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TEXAS AGRICULTURAL EXPERIMENT STATION
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
W. B. BIZZELL, President

BULLETIN NO. 258 DECEMBER, 1919

REPORT OF EXPERIMENTS, SUB-STATION NO. 4, BEAUMONT, TEXAS

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†As of December 30, 1919.
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**In cooperation with the United States Department of Agriculture.

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BULLETIN No. 258. DECEMBER, 1919.

REPORT OF EXPERIMENTS, SUBSTATION NO. 4, BEAUMONT, TEXAS.

BY

H. H. LAUDE.

Substation No. 4, located six miles west of Beaumont, in one of the largest rice-growing sections in Texas, is one of the outdoor laboratories of the Texas Agricultural Experiment Station, and is used primarily for the study of problems confronting the rice farmers. The chief subjects of investigation are the selection of varieties, the value of fertilizers, control of weeds, crops suitable for rotation with rice, and methods of preparing the land and of planting the rice crop. The land lies comparatively level and the soil type is heavy clay. The results of investigations are applicable in general to farms in the rice belt of Texas.

A former report* of this substation gives the data regarding its establishment, operation, and results to 1914, inclusive. This publication covers the period from 1915 to 1918, inclusive, though earlier results are included in some cases to secure averages for a longer period and thus give more reliable information.

Results of experiments conducted on this substation have been reported in the following-named publications:

Japanese Sugar Cane as a Forage Crop, Bulletin No. 195.

Progress Report, Substation No. 4, Beaumont, Texas, Bulletin No. 200.

Spacing of Rows in Corn and Its Effect Upon Grain Yield, Bulletin No. 230.

Control of Weeds in Rice Fields, Bulletin No. 239.

THE WEATHER.

The period from 1915 to 1918 inclusive, embraced one abnormally dry year, 1917, and no exceptionally wet years though certain short periods of heavy rainfall are recorded, particularly in the fall of 1918, when much damage was done to crops, limiting the amount of experiment data secured for that year.

The storm in August, 1915, damaged crops severely and made it impossible to secure comparative yields in some of the tests on the substation.

A summary of the climatic conditions for the years 1915 to 1918 inclusive, is given in the following tables:

*Bulletin No. 200, Progress Report, 1909-1914, Substation No. 4, Texas Agricultural Experiment Station, Beaumont, Texas. H. H. Laude.

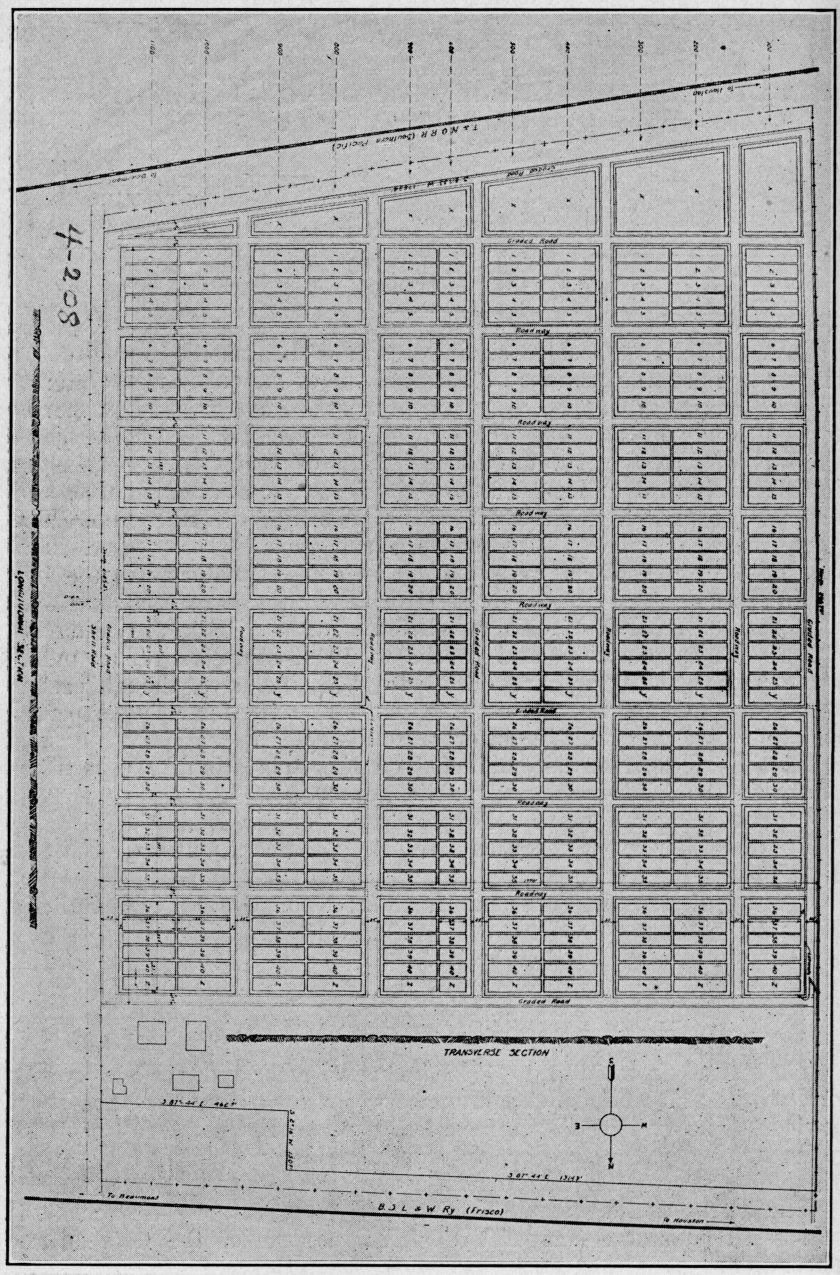

Fig. 1.—Plat map of Substation No. 4.
The small blocks are 33 feet wide and 132 feet long, comprising one-tenth acre.

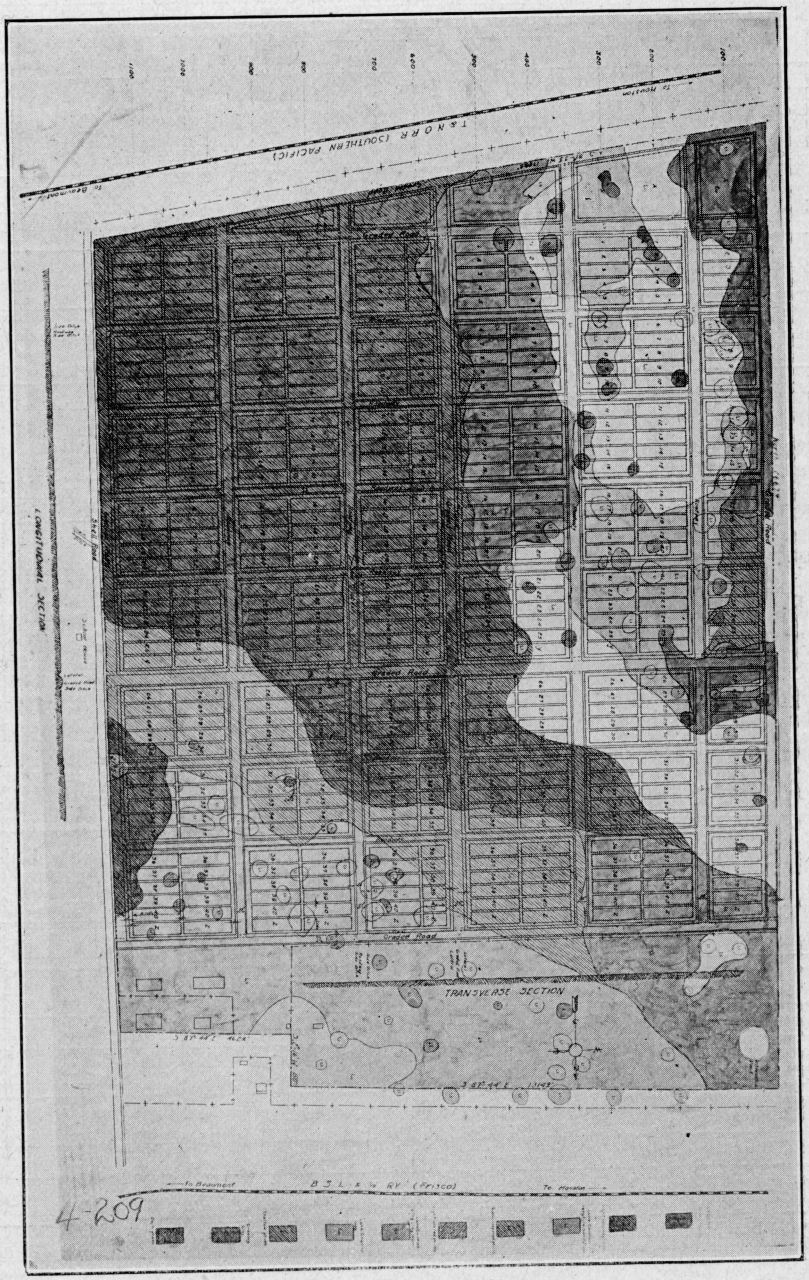

Fig. 2.—Soil map of Substation No. 4.
The darker areas represent the heavier types of soil.

Table 1.—Summary of meteorological data 1915 to 1918.

Year.	Temperature Average Daily Degrees F.			Humidity Mean, per cent	Wind Miles	Evaporation, Inches	Precipitation, Inches
	Max.	Min.	Mean				
1915	74	56	65	.....	58511	.....	50.04
1916	79	57	68	.....	46501	49.23	52.89
1917	77	55	66	77	46636	50.01	24.14
1918	78	57	68	79	40096	47.93	48.64
Mean	77	56	66	78	47936	49.05	43.92
Long term means	.....	.....	68	.....	.....	.....	47.69
No. years in long term	.....	.....	15	.....	.....	.....	26

Table 2.—Dates of last and first killing frosts and length of growing season.

Year	Date Last Killing Frost in Spring	Date First Killing Frost in Fall	Length of Growing Season, Days
1915	April 3	November 16	227
1916	February 15	November 14	273
1917	March 5	October 29	238
1918	February 5	December 3	301
Average	March 1	November 15	259

COTTONSEED MEAL PRODUCED THE MOST RICE, BUT A COMBINATION OF AMMONIUM SULPHATE AND ACID PHOSPHATE MADE THE LARGEST PROFIT.

Four years' results of the application of fertilizers to rice are available. In the following table are given the kinds and amounts of fertilizers used in each case and the average yields of rough rice for the different treatments:

Table 3.—Fertilizers for rice, arranged in order of their effect on yield, 1915 to 1918, inclusive.

Fertilizer Applied		Yield Pounds to the Acre, Average of Four Years
Kind	Pounds to the Acre	
Cottonseed Meal	300	2048
Ammonium Sulphate Acid Phosphate	50 75	2018
Ammonium Sulphate	100	2017
Ammonium Sulphate Acid Phosphate	200 300	2007
Ammonium Sulphate Acid Phosphate	100 150	1994
Acid Phosphate	150	1927
Cottonseed Meal Acid Phosphate	300 150	1873
Acid Phosphate Manure	150 12000	1758
Manure	12000	1625
Check—no fertilizer	.....	1526

The composition of the different fertilizers used in these experiments was:

Cottonseed meal, 43 per cent. protein, approximately 7 per cent. nitrogen.

Ammonium sulphate, 20.5 per cent. nitrogen.

Acid phosphate, 16 per cent.

Manure, from barnyard.

The applications of different fertilizers have produced average increases in yield from 99 pounds to the acre in case of manure, to 552 pounds to the acre in the case of cottonseed meal. Applications of ammonium sulphate or of a fertilizer in which ammonium sulphate was included have produced increases in yield of 468 to 492 pounds to the acre. The results show that the individual fertilizers rank in the following order, regarding effect on yield: (1) cottonseed meal, (2) ammonium sulphate, (3) acid phosphate, (4) manure.

The experiments conducted have shown that the value of a fertilizer for rice is influenced materially by the presence of weeds including grasses. In order to have the entire benefit of the fertilizer devoted to the production of rice it is necessary that the field be free of weeds. In case weeds are very abundant the application of fertilizers may even reduce the yield of rice. The low rank which manure has among the fertilizers has apparently been due to the introduction of weed seeds and thus the rapid increase of weeds on the land. The rate of increase of weeds is affected not only by the kind of fertilizer but also by the amount of fertilizer applied, the heavier applications causing more rapid increase.

In order to make the use of fertilizers for rice most profitable it is necessary to adopt some method of controlling the weeds. The method for doing this, explained in Bulletin No. 239, "Control of Weeds in Rice Fields," has given excellent results.

The rice on the fertilized plats showed a greater tendency to lodge than it did on the unfertilized plats. In a few cases, particularly with the heavier applications of fertilizers, enough lodging resulted to interfere with harvesting. In one instance lodging occurred early enough to apparently reduce the yield.

The basis for selecting the best fertilizer is not solely the increased yield due to its application, but the increased yield in relation to the increased cost per acre. When the approximate costs to the acre of the different fertilizers used in this test are examined it is apparent that ammonium sulphate ranks first in profitableness, acid phosphate probably outranks cottonseed meal, and manure is the last in the list. A light application of ammonium sulphate and acid phosphate combined has given as good results as a medium amount of ammonium sulphate alone and is somewhat cheaper.

IT PAID TO PLOW DEEP FOR RICE.

The depth to which land is plowed for rice has had a decided influence on the yield, the latter increasing with deeper plowing. Table 4 gives the average data for three years when the land was plowed in the fall or winter preceding each crop.

Table 4.—Yields of rice in depth-of-plowing test. Land plowed in fall or winter, hree y ar average.

Depth Plowed, Inches	Average Yield, Pounds to the Acre	Gain Over 2-inch Depth	Gain Over 5-inch Depth
2	1706		
5	1803	97	
8	1980	274	177

In Table 5 the results cover a 5-year test on land plowed in the spring.

Table 5.—Yields of rice in depth-of-plowing test. Land plowed in spring, 5-year average.

Depth Plowed, Inches	Average Yield, Pounds to the Acre	Gain Over 2-inch Depth	Gain Over 5-inch Depth
2	1567		
5	1703	136	
8	1802	235	99

These results show increases in the yield of rice due to deeper plowing regardless of the time of plowing. The gains, also, are sufficient to pay the extra cost of deeper plowing and leave an appreciable net profit.

There is little difference in the yield of rice on land plowed in the fall or early winter and that plowed later in the season. Fall or early winter plowing, however, has much advantage over spring plowing because it distributes the field labor over a longer period and reduces the cost of preparing the land for planting, due to the fact that fall-plowed land pulverizes readily with the disk and harrow.

Tests which have been conducted for six years, giving various amounts of preparation between the times of plowing and planting, show that two conditions should be attained in making the best seed bed for rice, and that these should prevail at time of planting: first, the ground should be sufficiently pulverized to insure a good stand; second, the land should be absolutely free of weeds. After these conditions have been secured additional preparatory tillage has not been beneficial.

PLANT ENOUGH SEED TO INSURE A GOOD STAND OF RICE.

Rice has been seeded at the rates of 60 pounds, 80 pounds, and 100 pounds of recleaned seed to the acre. The average yields in the experiments covering a period of five years show:

The 80-pound rate has produced 93 pounds to the acre more than the 60-pound rate.

The 100-pound rate has produced 53 pounds to the acre more than the 80-pound rate.

The 100-pound rate has produced 146 pounds to the acre more than the 60-pound rate.

These results show that an ample amount of seed should be sown.

The average of five years' results in seeding rice at the depths of

1 inch, 2 inches, and 3 inches, respectively, shows a small increase in favor of the medium depth.

In the test to determine the best time to seed rice, plantings have been made at intervals of two weeks from the middle of March to the latter part of June. The results of five years' work show little difference in yield of seedings made between the middle of April and the first part of June. Smaller yields on the average result from plantings made earlier and later than this period.

The method of drilling rice in moist ground has been compared with mudding in the seed. In each of the three years during which the test has been conducted the mudding method has produced higher yields than the method of drilling in moist ground.

KEEPING WEEDS OUT OF THE FIELDS INCREASED THE YIELDS OF RICE.

Tests have been conducted to find an effective method of controlling weeds in rice fields. A very successful means of accomplishing this result has been worked out in the experiments and is explained in detail in the bulletin entitled "Control of Weeds in Rice Fields."* One year's data have been secured since the results were published. This recent information corroborates the earlier tests and gives a 5-year average gain in yield of rice of 585 pounds to the acre where the weeds were controlled by this method, as is shown in the following table:

Table 6.—Comparison of common method of rice production with special weed control method, five-year average, 1914 to 1918, inclusive.

Method of Production	Yield, Pounds to the Acre	Gain by Weed Control Method
Common	1839	.....
Weed control	2424	585

HIGH YIELDING VARIETIES OF RICE ARE EASY TO FIND—QUALITY MUST BE CONSIDERED.

It is estimated by experts that there are more than 5000 varieties of rice in the world, to say nothing of numerous strains selected out of these. It is obvious that among this large number there must be some varieties that are superior to the varieties in general use in Texas.

A comparative test of varieties has been conducted including in different years 22 to 62 varieties planted in drilled plats and over 100 varieties and selections planted in rows. These rices were originally secured from various rice-growing countries of the world. In these tests comparisons have been made regarding yield, lodging, and general characters of the plant and grain. The results show the difficulty of securing varieties that yield high and also possess the other desirable characters necessary to make them successful commercial varieties. Some of the varieties tested, however, combine these factors in a satis-

*Bulletin No. 239, Control of Weeds in Rice Fields, Texas Agricultural Experiment Station, 1918. H. H. Laude.

factory way. The most common fault observed among high-yielding varieties is weak straw, which makes lodging prevalent among them.

Average yields of rice produced in drilled plats by some of the varieties tested two or more years are given in the following table:

Table 7.—Average yields of varieties of rice.

T. S. Number or Name of Variety	Average Yield in Pounds to the Acre	Average Yield in Barrels to the Acre (162 Lbs.)
1595	3130	19.32
1589	2861	17.66
1581	2850	17.59
1585	2628	16.22
1542	2523	15.57
1583	2400	14.81
1545	2334	14.40
1587	2305	14.22
1518	2195	13.54
1586	2187	13.50
1627	2129	13.14
Wataribune	2123	13.10
1624	2046	12.62
Louisiana Pearl	2031	12.53
1564	2009	12.40
Blue Rose	1929	11.90

The four varieties producing the highest average yields lodge badly and therefore are barred from consideration as commercial rices. T. S. Nos. 1587 and 1518 also lodge readily.

Fig. 3.—Varieties of rice grown in long narrow plats lying side by side so that accurate comparisons can be made.

T. S. No. 1583 stands up very well, is a rice of extra good quality, and has produced several hundred pounds to the acre more than the common varieties grown. This variety is being increased for distribution to growers.

MANURE PRODUCED MORE CORN THAN ANY COMMERCIAL FERTILIZER.

Acid phosphate, cottonseed meal, and manure were applied separately and in combination to corn in 1916, the results of which are given in the following table:

Table 8.—Yields of corn in fertilizer test 1916.

Fertilizer Applied		Yield of Corn Bushels to the Acre
Kind	Pounds to the Acre	
Manure Acid Phosphate	12000 200	30.82
Manure	12000	29.97
Cottonseed Meal Acid Phosphate	300 200	26.84
Cottonseed Meal	300	21.42
Acid Phosphate	200	20.56
Check—no fertilizer	0	20.39

The results show an increase of a little over 10 bushels an acre for manure and acid phosphate used in combination and slightly less for manure alone. Cottonseed meal and acid phosphate, when combined, gave an increase of 6 bushels, while each of these used alone gave small increases.

THE SUCCESS OF CORN IN THE RICE BELT DEPENDS MUCH UPON THE VARIETY PLANTED.

Varieties of corn have been tested for the purpose of finding those which produce the highest yields in the rice belt. The particular varieties included in the test as well as the number have varied from year to year. In 1914, 1916, 1917, and 1918 the number of varieties tested was 29, 31, 23, and 9, respectively. The variety test in 1915 was damaged to such an extent by a storm in August that reliable information as to the relative value of the different varieties could not be secured.

The highest yielding varieties together with their range in yields for each of the years are:

1914. U. S. Selection No. 136, Chappelle Prolific, Fentress Strawberry, Virginia White Dent, Surcropper, Creole Yellow, Mosby Prolific, Hearn White, and Ferguson Yellow Dent. The respective yields of these varieties ranged from 16.51 bushels to 11.46 bushels to the acre.

1916. Schieberle, Biggs Prolific, Fentress Strawberry, Hastings Prolific, Thomas, Cockes Prolific, St. Charles White, Chisholm, and Surcropper. The range in yield of these varieties was 31.22 bushels to 26.09 bushels to the acre.

1917. Schieberle, Ferguson Yellow Dent, White Mogul, Kirkpatrick Strawberry, Fentress Strawberry, Davis, Giant White Red Cob, Surcropper, and Experiment Station Yellow. These yielded from 40.70 bushels to 23.66 bushels to the acre respectively.

1918. Biggs Prolific, Chappelle Prolific, Hastings Prolific, Ferguson Yellow Dent, Thomas, Virginia White Dent, Creole, Surcropper, and Chisholm. These yielded 42.75 bushels to 33.25 bushels to the acre respectively.

Considering the number of tests in which each variety was included, the number in which the variety ranked relatively high in yield, as well as the particular seasons in which each was included in the test, the best varieties may be listed in the following order regarding yield: Schieberle, Biggs Prolific, Hastings Prolific, Ferguson Yellow Dent, Fentress Strawberry, Thomas, Surcropper, and Chisholm. In regard to quality these varieties may be listed in about the same order. Fentress Strawberry and Surcropper are softer than the other varieties and are too soft for best results in this locality.

COMMERCIAL FERTILIZERS INCREASED THE YIELD OF COTTON BUT MANURE GAVE LARGEST INCREASES.

The fertilizers used for cotton consisted of acid phosphate, cottonseed meal, manure, and combinations of these. The average yields of seed cotton for two years, corrections for soil variation being made, are given in the following table:

Table 9.—Yields of seed cotton in fertilizer test

Fertilizer Applied		Yield Seed Cotton, Pounds to the Acre. Average 1916 and 1917
Kind	Pounds to the Acre	
Manure	12000	781.7
Manure Acid Phosphate	12000 200	771.0
Acid Phosphate	200	599.9
Acid Phosphate Cottonseed Meal	200 300	584.9
Cottonseed Meal	300	434.2
Check—no fertilizer		370.1

These results show that the use of 6 tons of manure more than doubled the yield of cotton. Acid phosphate gave gains of over 200 pounds of seed cotton to the acre, while cottonseed meal produced an increase of 64 pounds.

DRAINAGE AND ADAPTED VARIETIES ARE NECESSARY FOR PROFITABLE COTTON PRODUCTION.

The cotton variety test included 29 varieties in 1916 and 30 in 1917. The varieties producing more than 550 pounds to the acre of seed cotton in 1916 in order of yield are: Allen Express, Bank Account, Wooten Columbia, Cleveland Big Boll, Mortgage Lifter, and Mebane.

The varieties yielding more than 600 pounds to the acre of seed cotton in 1917 are: Hawkins, Trice, Mebane, Bank Account, Mexican Big Boll, Lone Star, Cleveland Big Boll, and Union Big Boll.

The varieties that were tested both years and that produced the highest average yield are given in the following table:

Table 10.—Yields of cotton varieties average 1916 and 1917.

Variety	Average Yield Seed Cotton, Pounds to the Acre
Bank Account	633
Mebane	599
Mortgage Lifter	543
Union Big Boll	532
Cleveland Big Boll	526
Hawkins	522

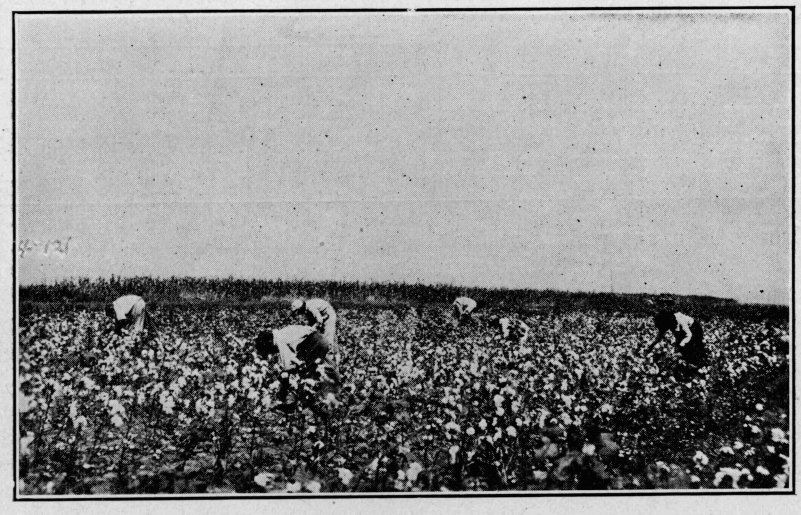

Fig. 4.—The different varieties of cotton are picked, weighed and ginned separately.

APPLICATION OF MANURE NEARLY DOUBLED THE YIELD OF SUDAN GRASS.

The yields of Sudan grass hay given in Table 11 show good increases for the different fertilizers.

Table 11.—Yields of Sudan hay on fertilized plats in 1917.

Fertilizer Applied		Yield, Pounds to the Acre
Kind	Pounds to the Acre	
Manure	12000	4105
Manure Acid Phosphate	12000 200	3497
Acid Phosphate	200	3262
Acid Phosphate Cottonseed Meal	200 300	2985
Cottonseed Meal	300	2708
Check—no fertilizer		2328

These results show manure to be the best fertilizer for Sudan grass, acid phosphate ranking second, and cottonseed meal third.

HEAVY RATES OF SEEDING SUDAN HAVE NOT BEEN NECESSARY.

Sudan grass produces a large amount of forage, which may be utilized for hay, pasture, or silage.

The yields of Sudan hay secured from the planting of different amounts of seed to the acre in close drills are given in the following table:

Table 12.—Yields of Sudan hay in rate of seeding test.

Pounds Seed to the Acre	Yield, Pounds Hay to the Acre—First Cutting		
	1914	1917	Average
10	4095	2500	3297
15	4967	2150	3558
20	4646	2140	3393
30	4481	2150	3315
40	4658	2550	3604

These data show little difference for the different rates of seeding and indicate that the chief requirement is to secure a good uniform stand.

Sudan grass may be planted either in rows which are cultivated, or in close drills without cultivation. Usually heavier yields are secured by planting in rows and by giving one or two cultivations.

On account of heavy precipitation, high humidity, and poor drainage, frequently conditions are not favorable for curing Sudan hay. In order to use the crop more successfully growers should be prepared to pasture it or harvest it for silage when conditions are not suitable for curing hay.

ONE TON OF HAY WAS OBTAINED FROM 2.6 TONS OF GREEN SUDAN GRASS.

In 1917 the yields of green forage and cured hay were secured from the first cutting on a field of 1¼ acres of Sudan grass. The yield of green forage was 9,592 pounds to the acre, and of cured hay, 3,637 pounds to the acre. The ratio between green forage, which is equal to silage yield, and cured hay was, in this case, 2.6 to 1.

JAPANESE SUGAR CANE* MADE LARGE YIELDS ON RICE LAND.

The value of Japanese sugar cane as a forage crop on rice land has been quite conclusively shown. The difficulty in finding a satisfactory crop to grow after rice is the greatest obstacle in rotating rice with highland crops. Japanese sugar cane fills this place profitably and better than any other crop that has been tested.

The yield of Japanese sugar cane the first year after rice as an average of three years was 25,002 pounds to the acre of green forage.

*For a more complete discussion see Texas Agricultural Experiment Station Bulletin No. 195, entitled "Japanese Sugar Cane as a Forage Crop." Leidigh, McNess, and Laude.

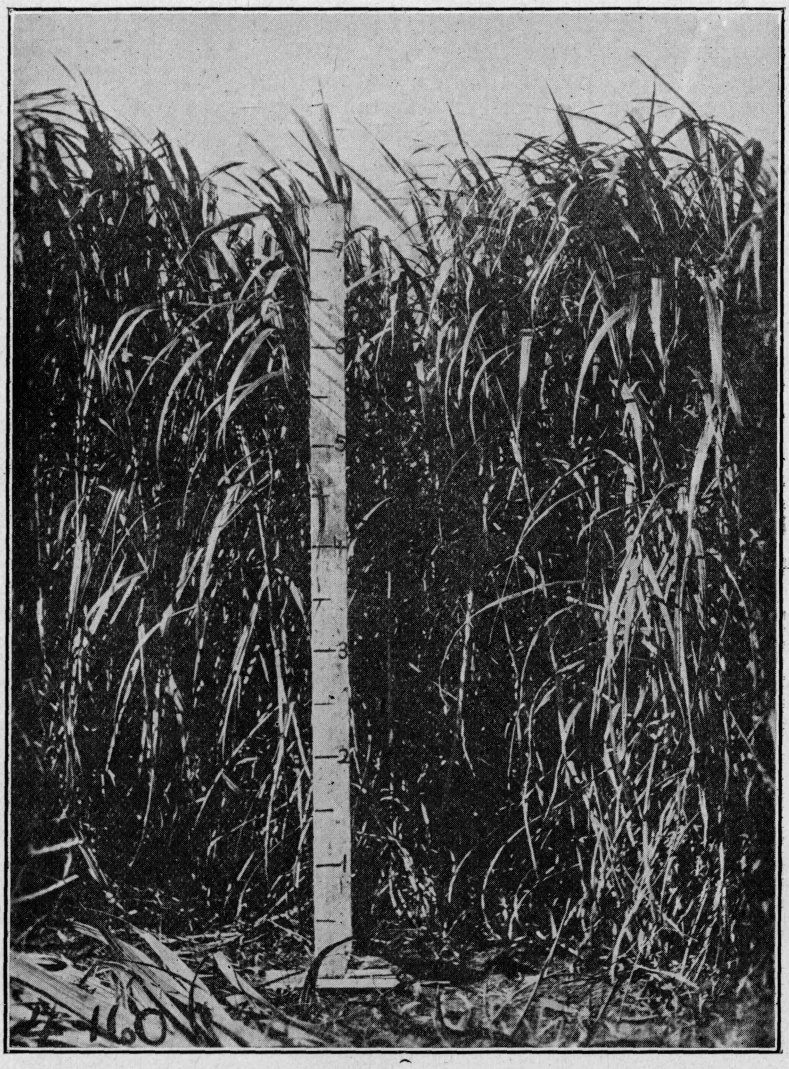

Fig. 5.—Stubble crop of Japanese sugar cane on rice land. It is dense and almost seven feet high August 6.

The average of two second-year crops, that is, crops grown from the stubble, was 48,254 pounds to the acre. These results were secured on heavy rice land.

On lighter rice land where highland crops had preceded the cane the average yield of four first-year crops of Japanese sugar cane was 41,666 pounds to the acre of green forage. The average yield of three second-year crops grown from these stubble fields was 27,045 pounds to the acre.

Japanese sugar cane was planted in a well-drained field in November, 1915, and in 1916 yielded 63,263 pounds to the acre of green forage.

This is the largest yield secured the first year and indicates the advisability of planting in the fall provided drainage is good. In 1917 a second-year crop after rice, yielding 65,677 pounds of green forage to the acre, was harvested from heavy rice land.

The results of the tests to determine the proper rate of seeding Japanese sugar cane show higher yields from the thicker rates.

Table 13.—Rate of planting seed canes of Japanese sugar cane.

Rates of Planting Canes in Rows Five Feet Apart	Yield—Green Forage, Pounds to the Acre, 3-year Average
1 line	20,552
2 lines	27,131
3 lines	30,666

The weight of seed cane required to plant an acre varies with conditions but can be approximately estimated at 1, 2, and 3 tons to the acre for the respective rates. The number of canes to the acre will, of course, depend upon the relative length of the canes, but may also be estimated, in the case of good seed canes, at 2000, 4000, and 6000 for the respective rates of planting given in the table.

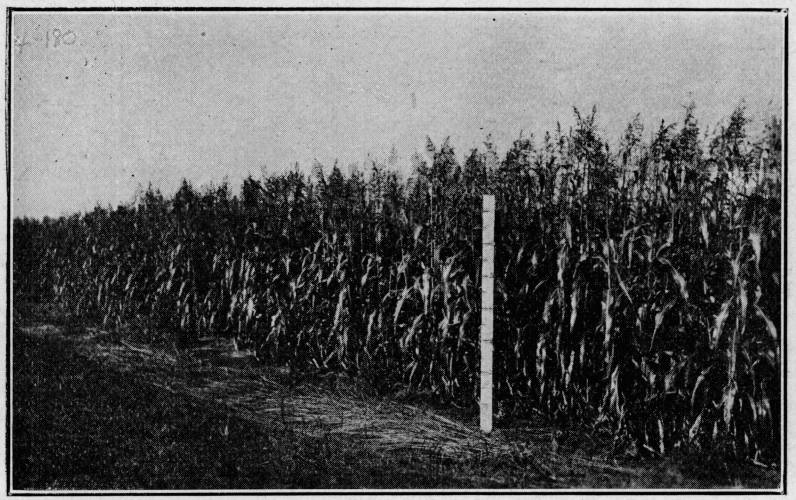

Fig. 6.—Shallu is one of the best grain sorghums, but it will not regularly produce high yields.

SORGHUMS CANNOT BE DEPENDED UPON FOR GRAIN.

The production of seed in several grain sorghums tested on the station has been rather uncertain on account of the sorghum midge. Some of the crops were not affected by the midge and produced good yields of grain. Sparrows have damaged all the grain sorghums when grown in small areas. All factors considered, Shallu is the best grain

sorghum among those tested, which include Blackhul White kafir, Pink kafir, Schrock kafir, Feterita, and Shallu.

MISCELLANEOUS NOTES.

Burr clover which was planted in the pasture has increased annually and furnishes much pasture in the winter and spring. Lespedeza is increasing rapidly in the lawn, pasture, and along the field roads. Both of these clovers are thoroughly inoculated with nitrogen-gathering bacteria.

Crimson clover treated with inoculation culture from the U. S. Department of Agriculture, was very well inoculated, while the check plats receiving no treatment showed practically no inoculation.

One to two tons to the acre of rice hay ranging in quality from good to excellent were obtained in 1915 after the main rice crop was harvested. The stems were small and the hay contained some grain.

Cowpeas can be depended upon to produce a heavy growth of vines but seed production is irregular.

Seven varieties of rust-resistant types of oats grown in the spring of 1916 were all seriously damaged by rust.

In a variety test of soy beans in 1917 wide variations were noted among varieties in regard to size of plant, time of maturity, seed yield, adaptability for forage production, percentage of protein, and oil content.

More than forty varieties and selections of castor beans were grown in 1918, exhibiting a wide range of variation in plant characters. In general it was observed that the dwarfer, earlier maturing types produced the most seed.

Eighty-seven bushels to the acre of Early Rose Irish potatoes were produced in the spring of 1916. Six other varieties yielded less.

Early fall planting of Irish potatoes in 1918 produced new potatoes until Christmas.

Tobacco made excellent growth in 1916 and 1917, but the quality and texture were poor.

Dewberry T. S. No. 4036, produced 615 gallons to the acre in 1917.

Cantaloupes of excellent quality were grown in 1915 and 1916. The Rocky Ford type including the varieties Netted Rock King, Eden Gem, Rust Resistant, and Improved Hoodoo were the best quality.

The Pencil Pod and Surecrop Stringless varieties have produced the best quality of wax garden beans, and Round Six Weeks and Stringless Green Podded have been superior among the green-podded varieties.

The small White Lima climbing bean produced throughout the summer and until frost in 1918.

Among the vegetables tested mustard, spinach, turnips, carrots, beets, radishes, lettuce, cabbage, and cauliflower are good winter truck crops. Tomatoes, egg-plant, peppers, and okra are among the most successful summer garden crops.

Technical research investigations were begun on the effect of different environments on the development of the rice plant, the results of which should indicate proper methods of culture.

SUMMARY.

Conditions on Substation No. 4 are especially suitable for the study of rice-farm problems.

Cottonseed meal produced the most rice, but a light application of ammonium sulphate and acid phosphate combined, or a medium application of either one alone was more profitable.

The application of fertilizers to rice aided weed growth, and sometimes caused the rice to lodge.

Deep plowing for rice has been very profitable when compared with shallow plowing.

Very little difference in yield of rice was found between fall or early winter plowing, and spring plowing.

The best seedbed for rice has been secured when the ground is sufficiently pulverized to insure a good stand and all the weeds are killed.

It is important to plant enough seed to insure a good stand of rice.

Rice can be "mudded in" very successfully when conditions are not favorable for drilling.

Weeds can be kept out of rice fields and the yields thereby materially increased.

High-yielding varieties of rice are easy to find, but consideration must also be given to stiffness of straw, shattering, and other factors affecting the value of the product.

Manure is the best of the fertilizers applied to corn, while cottonseed meal and acid phosphate combined rank second.

The success of corn in the rice belt depends much upon the variety planted.

Commercial fertilizers increased the yield of cotton, but manure produced greater increases.

Drainage and adapted varieties are necessary for profitable cotton production.

All the fertilizers used increased the yield of Sudan grass but manure produced much the highest yields.

Heavy rates of seeding Sudan grass have not been found necessary.

One ton of Sudan hay was obtained from 2.6 tons of green Sudan.

Japanese sugar cane in rotation with rice was the best crop tested for this purpose.

It seems advisable to plant Japanese sugar cane in the fall provided drainage is good.

Three lines of seed canes yielded more Japanese sugar cane than thinner rates of seeding. This is equal to about 6000 canes or 3 tons of seed canes to the acre.

Sorghums cannot be depended upon for grain on account of the sorghum midge, which destroys some of the crops.