.1	90.41
Half and Half Mahon	590.2	123.99	471.2	98.48
Miller	561.4	123.45	393.6	93.70
Acala 5*	541.7	119.04	435.2	104.18
Cleve. Pied	507.0	111.84	378.5	84.01

* Five Year's Average.

In the six year average table submitted above there are several varieties to which we wish to call special attention. Short staple varieties, D. and P. L. No. 4, Lone Star 65, Acala No. 5 Cleveland 54, Miler, and for staple varieties, Delfos 631, Lightening Express and D. and P. L. No. 6. We also wish to call attention to some varieties of promise that have been recently introduced. See table under variety tests, 1928. Stoneville No. 1 and No. 2, Rowden 3053.

Cotton Spacing Test—The soil for the hill test was brown loam and for the valley land test it was fertile brown loam land. All plots were fertilized as were the variety tests.

Plots—On hill land, four rows each duplicated, rows 316x3½ feet. On valley land the plots were three rows each duplicated, rows 196x3½ feet. Lone Star 65 cotton was used and plantings were made April 25th and 26th.

An attempt was made to get the following spacing. Cotton, as the planter left it or unthinned, three stalks per foot, two stalks per foot, one stalk per foot, one stalk per 18 inches, one stalk per 24 inches. The following table gives the results on both hill and valley land.

Table 4.—Average Three and Four Year Spacing Test

Hill Land Test 1925-26-27		Valley Land Test 1924-25-26-27	
Stalks per foot in drill.	Yield of seed cotton per acre.	Stalks per foot in drill.	Yield of seed cotton per acre.
4.56	1471.3	4.69	1889.9
2.63	1371.0	2.73	1687.2
1.88	1340.8	2.01	1640.9
1.20	1319.1	1.22	1611.9
.78	1239.0	.85	1408.0
.60	1113.2	.62	1401.5

This season was very unfavorable for the best development of cotton. On the valley land plots the red spider and rust did considerable damage. Probably the lack of moisture was the controlling factor. Our spacing results in 1927 were somewhat similar to this year's results. Both years the growing seasons were somewhat alike, being an extremely wet spring followed by a very dry fall. In a normal season, close spacing gives very much better results than wide spacing. Years like this, close spacing makes equally as much cotton, therefore it is the safest policy to use the close spacing method.

COOPERATIVE FERTILIZER TESTS

This work was conducted by the Holly Springs Branch Station in cooperation with county agents and good farmers. Similar plantings were made on the station on both valley and hill land. Two tests were conducted this year, one on the farm near Torrance in Grenada County, the other test was made near Sardis in Panola County. The planting near Torrance had to be discarded as part of the plots were plowed up and replanted, giving two dates of planting. Mr. C. G. Wallace, County Agent in Panola County, assisted. The plots were located on the farm of Mr. J. S. Woods on the State Highway between Sardis and Batesville. The soil was level second bottom greyish Pebly loam. The variety of cotton planted on this test was D. and P. L. No. 4. In all co-operative work of this station the soil is selected and the fertilizer applied and the crop gathered under the station supervision. The

crop cultivation is under farm management. The variety of cotton used on the Station valley land test was Delfos 1341; on the hill land test Lone Star 65.

In all fertilizer work represented in this bulletin the increase was obtained according to the standard adopted by the American Society of Agronomy as reported in Vol. 16 No. 1 of the Journal. The column marked "check yield" was obtained according to the above method by assuming that there is a gradual increase or decrease in fertility from one check to the other. All plots are 1-20 acre each in size, composed of four rows and three series. Only the middle rows were used in computing yields.

Table 5.—Fertilizer Test Valley Land, Holly Springs

Lbs. of material applied per acre			Average 1925-26-27-28					1928	
				Lbs. of seed cot. per acre		Dollars per acre			
Super phosphate	Nitrate of soda	Muriate of potash	Analysis	Plot yield	Increase	Cost of fertilizer	Net gain	Seed Cotton Increase	Dollars net gain
No fertilizer				1090.6					
300	160	100	8-4-8	1726.0	631.7	9.32	28.67	811.5	40.18
300	160	75	8-4-6	1636.8	538.8	8.63	23.70	816.5	41.01
300	160	50	8-4-4	1592.3	490.6	8.02	21.42	594.9	28.23
No fertilizer				1105.3					
300	160	25	8-4-2	1397.4	295.0	7.42	10.28	269.5	9.24
300	160	....	8-4-0	1252.7	153.4	6.81	2.39	60.6	-2.78
300	320	50	8-8-4	1494.3	398.1	12.39	11.50	458.2	15.87
No fertilizer				1093.1					
300	240	50	8-6-4	1589.7	493.0	10.19	19.39	596.5	26.25
225	160	50	6-4-4	1515.5	415.3	7.41	17.51	533.1	25.09
150	160	50	4-4-4	1448.9	345.2	6.79	13.92	392.5	17.22
No fertilizer				1107.2					
600	320	100	8-4-4	1777.3	676.2	16.04	24.53	760.1	30.69
900	480	150	8-4-4	1753.4	658.4	24.06	15.44	893.7	31.24
1200	640	200	8-4-4	1769.3	680.4	32.08	8.74	1080.7	35.00
No fertilizer				1082.9					

Table 6.—Fertilizer Test, Hill land—Holly Springs

Lbs. of material applied per acre			Average 1925-26-27-28					1928	
			Lbs. of seed cot. per acre			Dollars per acre			
Super phosphate	Nitrate of soda	Muriate of potash	Analysis	Plot yield	Increase	Cost of fertilizer	Net gain	Seed Cotton Increase	Dollars net gain
No fertilizer				508.6					
300	160	100	8-4-8	1167.9	628.1	9.23	28.46	388.3	14.79
300	160	75	8-4-6	1248.9	677.9	8.63	32.04	414.3	16.88
300	160	50	8-4-4	1239.9	637.7	8.02	30.24	327.8	12.21
No fertilizer				633.3					
300	160	25	8-4-2	1126.5	461.0	7.42	20.24	310.2	11.68
300	160	....	8-4-0	1070.0	372.3	6.81	15.53	199.8	5.58
300	320	50	8-8-4	1330.0	600.1	12.39	23.62	314.3	7.24
No fertilizer				762.1					
300	240	50	8-6-4	1167.3	428.3	10.19	15.51	302.9	8.63
225	160	50	6-4-4	1127.7	411.9	7.41	17.30	235.3	7.22
150	160	50	4-4-4	1049.7	357.1	6.79	14.64	219.7	6.85
No fertilizer				669.4					
600	320	100	8-4-4	1322.9	675.7	16.04	24.50	494.6	14.76
900	480	150	8-4-4	1434.6	809.8	24.06	24.53	495.6	7.36
1200	640	200	8-4-4	1479.5	877.1	32.08	20.55	542.4	2.70
No fertilizer				580.0					

Table 7.—Cooperative Fertilizer Test, Panola County

Pounds of material applied per acre.				Pounds of seed cotton per acre.			Dollars per acre.		
Super-phosphate	Nitrate of soda	Muriate of potash	Anlysis	Plot yield	Check yield	Increase	Increase at 6c	Cost of fertilizer	Net Gain
No fertilizer				630.5	630.5				
300	160	100	8-4-8	1123.7	673.1	450.6	27.04	8.51	18.53
300	160	75	8-4-6	974.4	715.7	258.7	15.52	7.98	7.54
300	160	50	8-4-4	1006.4	758.3	248.1	14.89	7.46	7.43
No fertilizer				801.1	801.1				
300	160	25	8-4-2	1101.1	800.7	300.4	18.02	6.93	11.09
300	160	....	8-4-0	1073.1	800.4	272.7	16.36	6.41	9.95
300	320	50	8-8-4	1209.0	800.1	408.9	24.53	11.62	12.91
No fertilizer				799.8	799.8				
300	240	50	8-6-4	1186.4	793.2	393.2	23.59	9.54	14.05
225	160	50	6-4-4	1090.4	786.5	303.9	18.23	6.90	11.33
150	160	50	4-4-4	1049.1	779.8	269.3	16.16	6.33	9.83
No fertilizer				773.1	773.1				
600	320	100	8-4-4	1274.3	754.5	519.8	31.19	14.92	16.27
900	480	150	8-4-4	1377.0	735.9	641.1	38.47	22.38	16.09
1200	640	200	8-4-4	1459.6	717.2	742.4	44.54	29.84	14.70
No fertilizer				698.5	698.5				

In the three tables given above the following data is found. Plot 3 fertilized with 600 pounds of 8-4-6 in the Holly Springs Valley land test gave a net gain for 1928 of $41.01 which was the highest gain in the test. 8-4-8 was second, plot (2) $40.18. 8-4-4 was third, $28.23.

In the three years average shown in same table plot 2, 8-4-8 gave an average gain of $28.67 for the three years which is the highest yield in the test. Plot 8-4-6 gave an average net gain of $23.70. Plot 8-4-4 gave a three year average net gain of $21.42.

In the hill land test conducted at Holly Springs Station in 1928, plot 3, Table No. 6, which is 600 pounds of 8-4-6 fertilizer, gave a net gain of $16.88. Plot 2, 8-4-8 gave a gain of $14.79. Plot 4, 8-4-4, $12.21.

In the four year average given in this same table, the highest net gain for four years was with 8-4-6 which was $32.04. The second highest plot was 8-4-4 giving a net

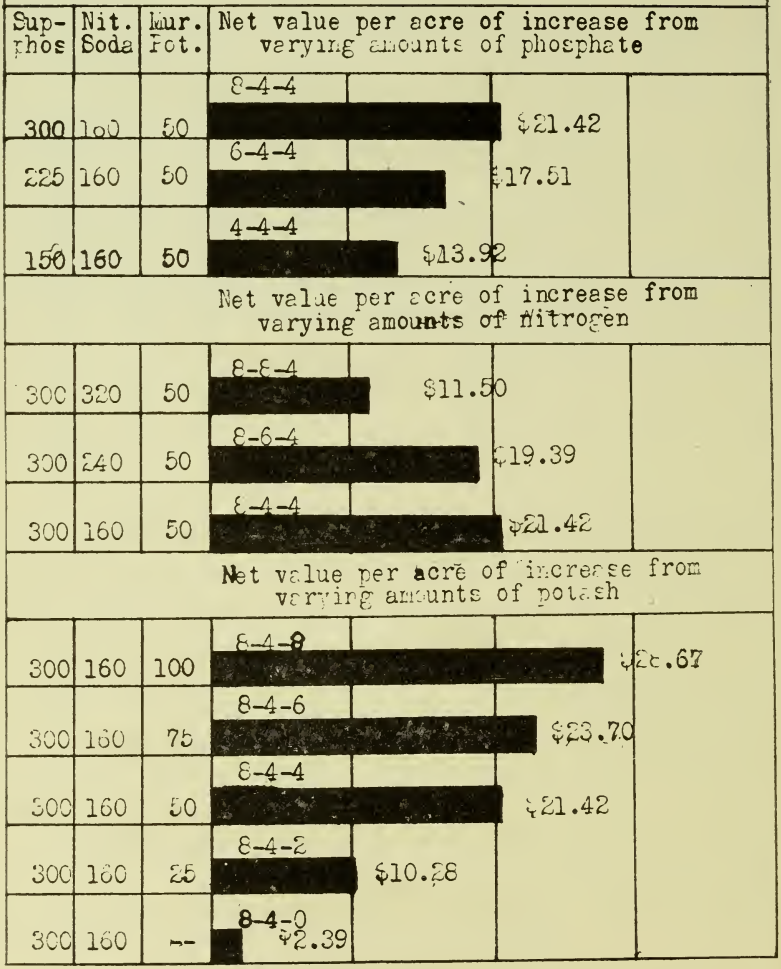
gain of $30.22 and the third highest was 8-4-8, giving an average of $28.46.

In table No. 7, the Panola County co-operative plots, the first years test, the plot giving the highest yield is Plot 2, 8-4-8 giving a net gain of $18.53. Plot 8-4-4 at the rate of 1200 pounds per acre came second with a net gain of $16.27.

There is no marked difference in the fertilizer requirements shown in any of these results. It is evident that phosphorus, nitrogen, and potash in combination give the best results. It seems in a majority of cases 600 pounds of fertilizer was the most economical quantity to use. Taking into consideration our past results at the Station and various co-operative results conducted over this Section of North Mississippi, we find no marked difference in the soil requirements in this part of the State, except on land heavily infested with wilt and rust. The outstanding fact is that a complete fertilizer will increase the yield of cotton very materially, frequently doubling the yield per acre. As can be seen from data given.

GRAPH 1

VALLEY LAND
Phosphate, Nitrogen and Potash Graphs
Averages 1925 - 26 - 27 - 28



GRAPH 2

HILL LAND

Phosphate, Nitrogen and Potash Graphs

Averages 1925 - 26 - 27 - 28

Sup-phos.	Nit. Soda	Mur. Pot.	Net value per acre of increase from varying amounts of phosphate
300	160	50	8-4-4 $ 30.24
225	160	50	6-4-4 $ 17.30
150	160	50	4-4-4 $ 14.64
			Net value per acre of increase from varying amounts of nitrogen
300	300	50	8-8-4 $ 23.62
300	240	50	8-6-4 $ 15.51
300	160	50	8-4-4 $ 30.24
			Net value per acre of increase from varying amounts of potash
300	160	100	8-4-8 $ 28.46
300	160	75	8-4-6 $32.04
300	160	50	8-4-4 $30.24
300	160	25	8-4-2 $20.24
300	160	--	8-4-0 $15.53

8-4-8—811.5 Lbs. Seed Cotton Increase Over No Fertilizer, $40.18.

8-4-6—816.5 Lbs. Seed Cotton Increase Over No Fertilizer, $41.01 Net Gain.

8-4-0—594.9 Lbs. Seed Cotton Increase Over No Fertilizer, $28.23.

No Fertilizer.

Recommendation—The cotton farmers in this section should use 600 to 900 pounds of fertilizer per acre as follows: On improved soils, where legumes have been grown or manures used, should use a mixture of 300 pounds of superphosphate (acid phosphate) 160 pounds of nitrate of soda or its equivalent in other forms of soluable nitrogen, and 50 pounds of muriate of potash or other forms of potash. This mixture is equivalent to 600 pounds of 8-4-4 factory mixed fertilizer.

On the thinner soils where the stalk growth is comparatively small, it will be found profitable to add 80 pounds nitrate of soda, or its equivalent in other forms of soluable nitrogen to the above mixture. This will make an equivalent to 600 pounds of 8-6-4 factory mixed fertilizer. The same quantities of 8-4-4 or 8-6-4 factory mixed can be used provided most of the nitrogen is from a readily soluable source.

From a four year average of both hill and valley land tests, the indications are that an addition to the above mixtures of 25 pounds muriate of potash (or other forms of potash) may be profitable on most land in this section. Where rust is prevalent this additional potash should be added.

The tendency with fertilizer factories now is to manufacture high grade goods. These high grade fertilizers can be sold cheaper per unit than the lower grades on account of saving in freight, sacks, handling, etc. Our recommendations are two parts phosphorus, one part of nitrogen and one part of potash. For example—100 pounds of a 12-6-6 has the same amount and kind of plant food as 150 pounds of 8-4-4. The tendency in some instances is to use more phosphorus than is necessary to balance the nitrogen and potash.

Potash Source Test—The soil used in this test is unimproved sandy loam, the same soil that has been used for the past three years. Each plot was fertilized the same as the past two years. All plots were in triplicate. Lone Star 79 was planted May 14th. Each potash carrier given in the table was applied at such a rate as to supply 24 pounds of available potash per acre. All plots including checks received in addition to the potash, 300 pounds of Superphos-

phate (acid phosphate) and 150 pounds of nitrate of soda per acre in order that deficiencies in these materials would not render the potash comparisons worthless. The increase was obtained by assuming that there was a gradual increase or decrease in fertility from one check to another, as is adopted by the American Society of Agronomy.

Table 8—Potash Source Test, 1928 and Average

	Average for 1926-27-28			Average for 1928	
	Lbs. seed cotton per acre			Lbs. seed cotton per acre	
Pounds of matreial applied per acre	Plot yield	Increase	Per cent increase	Increase	Per cent increase
No potash	1378.9				
50.0 Muriate of potash	1608.9	228.0	16.5	132.0	8.3
41.7 Trona	1518.7	135.7	9.8	169.3	10.9
No potash	1385.0				
50.0 Sul. of potash	1489.0	104.0	7.5	64.4	4.2
200. Kainit	1632.5	246.7	17.8	302.1	19.1
No potash	1386.3				

NITROGEN SOURCE TEST, 1928

This test was conducted on unimproved sandy loam valley land. All plots 1-20 acre in size and on the same soil that was used the past three years. Each plot was fertilized the same as the year before. All plots were in triplicate.

Lone Star 79 was the variety of cotton used. Planting was made May 14th, this being the second planting.

Each nitrogen carrier given in the table below was applied at such a rate as to supply 30 pounds of available nitrogen per acre. All plots including checks, received in addition to the nitrogen, 400 pounds Superphosphate (acid phosphate) and 67 3-4 pounds of muriate of potash per acre in order that deficiencies in these materials would not render the nitrogen comparison useless.

The increase was obtained by assuming that there was a gradual increase or decrease in fertility from one check to another, as is adopted by the American Society of Agronomy.

Table 9—Nitrogen Source Test, 1928 and Average

	Average for 1926-27-28			Average for 1928	
	Lbs. seed cotton per acre			Lbs. seed cotton per acre	
Pounds of matreial applied per acre	Plot yield	Increase	Per cent increase	Increase	Per cent increase
No nitrogen	863.5				
200.0 Nitrate of soda	1318.1	414.8	45.9	481.9	75.6
150.0 Ammonium Sul.	1323.9	380.8	40.4	478.6	66.4
115.5 Leunasalpeter	1191.0	208.1	21.2	423.3	52.6
No nitrogen	1022.8				
138.9 Cal. Cyanamid	1319.8	268.4	25.5	242.2	34.7
200.0 Cal. Nitrate	1504.3	424.3	39.3	453.1	41.5
65.2 Urea	1553.3	444.7	40.1	441.8	37.0
No nitrogen	1137.1				

NITROGEN SOURCE TESTS NO. 2

Two sets of plots were employed in this test. One on hill land of ordinary fertility and the other on unimproved valley land. The results of these two tests were averaged and put in one table. All plots were 1-20 acre each and planted in triplicate.

Table 10—Nitrogen Source Test

Super-phosphate	Nitrate of soda	Muriate of potash	Hill land test	Valley land test	Average
300	160 Nitra-Po.	50	1037.4	1651.6	1344.5
300	171.4 Calurea	0	1073.1	1536.9	1305.0
300	52.2	50	1189.3	1516.9	1352.9

Another season when we get possession of the additional land, most of the sources of nitrogen will be tested in one set of plots.

Side Dressing—Cotton with nitrate of soda. Soil used; unimproved low flat sandy loam valley land. Six plots of 1-20 acre each were used in the test. Cotton was planted May 14th. Excessive wet weather delayed cultivation. Three plots were planted as follows: 300 Superphosphate, 160 pounds nitrate of soda and 50 pounds muriate potash

making an 8-4-4 fertilizer. This application was made under the seed before planting.

Three plots were fertilized as follows: 300 pounds superphosphate 80 pounds nitrate of soda and 50 pounds muriate potash applied under the seed, making an 8-2-4 fertilizer. An additional 2 per cent of nitrogen (80 pounds nitrate of soda) was used as a side dressing when the squares began to form. The results were as follows: 600 pounds of 8-4-4 at planting yielded seed cotton 1727.6 pounds. 600 pounds of 8-2-4 at planting, 2 per cent of nitrogen (80 pounds nitrate of soda) used when first squares were forming, 1499.6 pounds. This gives 228 pounds seed cotton in favor applying all of the nitrogen under the seed before planting. This is only one year's test and should be considered as such. From past results on loam land with clay sub-soil, all of the nitrogen should be applied at planting time. On sandy soils with coarse sandy subsoils, side dressings with nitrogen in a soulable form is more beneficial.

Phosphate Fertilizer Test—Soil, slightly rolling brown loam table land. Date of planting: May 4th. Variety of cotton used, Lone Star 65. All plots were four rows each, 1-20 acre in size, and repeated three times.

Table 11—Phosphate Fertilizer Test, 1928

Pounds of material applied per acre					Pounds of seed cotton per acre		
Super. Phos.	Rhum's Phos.	Nit. soda	Mur. Pot.	Analysis	Plot Yield	Check Yield	Increase
300		160	50	8-4-4	1301.0	1301.0	
	300	160	50		1202.4	1294.0	-91.6
	400	160	50		1157.0	1287.1	-130.1
	600	160	50		1230.4	1280.2	-49.8
Nitrophoska		160 Lbs.		30-15-15	1210.4	1273.3	-62.9
300		160	50	8-4-4	1266.4	1266.4	
Factory mixed		600 Lbs.		8-4-4	1202.4	1251.3	-48.9
375		160	50	10-4-4	1234.4	1236.6	-2.2
450		160	50	12-4-4	1227.7	1221.9	5.8
	No fertilizer				991.8	1207.2	-215.4
300		160	50	8-4-4	1193.0		

Note—The 8-4-4 fertilizer was used as the check plot. From the results obtained in table 11 above, it appears that phosphorus at the rate of two pounds to one each of ni-

trogen and potash is very near the correct fertilizer requirement for this section. This being the case, 10-4-4 and 12-4-4 should produce but little more than an 8-4-4 except on fertile land having an extra supply of nitrogen. It appears that there is less available phosphorus in Rhum's phosphate than there is in superphosphate. These results should not be considered conclusive as they are for only one year.

CORN

The seasons this year were unfavorable for corn and all other farm crops. At this Station, corn is mostly grown after winter cover crops are removed from the land such as vetch, oats and vetch, and oats and Austrian Field Peas. This, of a necessity, causes planting in June. As a rule, early plantings of corn give the heaviest yields. When plantings are made earlier than the later part of April in this latitude, the results are often poor stands. Our practice is to turn the land as soon as the cover crops are removed, disk and plant on level. One good rain to settle the soil will almost insure a crop when a good stand is secured. Poor land is a poor place to plant corn.

On account of corn being a crop of low money value, only a small quantity of fertilizer can be used with profit. We have never been able to grow a profitable crop of corn on poor land, regardless of the methods used. If only poor land is available on a farm for planting to feed crops, it would be advisable to plant to soy beans in thirty inch drills. Two or three hundred pounds of 8-4-4 fertilizer would be profitable if used under the seed. The bean crop would be more valuable than if the land was grown in corn.

Soy beans are planted in every row of corn grown on the Station except when experiment tests are being made. Either of the following varieties can be used, according to the purpose for which they are grown: Laredo, O-too-tan, Mammoth Yellow, Biloxi, and George Washington. The Yellow Mammoth and Biloxi are fine for hogs. Soy beans will stand more water than corn. Unsafe wet land can be planted to corn and soy beans and if the corn is drowned out the beans will make a crop. The prime reason for

planting soy beans in corn is to increase soil fertility. With fair stand of beans in corn, when turned under, twelve to fifteen dollars worth of nitrogen is added to the soil per acre besides the vegetable matter which is equally as valuable. It is easy to grow two crops on good land each year. As soon as corn is harvested the beans and corn stalks can be grazed by hogs and dairy cattle. Not later than October 15th this land should be turned and seeded to oats and vetch or rye and vetch. When the grain and vetch or Austrian Field pea are harvested, plant the land again to corn and soy beans. It will be necessary to keep up the supply of phosphorus and potash on land handled in this way. Use these fertilizers under the corn. All of the station corn and bean land was planted this fall to oats and vetch and oats and Austrian Field Peas. The yield of corn on the Station this year was around fifty bushels per acre for an average.

Beans should be planted in every row of corn grown in the State. A dry year, the yield of corn will be reduced probably as much as 25 per cent the first year. The two crops will more than equal corn grown alone. There are many planters on the market that plant both corn and beans in alternate hills any distance apart desired. In the absence of such a planter the corn planter can be used with a bean plate planting the beans on the same row planted to corn. Beans can be planted any time corn is planted. The Station uses a double hopper planter that plants alternate hills of corn and beans about 14 inches apart. Every other hill of corn is removed leaving two hills of beans to one of corn. We believe in the liberal use of all seed to insure a stand. The one seed planters that drop one grain of corn about thitry inches apart cause untold losses by poor stands. It is easy to destroy plants not needed in the growing of any cultivated crop. There are but few crops that replanting skip places will pay. Use about a peck of corn and ten pounds of Otootan beans per acre and you can thin to the desired stand. No full crop can be made without a stand.

Planting—Corn should be planted very shallow early in the season on well prepared seed beds. As stated above there are but few crops that will make greater response to

well prepared soil. Good preparation is half cultivation with corn. We prefer wasting seed corn in order to insure a good stand. This would not be so necessary if the seed were properly selected and tested. On average land, rows forty-two inches apart give very satisfactory results. As the land increases or decreases in fertility, the distance should vary. The more fertile the soil the more closely the corn can be grown; and the thinner the soil, the wider the distance. The distance corn may be spaced in the row is from one stalk 2 1-2 to 4 feet apart in the row. When the corn is planted in 42 inch checks on good land, two stalks per hill is the limit. No land should be planted in corn that does not produce more than 20 bushels per acre. It requires about 20 bushels per acre to pay the cost of cultivation when rent and labor are considered. Plant the thin land to soy beans as a feed crop rather than plant such lands to corn.

Cultivation—When deep cultivation is practiced, it should begin when the plants are small and should be kept up at frequent intervals. For June plantings, medium shallow cultivation is advisable. Four or five cultivations on late plantings are usually sufficient for good results. The cultivator should run about the same depth at each cultivation, regardless of the method used. Plant soy beans in every row of corn to keep up soil fertility.

CORN VARIETY TEST

Plots—One row each, planted in checks and repeated seven times. Date of planting: May 16th. The checks were forty-two inches apart each way and the rows 130 feet long.

Fertilizer—Two hundred pounds superphosphate and 150 pounds of nitrate of soda per acre were used.

Table 12—Corn Variety Test

Variety	Per cent grain	Bushels shelled corn per acre	Rank
Mosby Sta.	85.0	68.3	5
Mosby Delta	85.0	64.9	9
Mosby D. & P. L.	84.9	69.6	2
Mosby Suttle	87.3	61.1	11
Cocke's Pro. Sta.	84.7	70.6	1
Cocke's Pro. Delta	84.6	68.7	3
Hastings	86.7	60.3	12
Delta Prol. 1	84.9	61.3	10
College 47	84.1	67.0	7
Laguna	83.1	58.4	14
Mexican June	81.6	47.7	17
Paymaster, Neals	84.6	65.6	8
Paymaster, Fisher	84.8	67.6	6
Yellow Dent, Ferg.	82.1	54.0	15
Yellow Dent, Sta.	82.2	53.1	16
Golden Dent, R. H.	82.5	59.1	13
Golden Dent, Sta.	80.6	68.1	4

The soil on which this test was conducted was highly improved land. Taking into consideration the corn variety test for the past six years, we make the following recommendations:

Hasting's Prolific, Neal's Paymaster, Mosby Station, Cocke's Prolific and Large Golden Dent Station. Any of these varieties are good. There are objections found by some to Neal's Paymaster. Some seasons the tip ends of the ears are a little inclined to weather damage. Mosby and Hasting's Prolific are two of the best varieties. The large Golden Dent gives the best yield among the yellow varieties. A Prolific Yellow variety is greatly desired in the South.

CORN AND BEAN TEST

This test was planted May 17th on thin valley land. Plots, six rows each, 275 feet long.

Fertilizer used, 400 pounds of an 8-4-4 mixture. All plots were in triplicate. Only four middle rows were used in getting this data. The following is the average of three sets of plots:

Corn alone, average 42.7 bushels.

Corn with soy beans in row, 38.1 bushels.

Two rows corn to one row soy beans, 36.8 bushels.

As can be seen from these results, there is very little difference in corn without beans and corn with beans, only about 5 bushels per acre. There was at least $15.00 worth of nitrogen turned into this soil in this bean crop before planting to oats and vetch. Every row of corn in the state should be planted to soy beans to improve the land. Two rows of corn and one row of soy beans gave splendid results. In making this planting an attempt was made to leave one third more corn on the two rows to make up for the row of beans. This is also a good way to plant corn.

Table 13—Fertilizer Test With Corn

Pounds of material applied per acre	Bushels per acre	Increase
No fertilizer	39.0	
100 lbs. nitrate soda	41.4	3.6
100 lbs. nitrate soda 300 superphosphate	40.5	3.9
No fertilizer	35.4	
100 lbs. nitrate soda at planting. 100 nitrate soda at 1st working	53.	17.4
200 superphosphate 100 nitrate soda 100 nitrate soda, 1st working	41.7	5.5
No fertilizer	36.7	
200 superphosphate 200 nitrate soda	40.7	12.4
No fertilizer	31.8	
400 superphosphate 200 nitrate soda	43.6	10.7
400 superphosphate 150 Am. Sulphate	42.3	8.3
No fertilizer	35.1	
150 Am. Sulphate	47.2	10.8
150 Am. Sulphate 400 superphosphate 200 kainit	46.2	8.5
No fertilizer	38.9	

FERTILIZER TEST WITH CORN

The soil employed in this test was unimproved valley land. Planted to Neal's Paymaster corn May 10th. Plots 1-20 acre each, repeated three times. Weather exteremely wet in spring and very dry at fruiting time.

There is very little to be gotten from the above table. Probably insufficient water supply at fruiting season was one of the controlling factors. It appears that 100 pounds of nitrate of soda at planting and 100 pounds at first working gave the best results. In another set of plots 200 superphosphate and 200 nitrate of soda gave fair results. We have never gotten satisfactory results with fertilizers under corn. Fertilizer is as necessary for corn as for any other crop, but as corn blooms only once the yield is very susceptible to unfavorable weather conditions.

The best yield ever obtained at this station was when 400 pounds superphosphate and 200 pounds nitrate of soda were used before planting. In the above plots it appears that superphosphate is not necessary. This is not borne out in past years results.

Side dressings of nitrate of soda are frequently very beneficial if they are not made too late. However, this is usually the case. The second application should be made when corn is about one foot high, or a little later.

The following method is used for growing corn on this station: Plant the corn on good land; use 300 pounds superphosphate mixed with 200 pounds nitrate of soda or an equal amount of nitrogen in some other soluble form. After securing a good stand cultivate shallow after each rain. All plantings of corn not used for experiment work are also planted in soy beans in the row with the corn. The average yield this year is about 50 bushels per acre, with an oat and vetch crop usually harvested from the land before the corn is planted.

SILAGE

Sorghum produces at least one-third more tonage per acre, and frequently double the tonage on any kind of land, than corn and has very nearly the same feeding value, ton for ton. Japanese and Texas seeded sorghum are

both most excellent varieties. We use the Japanese seeded sorghum altogether for silage. Sorghum will stand a drouth better, and will not damage if harvesting is delayed. This is not the case with corn. Corn blooms but once and if the weather is unfavorable during this period the yield may be poor. The sorghum must be matured to make good silage. Immature sorghum will make sour silage which is very undesirable as a cattle feed.

If sorghum is planted in rows like corn and a small size eight-hole corn plate is used in the planter, the seed will be dropped in bunches about twelve inches apart. Some thinning will be necessary. Cultivate shallow as for other crops. This Japanese sorghum is late maturing. All silage planted on the Station is after a grain and vetch crop is harvested from the land. No time should be lost in getting in the cane. Sorghum did not mature this season until the middle of October. A trench silo on clay soil properly handled keeps silage as good as a concrete silo. They cost only digging. Make investigations.

Fertilizer Used—Where heavy tonage is expected not less than 1,000 pounds of 8-4-4 should be used at planting. A side dressing with nitrogen would pay on most lands.

SWEET POTATOES

The sweet potato crop was almost a failure in this section this year. Many plantings were made after the wet weather ended, and the weather that followed was too dry for proper development. The station planted four acres in potatoes which gave a yield of about 700 bushels. The fertilizer test made was of no practical value and the results will not be published. This test was planted after the wet season and the yield was unsatisfactory. Variety tests in the past have indicated that Nancy Hall is one of the best varieties for this section.

A co-operative fertilizer test was made on the farm of Mr. J. G. Bell in the western part of Marshall County. The yields were so low that the crop was not dug. Regardless of this year's results the Sweet Potato could be made a good money crop and it furnishes a most excellent food for the cattle.

The Sweet Potato is one crop that should be grown by every farmer, and tenant on every farm in the South. It is adapted to almost any type of soil, but probably does best on a fertile sandy loam. An average crop in this section is 200 bushels per acre. It is not infrequent to make double this amount. There is but little difference in the food value between the Sweet and Irish Potato.

The greatest draw-back in Sweet potato growing is diseases. These diseases can be controlled with proper care. Rotation of seed bed and fields used in growing potatoes and using clean seed will eliminate most of the trouble. The State Plant Board is doing a great service in fighting potato and other plant diseases that effect the economical wealth of the state.

Only clean sound potatoes should be used for seed. Vine cuttings planted on land free from disease make desirable potatoes for growing plants. The usual width of rows are three to three and one-half feet. Plants should be set about 14 inches apart in the row for best results.

Fertilizer—Four or five hundred pounds of an 8-4-6 fertilizer will give good results. A freshly prepared soil is very desirable for potato planting. Land prepared and fertilized before a rain is fine for planting following a rain.

The only satisfactory method of growing slips or plants is in hot beds, or when bottom heat is supplied.

Planting—Potato slips or vine cuttings may be planted any time from the first of May in this section until the middle of July. The best results can be had from plantings made the latter part of May and early in June.

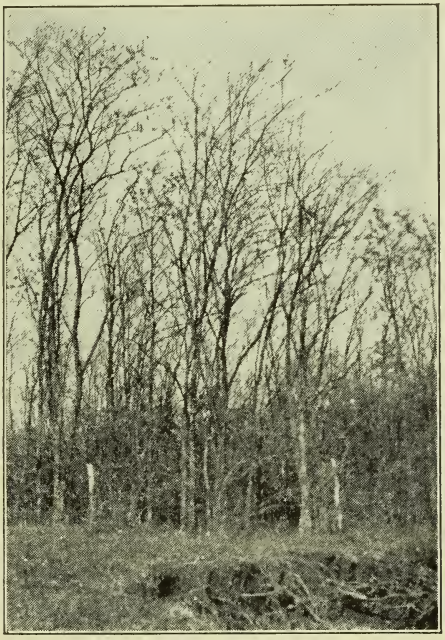
Cultivation—The method of cultivation is simple. Cultivate often enough to keep the weeds and grass out of the crop until the growth of vines cover the soil.

Curing Potatoes—Get rid of the excessive water in the potato soon after digging. If the weather is dry they will dry out rapidly in baskets if kept a day or two in the field or under the shed. If stored in curing houses and the weather is dry, open all ventilators, doors and windows, and allow the air to circulate during the day, closing up the house at night. If the weather is damp, keep fires going in furnace or stove during the day. It usually requires about two weeks to dry out a small house. The old fashion po-

tato bank is O. K. if the potatoes are dried out before covering and they are free from disease. There is no trouble in keeping potatoes through the winter that are properly cured and kept from frost. There is no method that will keep diseased potatoes except to can them.

BLACK LOCUST PLANTING

Seedings of black locust were planted in 1909 on a few acres of gullied land separated from the main farm by a public road. This planting was made to check soil washing and as a hope of future revenue. Below is a cut showing the condition of this planting at this time.



Black Locust Planting.

We estimate this land will yield 500 posts per acre at this time. Some of the trees will make five or six posts each. If we value them at 15 cents each this would give a value of $75.00 per acre which would be an average of $3.60 per acre for the past twenty years. After the trees are cut a second growth can be obtained from the stumps.

VETCH

Circular No. 74 issued by this Station in 1927 is available.

Every land owner should be interested in maintaining soil fertility. After the surface water has been controlled by terraces, the next step would be to grow legumes, either summer or winter to build up the soil fertility. Vetch, Crimson Clover, Bur Clover, Lespedeza, soy beans and cow peas are all good legumes. More profitable crops are grown following legumes without any additional cost. Legumes should be fed to livestock of any kind and the manure returned to the soil. Grow legumes as a cover crop. In most instances the cost is but little more than seeding. The hope of Southern Agriculture is increased production with less cost on less acreage. This can not be done except on good land. Vetch is becoming more popular to be planted every fall on cotton lands and turned in the spring in time for cotton to be grown. This method will reduce the nitrogen cost for the cotton crop far more than the cost of seeding.

Plant 15 to 20 pounds of seed in cotton middle late in September and cover the seed with a cultivator of some kind. Inoculate the seed by mixing one half pound of soil from a vetch field with each pound of seed sown. Rye and vetch or oats and vetch sown in September or early October furnish fine grazing and fine feed. After either of these grain crops are harvested, the land can be planted to corn or beans, or sorghum for silage.

Two Year Rotation—The following practice has been successful at this Station. Plant 15 pounds of vetch seed per acre in cotton middles in September and cover with a cultivator. After rain the seed will germinate. Harvesting the cotton will damage the seeding but little. Allow the vetch to mature, which will be about the first of June. Turn under the first crop and plant to corn or some other crop. The following spring, turn the land and plant to cotton. The volunteer vetch will come up in the cotton middles after a rain in September. Allow this vetch to mature some seed, after which harvest for hay. Turn the land and plant again to some other crop. This method has been in use on some of the Station soil for 18 years. Lime-

ing land, two tons per acre aids the growth of vetch very much. Hairy vetch is the variety used.

LESPEDEZA

A planting of three varieties was made in the spring of 1927, Kobe 04479, Common, and Korean. The average results for the two years are as follows:

Kobe 04479,	3900.4 pounds hay
Common,	2541.4 pounds hay
Korean 49027,	1632.8 pounds hay

Lespedeza adapted itself to the soil on which it is planted from the poorest to the richest but like other plants, it does best on fertile soils. Lespedeza is one of the greatest legumes ever grown in this country. It has been worth millions upon millions to the South for grazing, forage, and restoring soils depleted of vegetable matter. Lespedeza should be planted on all the idle lands of the South. Lespedeza as a hay ranks with alfalfa. The yield is according to the seasons from 1 to 2 tons per acre. The plant appears adapted to this type of soil. Lime is not beneficial. The plant responds quickly to the use of superphosphate and potash. The seed can be sown on freshly harrowed grain in the spring at the rate of one bushel (25 pounds) per acre. It is not necessary to cover the seed with a harrow.

Time and Rate of Seeding—March 1st to the middle of April. There is some danger of frost killing early seedings, when planted on freshly broken and unprotected soils. One bushel of seed per acre is the usual seeding but when 1½ bushels are used much better results can be had.

SOY BEANS

The soy bean should occupy first place as a forage crop for the hill section of the state. Laredo, O-too-tan, Biloxi, and Yellow Mammoth are standard varieties and are especially adopted to Southern agriculture. There are several new varieties of promise now being developed by the plant breeder at the Delta and Main Station.

The O-too-tan and Biloxi are both late maturing verieties and should be planted early for the best results. Either of the above varieties make a most excellent quality of forage and grain combined. When grain for hogs is de-

sired the Mammoth Yellow and Biloxi should be used.

There are many varieties of soy beans on the market and all have their place for various conditions over the United States.

On account of weather and other conditions it was almost impossible to make an early planting of beans.

Planting Time—Any time from the middle of April until about the middle of July is a good time for planting this crop. On this type of soil it is not advisable to grow soy beans broadcast unless the soil is unusually fertile. The majority of soils are too thin for sowing broadcast. If the rotary hoe is used in cultivation much better results could be had. It requires about 10 pounds of Laredo, O-too-tan, or Virginia beans to seed an acre in 30 inch rows. One half bushel each of Yellow Mammoth or Biloxi is required to seed an acre of these varieties, as the seed are much larger. Soy beans will grow on land too wet to grow good corn. Much of the wet land should be planted to corn and soy beans and if the corn is drowned out the beans will make a crop.

Most of the hay on the Station farm is soy beans planted after early spring crops.

Soy beans are planted in every row of corn not used for experiment purposes on the farm, and after oats and vetch are harvested. The land is broken broadcast and disked and the bean seed drilled in rows about thirty inches apart.

Two cultivations are usually sufficient to insure a good yield. If a rotary hoe is used other forms of cultivation could be dispensed with. The rotary hoe covers an eight foot space and pecks up the entire surface. A good team can cover from 15 to 18 acres per day. Three or four hundred pounds of an 8-4-4 fertilizer gives good results. Two tons of lime per acre adds greatly to the yield of the soy bean.

Inoculation—Inoculation is of greatest importance. Many plantings prove a failure for lack of proper inoculation. Land on which a small quantity of stable manure has been broadcasted gives good results when the seed are inoculated. Use about ½ pound of soil from a well inoculated field, to each pound of seed.

Variety Test—Soils, valley land above the average in fertility. Date of planting, May 17. The wet seasons made cultivation very deficient. The results given below are only fair:

Table No. 14—Soy Bean Variety Test

Variety	Pounds of hay per acre	Bushels beans per acre
Delta 488	7319.2	7.8
Delta 491	4564.6	6.0
Tanlaxi	3629.3	10.1
Loxita	3675.9	8.1
Midwest	5844.6	11.7
George Washington	5578.9	9.6
Ebony	3697.3	7.5
Laredo	6128.0	9.0
Mammoth Yellow	4369.2	8.9
Tokio	5941.9	4.5
O-too-tan	7449.5	7.6
Biloxi	2638.3	8.1

ALFALFA

The cut given below shows the result of plantings made in the fall of 1927. Extreme heavy rains and freezes dam-

Alfalfa—1½ Tons First Cutting After Seeding.

aged the stand to some extent when the plants were very small. The soil on which this planting was made was red

clay hill and brown loam valley land. 500 pounds of superphosphate and 100 pounds muriate potash per acre were used. A fair application of stable manure was applied in the spring of 1927. A spring seeding was made with poor results, the land was turned and seeded in the fall. September has proven to be by far the best time to plant alfalfa in this section.

First cutting 1½ tons per acre. On account of the extreme dry summer and fall only three cuttings were made this year. The requirements for growing alfalfa in the brown loam are: a fertile soil, well drained, the addition of four or five tons of lime per acre, 1,000 pounds of phosphate rock or 500 pounds of superphosphate and 100 pounds muriate of potash per acre. A well prepared firm seed bed, and fall seeding. It requires about 25 pounds of seed per acre. When alfalfa has its requirements there is no better forage crop.

DAIRYING

The Station now owns a herd of Registered Jersey cows. From the time the Station was established it was recognized that dairying and poultry, and in some instances hogs, would be necessary to furnish a market on the farm for legumes and other crops grown, and to utilize the idle lands for grazing.

North Mississippi will never come into her own until dairying, poultry, pigs, cotton, and feed growing becomes her chief industry. In the past, the dairy has been run so as not to interfere with regular Station work, leaving the experiment a feature to the College herd at the A. and M. College of Mississippi. Most of the milk secured is sold locally at the dairy barn and the balance is separated and the cream shipped on the butter fat basis. The skimmed milk is fed to calves and poultry. This method interferes but little with regular station work.

Several projects are in progress to ascertain the value of manure measured in pounds of cotton, or other crops; also a system of rotation including forage crops suitable for dairy feeds, etc. These results will be reported later.

The dairy possibilities in this section are good. Cream

and milk markets are close in almost any direction, with good roads in practically every county. There are thousands of acres of idle lands that could be used in growing feed and making pastures. Good cows are available and cream separators can be had at almost one's own terms.

How to Begin Dairying—The following is a suggested way to begin dairying: Get together a few cows, the best available, purchase a separator, if necessary, and start milking. Breed these cows to a first class bull of a dairy type, and in a few years you will have a herd of cattle. Sell off the poorest producers as fast as possible and replace with good cows. Keep daily records of every cow to determine her value. Four or five real good cows will pay a greater profit than ten to fifteen ordinary milk cows. It is hard to pay too much for a good milk cow. There is idle labor on the farm half the year that has to be fed. The South has advantage in her favor in mild winters, cheap lands, cheap labor and long growing seasons. Inexpensive barns can be used. We will succeed when we become "Dairy Minded" and not until then. Dairying should interfere with the growing of cotton but little, in fact in a few years more cotton should be grown.

Pasture—Good pastures are almost as essential to succesful dairying as good cows. The land should be prepared by cutting the bushes and unnecessary trees, terracing to control soil washing, and breaking with a plow and seeded with bermuda grass, lespedeza, white and hop clover, Dallas and Carpet grass. It may not always be the best plan to break up a pasture to add other seed. Lespedeza, carpet grass, Dallas grass, hop clover and white clover can be added in the spring without plowing. We find a good practice to divide the pasture and plant one part one year while the cattle are grazing the unbroken part and the next year reverse the order.

The use of a mowing machine once or twice a season, usually July and September is the best way to handle a pasture. The cattle eat the grass and the weeds fight the grass, so both cattle and weeds frequently win the fight.

Forage Crops—Dairying and purchasing feed is like growing cotton and buying feed for labor and work stock, —it cannot be done successfully under average conditions.

The best forage crops for this section are soy beans, sorghum, sudan grass, lespedeza, and cow peas. One acre per cow when good land is used should grow sufficient forage. All of the forage and feed should be grown on the farm with probably the exception of some grain. There is no better dairy feed than silage, legume hay, ground corn and cob meal, cotton seed meal, and wheat bran or ground oats. All of these with probably the exception of the bran, are easily produced on the farms in this section.

Thirty-five pounds of silage, ten pounds of legume hay, and one pound of the following mixture to each three pounds of milk is a good ration. Two pounds of corn and cob meal, one pound cotton seed meal, one pound ground oats mixed.

Probably more cow trouble comes from feeding an excessive amount of cotton seed meal to dairy cattle than from any other source. There is no cheaper or better protein feed on the market than cotton seed meal as far as it can be used.

Dairying does not mean less cotton, but more fertile soil on which to grow larger crops. In addition to this it frequently means double the revenue from the farm.

In conclusion, I wish to state that Mr. Otis B. Casanova and Mr. O. K. Morgan have assisted very materially in the success of the year's work, also Mr. Leo Bates, who has charge of the dairy.

Dr. B. M. Walker and Director J. R. Ricks have been very kind and pleasant in directing the work.