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CORN

AT

HOLLY SPRINGS BRANCH EXPERIMENT STATION

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Mississippi Agricultural Experiment Station
Agricultural College, Mississippi

J. R. RICKS, Director

EXPERIMENTS WITH CORN AT THE HOLLY SPRINGS BRANCH EXPERIMENT STATION

INTRODUCTION

For the last fourteen years experiments have been carried on at this Station with the testing of varieties of corn, different kinds of fertilizers, and best methods of soil preparation and cultivation. The results have been published from time to time in reports as well as some of the general bulletins from the Central Station. This bulletin, however, deals with results obtained within the last few years. It must be remembered, however, that the results shown in this bulletin, as well as recommendations we make, are for the Brown Loam section of Mississippi and do not apply to any other section. For instance, in our tests here the results indicate that we get good returns from the use of phosphorus, which is not the case in some other sections of the state. From our experience in growing corn for several years, we would state that to grow corn successfully on the Brown Loam soils the following methods of preparations and cultivations should be followed:

PREPARATION OF THE SOIL.—On land properly surface drained, flat preparation and level cultivation gives decidedly the best results. Fall breaking in the Brown Loam area is undesirable unless large quantities of vegetable matter are being turned under, the surface to be left rough, or land is to be seeded to a winter cover crop, such as Crimson Clover, Vetch or Rye. The roots, stalk, and rubbish remaining on the surface of unbroken land during the winter, prevents washing to some extent, whereas, soils turned, even on slightly rolling land, and left unprotected will gully in many places to the depth the land is broken.

If winter cover crops are grown, the land may be turned shortly before the desired planting time, disked, harrowed, fertilized if desired, and planted.

Soils that are broken in the fall and not planted to winter cover crops, in many instances, can be put in fine condition by double disking without re-breaking. If Vetch is used as a winter cover crop (See Holly Springs 1920 Report—"Two Year Rotation") it should be allowed to form some seed before the crop is removed or turned into the soil. This will, of a necessity, cause June planting of corn. The two crops, vetch and late corn, will be more valuable than any early spring planting of corn and the land will be richer in vegetable matter.

Where soil is inclined to be wet in the spring, the land may

be prepared in beds with water furrows not closer than every other row, which will not prevent flat cultivation and at the same time furnish proper drainage to the crop.

TIME OF PLANTING.—Early plantings have always given the largest yields as the seasons are more favorable for growth and there is no damage from bud worm on such plantings. Early in April is probably the earliest corn can be safely planted in North Mississippi under ordinary weather conditions. Rows three and one-half feet wide are considered standard, as most cultivators will cover the entire middle, whereas, in broader rows an uncultivated space will be left in the middle. The number of stalks per acre can easily be controlled by spacing in the row. A good stand of corn is necessary to heavy yields. When very early plantings are made heavy seedings are advisable. It is much easier and more profitable to have to thin corn than it is to have to cultivate land with a poor stand. The more fertile the soil, the closer the stalks can be left in the row. A good distance is from one to four feet, according to soil fertility. When more than five feet is necessary, such land should not be planted in corn. Soy beans or cow peas would be more profitable if it is necessary to use such lands for feed growing.

CULTIVATION. — With proper preparation, cultivation should be shallow and frequent. A smoothing harrow run diagonally across the rows while the corn is quite young does splendid work. This harrow may do good a few days later if run at right angles to first harrowing. After this, if the soil has become packed from lack of vegetable matter after a hard rain, a sharp tooth cultivator run three, or three and one-half inches deep will enliven the soil, and while the plants are small will do no harm. After this, frequent shallow cultivation, deep enough to make a good dust mulch, is desirable. Cultivate as soon as possible after each rain to destroy the weeds and grass while young, and check the loss of moisture, which takes place very rapidly after a crust is formed on the surface. Cultivation should continue until about the time the corn begins to tassel.

As to the kinds of tools to use, that will depend upon the weather conditions. Ordinarily, for one horse work, a side harrow, double shovel Perry, or a five tooth cultivator will do very satisfactory work. The double horse cultivator with shovel plow attachments does good work while the corn is young and the spring tooth attachment for later work. If the season is very wet, use the plow that will destroy the most grass with the least damage to the corn.

It may be seen in a following table that the prolific varieties have in most instances given the highest yields, such varieties as Cocke's Prolific, Mosby, Hastings, North Carolina Prolific, Jones Prolific, Vardaman, and Davis Poor Land corn. In the past few

years selections from the Tennessee Red Cob, such as Neal's Paymaster, Station Paymaster, and Tennessee Red Cob, a large eared type, are taking the lead.

SEED CORN.—Every farmer should, as far as possible, select his own seed, and if he finds that he has not the best variety and cannot obtain good sound seed from his own farm, he should buy his seed from some good seed breeder in his own section and not send to some distant state for it. This is particularly true of northern and western grown seed. Seed of the above mentioned varieties that have been grown and selected by a good seed breeder anywhere in the Southern States, especially east of the Mississippi River, will give good results in this section. The planting of early varieties of corn, especially where the seed have been obtained from the northern states should be discouraged. These varieties are usually low in yield, and quality of the grain is poor. Many farmers, with the idea of getting some early feed, plant these early northern grown varieties. They are only a few days earlier than some of our native varieties. Every farmer who has attempted to grow these varieties knows that they are very inferior, and as a usual thing, he never tries them the second time.

FERTILIZERS.—The use of commercial fertilizers under corn has not been a very paying investment as indicated in the majority of the fertilizer experiments conducted at this Station. Nitrate of soda, or nitrogen in some form, applied to the crop at planting time, or after first working, has given the best results, when early plantings are made on good soil. The inability of soil, deficient in humus or organic matter, to retain the proper amount of moisture is the greatest limiting factor in producing large yields. When legumes have not been grown and but little acid phosphate used on previous crops, apply from 150 to 200 pounds acid phosphate and 75 to 100 lbs. nitrate of soda, or its equivalent in other forms of nitrogen, per acre. Apply acid phosphate before seed planting and nitrate of soda after first working on top of the soil near the plants. If other forms of nitrogen are used, such as cotton seed meal, or high grade tankage, it may be applied with the phosphate before planting.

From results indicated in the fertilizer tables, it would appear that corn planted in five and one-half or six foot rows and left thick enough in the drill to make up for the extra width, and the middles between the rows planted either to soy or velvet beans, have given good results. Such a method does not reduce the yield of corn, and the beans make a better growth; this plan also gives the beans as an extra crop. Use 200 pounds per acre of acid phosphate under the beans for the best results.

Probably the most economical results are obtained, when only nitrate of soda, or some other readily available nitrogen is used. If nitrate of soda is used, 100 pounds to the acre applied at the time of planting, or at the time the corn is given its first working,

seems to give the most economical returns. However, we know that these soils are deficient in phosphorus, and applications of acid phosphate, mentioned above, usually give paying returns.

EIGHT YEAR VARIETY TEST WITH CORN

Soil—Brown Loam Valley Land.

Plots—One row plots repeated five or six times, containing from one-twentieth to one-tenth an acre each.

Fertilizer—From 300 to 400 pounds of cottonseed meal and acid phosphate mixed and applied under the seed. Two crops of crimson clover and two crops of wheat and vetch were also grown on the land during the past nine years.

NAMES OF VARIETIES	PLANTED MAY 11, 1912.	PLANTED APRIL 5, 1913.		PLANTED MAY 14, 1914.	PLANTED JUNE 14, 1914.	PLANTED APRIL 19, 1915.	PLANTED JUNE 16, 1915.	PLANTED JUNE 16, 1916.	PLANTED APRIL 18, 1917.	PLANTED MAY 5, 1919.	PLANTED JUNE 9, 1920.	ACTUAL YIELD IN LBS. PER PLAT.	PER CENT OF SHELLED CORN PER BUSHEL.
											Yield in Shelled Corn Per Acre—Bushels.		
Tennessee Red Cob	52.0		80.5	50.2	55.1	33.9	26.8	34.2	56.2	61.11	255.5	75.0	
N. C. Prolific (Home Grown)		48.0	78.0		54.4	43.6	30.8						
Butt's Prolific	58.3	52.0	67.0	45.9	52.2	48.1	30.8						
Cooke's Prolific	51.2	53.9	87.0	48.7	51.2	47.3			34.7	80.4	41.86	233.0	75.7
Florida Flint	53.4	39.6	74.7	38.4	49.8	38.4	28.			62.8	45.24	241.5	72.9
Davis' Poor Land Corn	54.6	49.8	75.0	50.2	49.1	43.6							
Vardaman's Stooling Corn		57.8	79.0	53.7	48.6	42.0	23.6	31.6	67.0	34.49	210.5	84.0	
Reid's Yellow Dent					46.9	34.4							
Mosby	54.0	43.0	75.5	53.5	46.8	40.9	31.8	30.2			38.72	218.5	78.5
Mosby (Woodruff's)													
Alexander's 6-Ear					46.6	36.7	26.6	33.2		71.2	43.19	228.0	79.2
Boone County White	45.5	47.1	65.5	41.0	45.8	41.4	30.4	29.6					
N. C. Prolific					43.8	49.6		33.6	67.7	34.99	217.5	82.6	
Rockdale	54.0	36.7	60.8	37.0	38.4	22.9		19.7					
Goliad						46.3		33.9					
Johnson's Prolific						36.1							
Marlboro	63.0						34.4	40.5	65.7	50.20	240.0	72.2	
Hickory King							30.0				49.53	217.5	73.6
Neal's Paymaster							44.0		69.2				
Ala. Expt. Sta. Yellow							30.5						
New Era			73.9	45.5									
Hasting's Prolific	51.2	47.1	77.5	47.0	45.8	47.7	25.8	32.0	61.6	42.04	207.0	77.8	
Mosby (Rhodes)			83.3	43.3					66.9				
Leaming			30.5	54.4	34.0								
Munson	57.9	47.1	73.0	50.0									
E-1	56.2	49.4											
Jones' Prolific		49.4	92.2	48.1	46.2	46.7	38.2			39.95	237.5	76.4	
U. S. D. A. No. 195								34.2					
Williamson								47.3					
Johnson County White								38.4		46.99	236.0	75.7	
Jones' Vardaman									60.4	39.99	236.5	84.0	
Simmons' Prolific									65.7	49.07	230.5	73.6	
Ferguson's Yellow Dent									44.0				
Sure Cropper									70.1				
Giant Tennessee Red Cob									87.5				
Paymaster (Station)								73.7		51.92	249.5	79.9	
Mosby — 553										41.61	217.5	77.8	
Paymaster (Harpeh)										61.63	275.0	73.6	
Tennessee Red Cob—72										57.60	242.5	72.2	
Garric										46.43	223.0	67.4	

FERTILIZER UNDER CORN. 1917.

Soil—Brown Loam Table land.

Plots—Six rows, each 92 feet long and four feet wide, making one-twentieth of an acre.

Planted to Mosby corn, April 24, 1917.

Number.	Bushels per acre.
1.—200 pounds Acid Phosphate.....	16.6
2.—Check	15.5
3.—200 pounds Cottonseed Meal.....	24.1
4.—200 pounds Kainit	17.7
5.—Check	15.5
6.—200 pounds Basic Slag	14.7
7.—200 pounds Tenn. Phosphate Rock....	15.8
8.—Check	11.4
9.—100 Cottonseed Meal	
100 pounds Acid Phosphate.....	24.1
10.—100 pounds Cottonseed Meal.....	23.0
300 pounds Acid Phosphate	
11.—Check	15.4
12.—200 pounds Acid Phosphate	
200 pounds Cottonseed Meal	25.8
13.—300 pounds Tenn. Phosphate Rock	
100 pounds Cottonseed Meal.....	17.5
14.—Check	20.0
15.—200 pounds Cottonseed Meal	
200 pounds Basic Slag.....	14.7
16.—100 Cottonseed Meal	
300 pounds Acid Phosphate.....	16.4
17.—Check	11.4
18.—300 pounds Cottonseed Meal	
300 pounds Acid Phosphate.....	16.1
19.—300 pounds Acid Phosphate	
300 pounds Kainit.....	17.5
20.—Check	20.0
21.—300 pounds Acid Phosphate	
300 pounds Kainit	14.7
22.—400 pounds Cottonseed Meal	15.5
23.—Check	11.4
24.—2000 pounds Crushed Limestone....	12.7

REMARKS.—The season was unfavorable, which is usually the case on comparatively thin land. In the arrangement of table it was necessary to repeat check plots, as every fifth plot was used in planting.

CONCLUSIONS.—Large applications of fertilizer a dry year will not insure a large yield, when used on thin land. Two hundred pounds of cottonseed meal gave good results, also a mixture

of 100 pounds of cotton seed meal and 100 pounds acid phosphate.

The limiting factor unquestionably was the lack of the proper amount of moisture. Such land, if possible, should be seeded in velvet beans early in the spring, using 200 pounds acid phosphate under the beans. In the early fall these beans should be either grazed off or turned under and land then seeded to either hairy vetch or crimson clover. If planted to corn after this crop, it will yield enough to make up for the year lost in corn.

FERTILIZER TEST WITH CORN AND BEANS. 1919.

Soil—Brown Loam valley land from which had been harvested a crop of wheat and vetch, shortly before seeding to corn.

Plots—Six rows each, four feet wide and 235 feet long, making one-eighth of an acre. All rows four feet wide unless otherwise stated.

Planted—June 28, 1919.

Number	Bushels per acre.
1.—Corn and soy beans in same row	35.6
2.—Check	39.2
3.—Corn and velvet beans in same row	32.1
4.—Corn in 6 ft. row with soy beans between row	39.2
5.—Check	38.1
6.—Corn in 6 ft. rows, velvet beans between rows	36.7
7.—Corn, 100 pounds nitrate of soda after first working	48.2
8.—Check	38.1
9.—250 pounds cottonseed meal at planting	44.1
10.—250 pounds acid phosphate	41.5
11.—Check	38.1
12.—250 pounds cottonseed meal at planting	47.3
13.—250 pounds cottonseed meal 250 pounds acid phosphate	47.7
14.—Check	41.1
15.—250 pounds cottonseed meal 250 pounds acid phosphate	44.4

REMARKS.—It was the intention that all plots, including those with six-foot rows, should have the same number of stalks per acre.

In the arrangement of the above table it was necessary to repeat two of the check plots, as in the planting each fifth plot was a check.

CONCLUSIONS.—Nitrogen gave the best results. As may

be seen, 100 pounds of nitrate of soda applied after first working, gave an increased yield of ten bushels per acre.

It would also appear that corn planted in 5 1-2 to 6 ft. rows, using the same number of stalks per acre as for narrow rows, and planting a row of velvet or soy beans between the rows of corn, does not decrease the yield of corn. Such a method would give an additional crop of beans on the land which almost every acre in the South sorely needs.

CORN FOR SILAGE

The principal silage crop in the South is corn. Such varieties as Goliad, Mosby, Cocke's Prolific, and Hastings are tall growing and give good yields. Of these varieties we would especially recommend Goliad, since it usually produces anywhere from 10 to 30 per cent more in tonnage than the other varieties. For the past three years, this Station has discarded the use of corn as silage entirely, and is now growing Japanese seeded ribbon cane. On this land this sorghum will stand much more drouth than corn and produce greater tonnage. On good land, after a crop of crimson clover, where the corn grew thirteen feet tall, it only produced twelve and one-half tons of silage per acre, whereas, sorghum on similar soil would have produced from 15 to 16 tons per acre. In feeding tests at the Central Station, it was determined that there was something like fifty cents per ton difference in feeding value in favor of corn. With this small difference, and a considerable increase in yield and a much surer crop on either thin or fertile soil, why grow corn for silage at all? In using sorghum for silage, the cane must be full ripe, that is, ripe enough for syrup; otherwise it makes a sour silage, an undesirable feed. Corn and sorghum mixed make a good silage. Corn and sorghum may be planted in alternate rows with success on fertile soils.

It must be remembered, however, that by growing sorghum on the same land continuously, the fertility of the soil is reduced rapidly and in a few years even sorghum growing on the same soil would be unprofitable. It is usually conceded that sorghum will reduce the fertility of the soil more rapidly than corn. In growing either crop for silage it will be necessary to add liberal amounts of barnyard manure, or else grow some cover crop, like vetch and oats, or crimson clover to be turned into the soil in order to keep up the fertility. In this section this can be done. As soon as the crop is off in the early fall, the land must be immediately prepared and planted to a winter cover crop, which may be turned into the soil as early in the spring as the maturity of such crop justifies. By this is meant, if the crop should be crimson clover, it is ready to be turned into the soil when it is in full bloom, which is usually about the first of May. If vetch and oats, or vetch and some other small grain are used, the time for turning under

will be about two or three weeks later, or about the time the first vetch seed are ripe as indicated on the first page of this bulletin. By following this system, one can continue to grow these silage crops for several years, provided that some acid phosphate has been applied to the soil. Where a good deal of barnyard manure is used, and where a large amount of these cover crops is turned under, rock phosphate will give good results. By using rock phosphate in larger quantities than acid phosphate, it will be unnecessary to add this material oftener than four or five years.