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TEXAS AGRICULTURAL EXPERIMENT STATION

A. B. CONNER, DIRECTOR
COLLEGE STATION, BRAZOS COUNTY, TEXAS

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DIVISION OF AGRONOMY

Corn Varieties in Texas; Their Regional and Seasonal Adaptation

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
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**In cooperation with U. S. Department of Agriculture.
***In cooperation with the School of Agriculture.

This Bulletin interprets the results of experimental work from 1918 to 1927 on the effects of time of planting on many different varieties of corn in eleven localities in Texas.

Varieties differ greatly in their response to regional conditions. Some varieties, such as Surcropper and Ferguson Yellow Dent, exhibit a wide range of adaptation to regional conditions and are almost equally productive in all parts of the State. Other varieties, such as Strawberry, Hastings' Prolific, Chisholm, Brazos White, Bloody Butcher, Horton, and Oklahoma White Wonder, show a medium range of regional adaptation and are better than the average in several localities and poorer than the average in others. Varieties with a narrow range of adaptation are those which yield extremely well under one set of regional conditions, but are very inferior under another set. This class includes such varieties as Thomas, Tuxpan, and Blount's Prolific.

All varieties which are adequately tested show a reduced yield as the result of late planting, but varieties differ greatly in their response to time of planting. Mexican June and Surcropper are only slightly affected in yield by time of planting, while Ferguson Yellow Dent, Chisholm, Strawberry, Oklahoma White Wonder, and Brazos White, are considerably reduced in yield as the result of late planting. Other things being equal, varieties which show a wide range of adaptation to seasonal conditions are to be preferred, as they permit a greater latitude in time of planting. In many cases, however, maximum yields are made by varieties which have only a narrow range of seasonal adaptation, but are planted at the optimum time.

The reduction in yield resulting from late planting is undoubtedly partly due to the accompanying delay in time of blooming and maturity. It is shown, however, that a delay of ten days in time of planting results in a delay of only about five days in time of silking.

On the basis of the experimental results reported in this Bulletin, recommendations regarding time of planting and choice of varieties are made for nine regions of Texas.

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BULLETIN NO. 397 JUNE, 1928

CORN VARIETIES IN TEXAS; THEIR REGIONAL AND SEASONAL ADAPTATION

P. C. MANGELSDORF

From the standpoint of acreage, production, and total value, corn ranks second among the wide variety of crops grown in Texas, being exceeded only by cotton. Because corn-growing is largely confined to the eastern half of the State, as shown in Figure 1, and because most of the crop is fed on the farms where it is grown, and only a small percentage is sold for cash, the importance of corn in Texas has probably been minimized. It is not generally known, for example, that Texas, with an average annual acreage of 5,911,000 acres ranks sixth among the States in corn acreage, exceeding in this respect two of the States generally regarded as "corn belt" States. The average yield per acre in Texas, however, is low, only 19.2 bushels per acre for the period from 1909 to 1926. In this respect Texas ranks fortieth among the States.

In view of the large acreage annually planted to corn in Texas it follows that any general increase in yield, however small, resulting from the use of better varieties or improved cultural practices, will greatly affect the total production of corn in the State, or the production remaining the same will reduce the acreage now required for corn and permit the substitution of other crops. The Texas Agricultural Experiment Station has, since 1894, conducted experiments aimed at the improvement of the corn crop. Results of these experiments have been published from time to time in bulletin form. Since all the early station bulletins dealing with corn are now out of print and not available for distribution, it seems worth while to summarize briefly some of the earlier experimental work with variety tests or corn conducted by the Texas Station.

Bulletins No. 34, 1895; No. 45, 1897; and No. 49, 1898, include reports of variety tests conducted at McKinney, Wichita Falls, College Station, and Beeville. In these tests a large number of varieties from many different regions were compared. It appears that the main object of this test was to determine the relative value of local and northern varieties, a question which was apparently of considerable interest at that time. Although these tests were not completely conclusive in their results, they showed clearly that during normal seasons the local varieties were superior to northern sorts, while in seasons when an early drouth destroyed the crop some of the earlier-maturing northern varieties made the higher yields. Bulletin No. 49 states the problem so concisely that it deserves repetition: "It must be clearly borne in mind that it is the last thirty days' growth that determines the success of corn in Texas.

It must be grown to 'beat the drouth.' With early-maturing kinds this falls within the thirty days extending from the ninetieth to the one hundred and twentieth day from germination, while with late varieties the crucial test is to be expected between the one hundred and twentieth and one hundred and fiftieth day after germination."

Bulletin No. 120, published in 1908, presents the results of a comparison of twenty-eight varieties of corn exhibited at the Dallas Fair with a selection of corn made by R. L. Bennett of the Texas Station

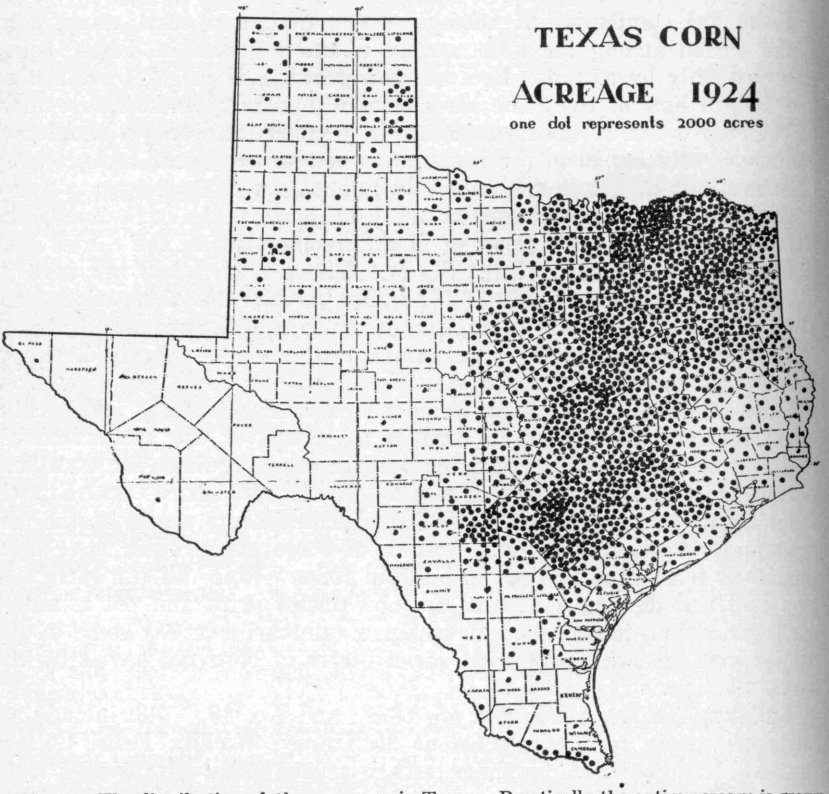

Fig. 1.—The distribution of the corn crop in Texas. Practically the entire acreage is grown east of the line of 30-inch rainfall. Half dots and quarter dots represent approximately 1,000 and 500 acres, respectively.

and a sample of corn of unknown breeding, selected out of the crib at planting time. In practically every comparison the local Bennett strain or the home-grown, crib-selected seed proved more productive than the "show corn."

The report of this test is concluded with the following statement: "The conflicting and disappointing results of most of the kinds of corn supposed to be most highly improved would seem to justify caution

before buying seed at a distance, whatever the claims may be as to purity and improvement in yielding power. So far as this season's results indicate, the improvement affected was local, was fanciful, or failed to be transmitted in the crops grown here."

This statement, made at a time when confidence in the corn shows and in selection on a score card basis as a method of improvement was almost nation-wide, is of particular significance. Though the reliability of a single year's test may be questioned, the conclusion drawn from it has been amply borne out by numerous experiments conducted in other States until today most breeders realize the futility of attempting to increase yields by selection according to the old "show type" score card.

Variety tests with corn have been conducted at most of the Texas Substations where corn can be grown. These results have been presented in Progress Reports from Angleton, Denton, Beaumont, Troup, Beeville, Temple, Spur, Lubbock, Pecos, and Nacogdoches, and in Bulletin 276, "Corn Variety Experiments, Substation No. 3, Angleton."

SCOPE OF THE BULLETIN

Two of the most important factors in obtaining maximum production are the use of adapted varieties and planting at the optimum time. Earlier experimental work has shown in a general way the varieties of corn best adapted to Texas conditions. The corn-growing area of the State is so large, however, and is subject to such diverse soil and climatic conditions that a variety of corn adapted to one part of the State may be of little value in another. Furthermore, the weather conditions are such that the growing season for corn varies greatly in the different parts of the State. The growing season is generally considered to be the period from average date of last killing frost in the spring to average date of first killing frost in the fall. In the case of corn, however, the growing season is definitely terminated by the occurrence of hot, dry weather during the summer months. The time of occurrence and period of duration of the summer drouth vary from season to season and with different regions of the State. It is, however, a very general phenomenon and is undoubtedly the limiting factor in corn production.

It follows that maximum yields of corn will be obtained only through complete utilization of the growing period through the use of varieties that are capable of maturing their crops before the drouth begins and by planting at such dates that the crop will suffer the least damage from cold weather during early development or from hot, dry weather at maturity.

In other words, varieties of corn in Texas are subject to both regional and seasonal variations. To determine the adaptation of varieties to these two influences a variety-date-of-planting test was instituted in 1918. This test has been conducted at eleven substations throughout the State, in most cases for a period of ten years. In interpreting the results of the test, answers to the following questions have been sought:

1. What is the optimum time for planting corn in the various regions of the State?
2. Does the delay between early and medium planting have the same effect as a delay between medium and late planting?
3. Which varieties make the highest yields in early planting?
4. Which varieties make the highest yields in midseason planting?
5. Which varieties make the highest yields in late planting?
6. Which varieties are above or below the median in yield in each of the three plantings?
7. Which varieties make the highest average yields at all dates of planting?
8. How do varieties differ in their reaction to time of planting?
9. Which varieties have the widest and which the most limited range of adaptation throughout the State?
10. Which varieties can be recommended for each region?

These questions are answered in detail for each region by the tables which accompany the discussion. In addition to the tables, a diagram has been included for each station, which shows at a glance (1) the ranking of varieties according to average yield, (2) the highest yield made in the entire test, (3) the highest yielding variety in the early plantings, (4) in the medium plantings, (5) in the late plantings, (6) the optimum time of planting for each variety within the range covered by the test.

PLAN OF THE EXPERIMENT

The plan of this experiment was uniform at most of the stations and with a few exceptions the experiment has been conducted strictly according to the original plan.

The test occupied three acres every year, one acre each for early, medium, and late planting. Each acre was divided into sixteen plats, each plat comprising seven rows three feet apart and 132 feet long. The two outside rows of each plat were discarded at harvest, making the net size of plats five rows or 1/22 acre. Every fifth plat was planted to the same variety and used as a soil check. In addition to the soil checks each acre included three "date checks," in which one variety was planted at three dates. Since all varieties except those used as soil checks are replicated only once at each date of planting, the yields of the date checks are useful as an indication of the productive capacity of the three acres used each year for this experiment, and serve as a measure of the reliability of the experiment. In other words, if the yields of the date checks in which three plantings were made on each acre rank in the same order as the other varieties, in which each planting was made on a separate acre, it is fairly certain that the differences in yield between different plantings are due to the effect of time of planting and not to variation in fertility of the three acres used in the experiment.

The dates at which the three plantings, hereafter termed "early," "medium," and "late," were made varied with the locality and season,

but so far as possible the early planting was made as early as practicable and the medium and late plantings at intervals of approximately two and four weeks later. Unfavorable seasonal conditions frequently delayed one or more of the plantings, but over a period of years the average dates of planting correspond fairly well to the plan as outlined.

The varieties used in this experiment include those which proved to be most promising in preliminary variety tests which had been conducted at the several substations. Varieties which made a poor showing in the early years of the test were discarded and replaced by others. In tabulating the data, varieties which were grown less than two years have generally been omitted.

METHOD OF PRESENTING DATA

The results of this test are presented separately for each station, with a discussion of the soil and climatic conditions as related to the test. So far as possible, the following tables are presented for each station. For the purpose of convenience in applying the results of these tests to various regions of the State, they are presented in the same order as the regions shown on the map in Figure 15.

1. Summary of dates of planting, stand percentages, average yields of date checks in comparison with average of all varieties.
2. Annual and average yields of all varieties in early planting ranked according to yield.
3. Annual and average yields of all varieties in medium planting ranked according to yield.
4. Annual and average yields of all varieties in late planting ranked according to yield.
5. Annual and average yields of all varieties. Average of three plantings ranked according to yield.
6. The effect of time of planting on the yield of different varieties.

Method of Computing Percentage Rating and Corrected Yields

The figures presented for yields represent the actual yields in bushels of shelled corn per acre, with few exceptions in which yields are computed on the basis of ear corn. Since all varieties were not grown during the entire ten-year period, the average yields are not a fair basis of comparison. In order to study the varieties on a comparable basis, a percentage rating and corrected average yield have been calculated by the following method: All varieties which have been grown for the entire period of the test are considered as checks or "standards." The percentage rating of any variety for any planting is found by dividing its average by the average for three plantings of the "standard" varieties for the same period of years. For example, at Angleton, six varieties, Chisholm, Ferguson Yellow Dent, Hastings' Prolific, Surcropper, Thomas, and Tuxpan, were grown every year of the test. Florida Flint, however, was grown only from 1918 to 1920. When only actual averages

are considered, Florida Flint ranks first among the varieties with 26.9 bushels per acre, as shown in Table 30. When the percentage rating is calculated, however, by dividing the average yield of Florida Flint, which is 26.9 for the years 1918-1920, by the average yield for three plantings of the six "standard" varieties for the same three years, which is 29.1, giving a percentage rating of 92.4, the rank of Florida Flint is reduced from first to ninth place, as shown in Table 30. The corrected yield, shown in the last column of the tables, is added merely for convenience because it is easier to consider corn yields in terms of bushels than in percentages. It is obtained by multiplying the average yield of the "standard" varieties for the entire test period by the percentage rating. The values of the percentage rating and of the corrected yields are identical except that one is expressed in percentages, the other in bushels per acre.

This method of presenting the average yield was adopted because it appeared by actual comparison of several methods to be the most accurate for ranking varieties grown during different periods and because it eliminates the very marked errors which frequently occur when a corrected yield is obtained by the common method of calculating the percentage rating of each variety for each year separately, and obtaining an average rating by dividing the sum of the individual ratings by the number of years grown. Such a method invariably gives the highest ranking to those varieties which produce the highest yields in unfavorable seasons when other varieties are almost complete failures.

Replanted Plats and Crop Failures

Occasionally one or more varieties failed to make a satisfactory stand in one of the plantings and were replanted at a later date. In such cases the yield of the replanted plat is not included in the tables. When yields from one of the plantings has been omitted, the yields of the other plantings are ignored in calculating the average of the three plantings for this variety, but are included in determining the average yield of the variety for all plantings. For example, at Angleton four varieties failed to make a satisfactory stand in the early planting of 1924 and the yields from these plats have been omitted, so that the average yields for the early planting are based on nine years' results. The yields of these varieties for the medium and late plantings are included in the tables showing these plantings, but are omitted in making the calculations, so that the average yields in the three tables are based on the same period of years. In Table 30, however, where the average for all plantings is shown, the yield for 1924 of these varieties has been determined by averaging the medium and late plantings.

In very unfavorable years, at several stations some of the varieties produced no crop. In such cases the yield is considered to be zero and the average is calculated on this basis. When none of the varieties produced a crop, the season is omitted in making up the averages.

Soil Checks and Date Checks

Varieties used as soil checks, which occupied four plats on each acre, are represented in the tables by the average yield of the four plats. Varieties used as date checks, which were planted at three different dates on each acre, are represented in the table only by one plat, the one which corresponds to the other varieties on the same acre, so that the three plantings of the date checks are represented by the early planting on the first acre, the medium on the second acre, and the late planting on the third acre.

It should be particularly emphasized at this point that slight differences in yield between varieties are usually not significant. It is probably safe to conclude, however, that varieties which have been above the average in all three plantings are superior to those which have been below the average in three plantings.

ADAPTATION OF VARIETIES TO REGIONAL CONDITIONS

A study of the yields of varieties at various localities, which are presented in detail later in the Bulletin, indicates that some varieties rank high in all localities, while others may rank high in one locality and be almost worthless in another. In other words, some varieties appear to have a wide range of adaptation within the State, others a comparatively narrow range.

It would seem to be desirable to find some method of expressing in a single term the range of adaptation of each variety. This has been attempted by summarizing the percentage rating of each variety at all the localities where the variety was grown. The results of this summary are shown in Table 1.

Only the results from the eight stations in the eastern half of the State have been included and all varieties which have been grown at less than two stations are omitted.

The two last columns of figures considered in connection with the results from each station separately furnish an indication of the range of adaptation of any variety. A variety that has a high average percentage rating and a small difference between the highest and the lowest percentage rating is obviously one having a wide range of adaptation.

Surcropper and Ferguson Yellow Dent are the only varieties included in this category. Surcropper undoubtedly exhibits the widest range of adaptation of any variety included in these tests, having a percentage rating above 100 at each of the eight substations. Also, the percentage rating for Surcropper is very similar in all localities, the difference between the highest and lowest rating being only 12.5 per cent. Ferguson Yellow Dent resembles Surcropper in having practically the same percentage rating in all localities, but is inferior to it in yield at every station except Temple.

Table 1.—The regional range of adaptation of varieties as indicated by percentage ratings in various regions.

	Percentage rating at								Range, highest-lowest	Average Percentage rating	Range of adaptation
	Troup	Nacogdoches	Beaumont	College Station	Angleton	Denton	Temple	Beeville			
Varieties grown at all stations:											
Surcropper	113.2	107.1	108.1	102.3	114.5	109.3	102.0	108.2	12.5	108.1	wide
Ferguson Yellow Dent	102.9	94.4	94.6	97.4	94.9	98.7	105.7	97.6	11.3	98.3	wide
Strawberry	95.1	83.2	102.6	104.6	95.3	98.3	101.7	98.9	21.4	97.5	medium
Hastings' Prolific	91.4	114.3	116.6	90.5	106.5	74.7	94.6	88.0	28.6	97.1	medium
Chisholm	105.7	96.8	90.3	98.9	90.7	95.8	99.4	93.7	15.4	96.4	medium
Thomas	73.0	83.3	90.3	95.1	94.4	88.4	71.2	104.4	33.2	87.5	narrow
Varieties not grown at all stations:											
Brazos White	.....	112.7	.....	88.5	116.5	106.8	96.6	.....	28.0	104.2	medium
Tuxpan	.....	.....	136.7	.....	107.5	.....	.....	61.7	75.0	102.0	narrow
Bloody Butcher	94.9	.....	.....	.....	.....	106.0	.....	.....	11.1	100.4	medium
Horton	.....	79.5	104.8	.....	.....	.....	98.9	93.6	25.3	94.2	medium
Oklahoma White Wonder	86.3	89.7	.....	99.0	87.0	99.2	91.2	102.3	15.3	93.5	medium
Virginia White Dent	83.7	.....	94.9	90.1	92.4	.....	.....	98.8	15.1	92.0	unadapted
Blount's Prolific	75.2	11.2	.....	98.5	.....	.....	83.2	66.7	44.5	87.0	narrow
Cocke's Prolific	.....	59.2	.....	92.9	.....	.....	.....	89.3	33.7	80.5	unadapted
St. Charles White	77.1	.....	.....	83.2	65.6	72.4	71.3	72.0	17.6	73.6	unadapted
Nacogdoches	.....	83.6	.....	69.5	.....	.....	.....	.....	14.1	76.6	unadapted

Varieties with a medium range of adaptation are those which are better than 100 per cent at several stations and which show an intermediate difference between the highest and lowest yield. This class includes Strawberry, Hastings' Prolific, Chisholm, Brazos White, Bloody Butcher, Horton, and Oklahoma White Wonder. All of these varieties gave excellent results at several stations, but were inferior in other localities.

Varieties with a narrow range of adaptation are those which yield extremely well under one set of regional conditions, but are very inferior under another set. This class includes Thomas, Tuxpan, and Blount's Prolific. These varieties are all very productive within a limited region and very unproductive in some other localities.

A fourth class includes varieties which appear to be unadapted to Texas conditions and have a percentage rating less than 100 at every locality where they have been tested. This class includes Virginia White Dent, Cocke's Prolific, St. Charles White, and Nacogdoches. In connection with these varieties it should be mentioned that none of them have been tested at all the substations and, if this were done, it is entirely possible that some of them would prove to have a narrow range of adaptation. Also, these varieties may be of value for very early or very late plantings and yet have a low average yield.

ADAPTATION OF VARIETIES TO SEASONAL CONDITIONS

The results on effect of time of planting on yields of different varieties, which are presented in detail later, shows that almost all varieties are less productive in the late planting than in the early. The degree of loss resulting from late planting varies with the variety and with the locality, but in ninety comparisons involving sixteen varieties only seven showed a gain due to late planting.

It is evident that some varieties are less subject to loss as a result of late planting than are others, and an attempt has been made to describe the varieties in this respect by summarizing the results from all stations. This has been done in Table 2. Due to the fact that the loss was consistently greater at some stations than at others, an adequate comparison of varieties is possible only when the varieties have been grown at the same stations. Consequently, the varieties grown at all stations have been separated, in Table 2, from those which were not grown at all stations.

Among the six varieties which were grown at all stations the loss due to late planting varies from 13.3 per cent in the case of Surcropper to 26.5 per cent in the case of Strawberry. Among the remaining varieties the differences between early and late plantings range from a gain of 0.1 per cent in Cocke's Prolific to a loss of 41.8 per cent in Nacogdoches.

In this connection it should be mentioned that the Mexican June variety, which unfortunately was not included in tests in the eastern part of the State, probably has a wider range of adaptation to seasonal conditions than any other variety. This is indicated by the general

Table 2.—The seasonal adaptation of varieties as indicated by the gains and losses resulting from late planting. Yield of early planting considered as 100 per cent.

	Percentage gain or loss* at								Average gain or loss
	Troup	Nacog-doches	Beau-mont	College Station	Angleton	Denton	Temple	Beeville	
Varieties grown at all stations:									
Surcropper	+11.1	27.7	20.0	26.4	15.5	13.5	11.1	3.1	13.3
Hastings' Prolific	+ 4.3	35.1	8.5	38.1	11.8	24.3	21.9	22.3	19.7
Thomas	17.2	24.0	16.0	20.4	16.1	61.4	31.2	+ 5.5	22.6
Ferguson Yellow Dent	4.2	38.2	17.1	40.2	35.2	21.9	20.5	8.7	23.2
Chisholm	+ 3.2	45.7	30.1	32.2	36.8	26.7	20.4	9.9	24.8
Strawberry	2.9	44.8	27.9	34.5	18.3	36.3	22.0	25.1	26.5
Varieties not grown at all stations:									
Cocke's Prolific	.....	29.2	.....	15.2	.....	.....	.....	+44.8	+ 0.1
Blount's Prolific	33.5	5.6	.....	17.9	.....	.....	8.8	+47.7	3.6
Virginia White Dent	14.4	.....	38.9	10.2	11.0	.....	.....	+48.6	5.2
Tuxpan	.....	.....	10.8	.....	27.5	.....	.....	10.4	16.2
Horton	.....	20.3	.....	33.5	.....	.....	11.9	6.0	17.9
Bloody Butcher	10.7	.....	.....	.....	.....	28.5	.....	.....	19.6
St. Charles White	12.8	.....	.....	24.9	35.2	15.5	21.6	19.0	21.5
Oklahoma White Wonder	14.5	46.4	.....	40.7	7.7	32.0	25.5	3.7	24.4
Brazos White	.....	26.4	.....	34.6	12.1	55.8	29.2	.....	31.6
Nacogdoches	.....	52.3	.....	31.4	.....	.....	.....	.....	41.8

*All values represent losses unless preceded by plus sign.

experience of farmers throughout the State and is partly substantiated by the results at Chillicothe and Pecos. The results at Chillicothe, illustrated in Figure 12, are particularly interesting in showing the great difference between Mexican June and such varieties as Strawberry and Chisholm in their reaction to effects of time of planting and the intermediate position of Surcropper in this characteristic.

These averages furnish a more or less accurate measure of the adaptation of varieties to seasonal conditions. It might be supposed that the varieties which show the widest range of adaptation to regional conditions would also be those which show the widest adaptation to seasonal conditions. This is only partly true. The Surcropper variety shows a wide range of adaptation to both conditions, but other varieties differ considerably in the two series.

It should be emphasized that the adaptation of a variety to seasonal conditions is not in itself a measure of the value of a variety for any locality. Some of the least productive varieties show the least effect of time of planting. On the other hand, where two varieties are equally productive, preference should be given to the one which suffers the least loss due to late planting, as the use of such a variety allows a wider latitude in time of planting.

RELATION BETWEEN TIME OF PLANTING AND DATE OF SILKING

The results of the tests on the effect of time of planting on yield at eleven localities in Texas are rather consistent in demonstrating that early planting is associated with higher yields, except where other factors such as low February rainfall at Beeville or root-worm damage at Beaumont exert a limiting influence on early planting. These results are in agreement with those from other sections of the country and it may be said, as a general rule, that the earlier corn can be planted without sacrificing stand and seeding vigor the higher will be the yield.

It would be difficult to determine all the factors which contribute to these results, but it is entirely obvious that in Texas a large share of the superiority of the earlier-planted corn is due to the fact that it blooms and matures earlier and, as a consequence, is less subject to injury from hot, dry weather. This brings up the question of the relation between time of planting and time of maturity. Space will not permit a complete treatment of this subject in the present Bulletin and it is hoped to take up this phase of the experiment in a later publication. It may be helpful in this connection, however, to present one example of the relation between time of planting and date of maturity. For this purpose the results at Substation No. 5, Temple, have been chosen.

Since the time of ripening is difficult to record accurately, and as varieties show their greatest differences in the period between planting and silking, and comparatively little difference in the length of the period between time of silking and ripening, the date of silking is generally the best criterion of maturity.

The relation between date of planting and number of days between

planting and silking for five varieties grown at Temple from 1918 to 1924 is shown by Figure 2. The regression line in the diagram represents a statistical estimate, in the form of a straight line, of the average dates of silking of these five varieties, when planted on any date between March 1 and May 9. If a longer planting period were to be considered, this relationship should undoubtedly be represented by a curved line rather than by a straight one, but, so far as these data are concerned, a straight line appears to furnish a fairly satisfactory estimate of the relationship.

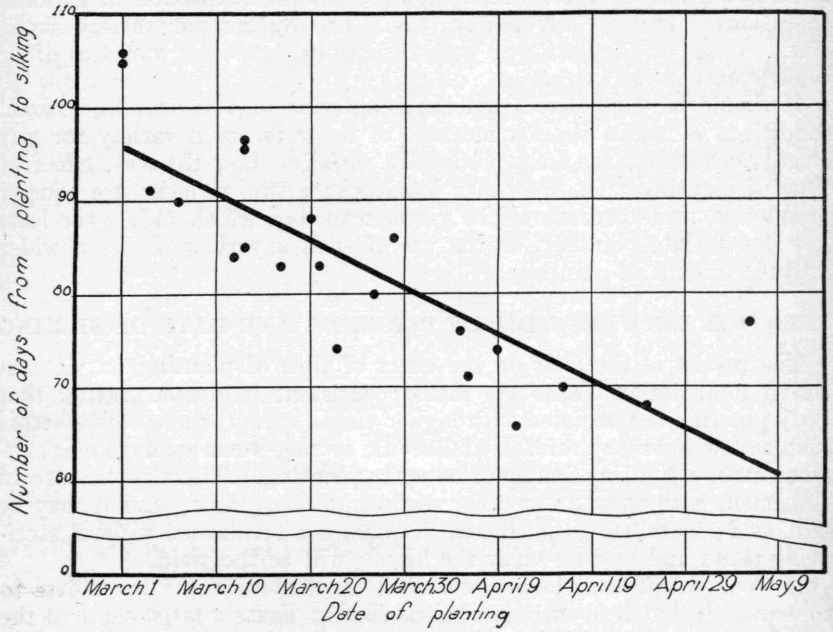

Fig. 2.—The relation between time of planting and number of days from planting to silking, Texas Substation No. 5, Temple. Ten days difference in time of planting results in approximately five days difference in date of silking.

The regression line shows that ten days' difference in time of planting is associated with only approximately five days' difference in the period between planting and silking. In other words, the later that corn is planted the shorter will be the period between planting and silking.

This is true for each of the five varieties included in computing the averages shown by the black dots in Figure 2. The regression lines of the varieties are almost identical. Ten days' delay in planting results in shortening the period between planting and silking, 5.18 days for Oklahoma White Wonder, 4.62 days for Strawberry, 5.18 days for Chisholm, 4.97 days for Surcropper, and 4.92 days for Ferguson Yellow Dent.

It is obvious from the data in Figure 2 that a variety of corn cannot be accurately described as a 100-day, 120-day, or 150-day variety. Even when grown in the same locality, a variety of corn that requires 150 days to mature when planted on March 1 may require only 120 days to mature when planted on May 1. Also, a variety of corn that matures in 150 days when planted March 1 in North Texas may mature in considerably less time when planted on the same date in South Texas. These, however, are questions which deserve additional study. The main object in presenting the data from Temple is to show that time of planting is intimately related to time of silking, and hence to danger of injury by hot, dry weather, and that differences in date of planting result in much smaller differences in date of silking and maturity.

RELATION BETWEEN TIME OF PLANTING AND YIELD OF VARIETIES

The general conclusions from the ten years' test with corn have already been presented. In this section of the Bulletin the detailed results from each station are presented separately, with a discussion of the conditions under which the tests were made. On the basis of these detailed results, recommendations regarding time of planting and choice of varieties are made at the conclusion of the Bulletin for nine regions of Texas. The data are presented in the same order as the regions are numbered in the map (Figure 15) on page 70.

Results at Troup

Texas Substation No. 2 is located in Smith County, one mile northeast of Troup. The soil is Kirwin fine sandy loam and is typical of large areas in Northeast Texas. The average date of last killing frost at Troup, for a period of twenty-three years, is March 14. The average rainfall for the ten-year period covered by the test was 43.88 inches, of which 21.44 inches, or almost half, occurred during the five months, March to July, inclusive.

Table 3 shows that the average dates of planting were March 25, April 8, and April 22, respectively. The difference of fourteen days between the early and medium plantings was accompanied by an average reduction in yield of 2.3 bushels per acre. The average difference of fourteen days between the medium and late plantings, however, was associated with a gain of 1.3 bushels. These results are contrary to those of any other station and are probably partially due to the poorer stand of the medium plantings. The average of the date checks shows the late planting to be 1.5 bushels lower in yield than the medium planting.

Table 3 shows further that the early plantings ranked first in five of the ten years, the medium planting first in one year, the late planting first in three years, while the early and late were equal in the remaining years.

Tables 4, 5, and 6 show the ranking of all varieties at three dates of planting. Ferguson Yellow Dent, Surcropper, Bloody Butcher, and Chisholm ranked above the median in each of the plantings, while Thomas, St. Charles White, Blount's Prolific, and Oklahoma White Wonder were below the median in each planting.

Table 7 gives the results of ranking the varieties on the basis of the average for all plantings. Surcropper, Chisholm, and Ferguson Yellow Dent are the three highest yielding varieties when all dates of planting are considered.

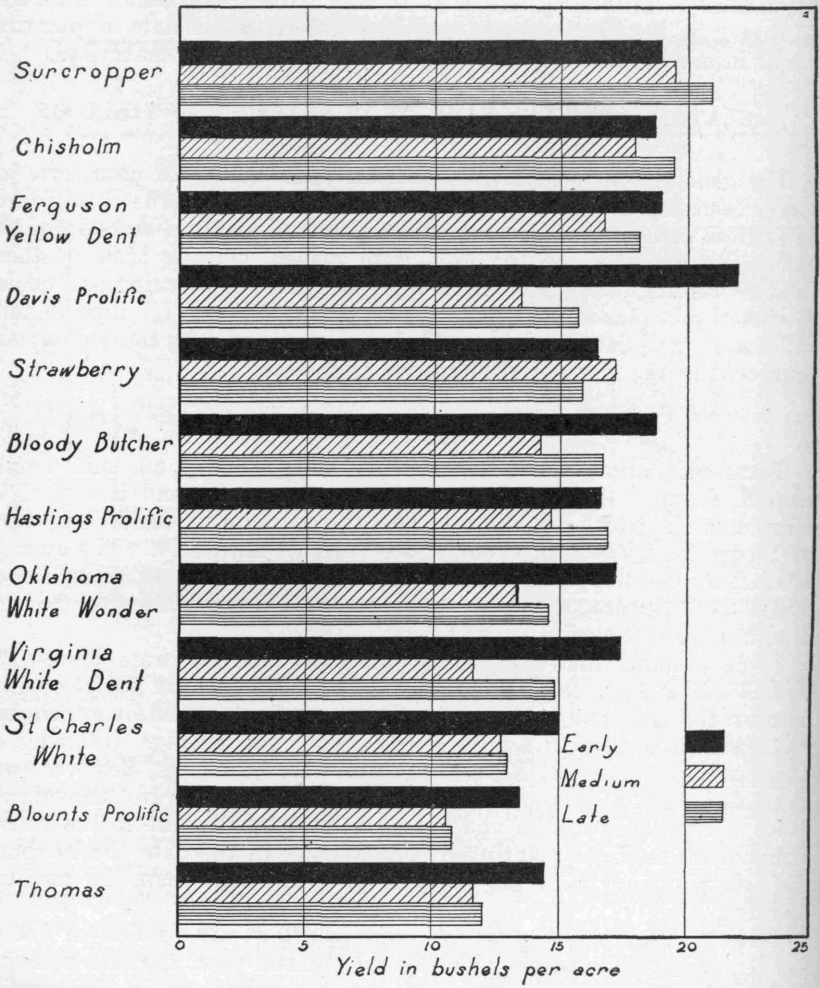

Fig. 3.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 2, Troup. These results are applicable to the counties in Region No. 1 of the map (Fig. 15).

Table 3.—Dates of planting, per cent stand, and average yields of date checks and varieties in early, medium, and late plantings, Texas Substation No. 2, Troup.

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average
Dates of planting:											
Early	Mar. 15	*Mar. 25	Mar. 17	Mar. 25	Mar. 24	April 3	April 1	Mar. 5	April 12	Mar. 30	Mar. 25
Medium	April 1	*April 11	April 5	April 6	April 6	April 14	April 10	Mar. 20	April 26	April 11	April 8
Late	April 20	April 29	April 13	April 25	April 18	April 24	April 19	April 4	May 5	April 29	April 22
Per cent stand:											
Early	96.3	97.5	88.3	90.6	94.1	85.8	93.3	92.8	84.8	98.1	92.2
Medium	97.3	98.5	85.6	57.6	91.7	75.0	93.0	94.2	91.4	93.7	87.8
Late	96.6	97.6	88.0	85.0	92.3	85.2	92.5	85.9	89.3	90.5	90.3
Yields of date checks:											
Early	6.8	18.9	16.0	25.8	20.1	9.2	16.1	21.1	29.7	28.2	19.2
Medium	6.4	18.6	15.9	19.4	19.2	8.9	15.6	15.6	32.6	29.0	18.1
Late	5.2	19.9	14.7	9.3	18.2	10.3	15.1	10.6	34.9	27.6	16.6
Yields of all varieties:											
Early	9.0	24.3	14.0	17.1	15.4	16.6	14.7	11.5	33.5	19.9	17.6
Medium	7.1	15.4	13.8	10.0	16.0	11.6	12.7	8.4	39.1	19.3	15.3
Late	7.7	16.5	19.4	14.6	17.0	16.6	11.8	6.9	35.1	20.0	16.6
Days difference in planting:											
Early-medium	17	17	19	12	13	11	9	15	14	12	14
Medium-late	19	18	8	19	12	10	9	15	9	18	14
Early-late	36	35	27	31	25	21	18	30	23	30	28
Bushels difference in yield:											
Early-medium	—1.9	—8.9	—0.2	—7.1	0.6	—5.0	—2.0	—3.1	5.6	—0.6	—2.3
Medium-late	0.6	1.1	5.6	4.6	1.0	5.0	—0.9	—1.5	—4.0	0.7	1.3
Early-late	—1.3	—7.8	5.4	—2.5	1.6	0.0	—2.9	—4.6	1.6	0.1	—1.0

*Replanted April 29.

Table 4.—Early planting, all varieties, annual and average yields, Texas Substation No. 2, Troup.

Variety	Yield in bushels per acre											Percentage rating*	Corrected yields
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Davis' Prolific	.....	33.2	15.7	17.6	19.3	.....	.....	.....	.....	.....	21.4	125.9	22.0
Ferguson Yellow Dent	12.3	27.0	17.6	14.2	14.6	22.7	14.2	19.2	19.8	28.9	19.0	108.6	19.0
Surcropper	17.0	28.5	12.7	18.5	16.9	22.3	12.8	18.4	25.9	16.4	18.9	108.0	18.9
Bloody Butcher	7.9	15.9	14.1	18.7	.....	.....	19.3	9.6	39.9	25.2	18.8	106.8	18.7
Chisholm	11.4	26.3	9.9	13.3	13.4	22.9	18.6	11.6	36.5	22.0	18.6	106.3	18.6
Virginia White Dent	5.8	22.8	19.3	13.1	.....	.....	.....	.....	.....	.....	15.2	99.4	17.4
Oklahoma White Wonder	6.4	16.8	7.5	17.0	15.2	22.3	14.6	11.4	43.6	16.7	17.2	98.3	17.2
Blount's Prolific	.....	.....	.....	.....	17.3	8.6	16.5	14.0	.....	.....	14.1	97.3	17.0
Strawberry	.....	.....	.....	21.4	18.4	12.8	16.4	6.3	33.0	13.1	17.3	94.5	16.5
Hastings' Prolific	7.0	27.0	15.8	23.7	11.6	11.4	9.4	8.0	33.7	15.3	16.3	93.1	16.3
St. Charles White	4.2	21.2	13.1	13.6	.....	.....	.....	.....	.....	.....	13.0	85.1	14.9
Thomas	.....	.....	.....	.....	11.5	10.1	10.2	5.4	35.7	21.6	15.7	83.1	14.5
Average	9.0	24.3	14.0	17.1	15.4	16.6	14.7	11.5	33.5	19.9	17.6	100.6	17.6

*The percentage ratings in this table and all succeeding tables, except those otherwise indicated, are computed by dividing the average yield of each variety by the average yield **for the same period of years** of all varieties which were grown continuously during the entire period of the test. This method of correcting the yields is described in greater detail on page 9.

Table 5.—Medium planting, all varieties, annual and average yields, Texas Substation No. 2, Troup.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	13.9	21.7	11.0	11.0	19.8	24.2	14.6	16.1	41.1	21.2	19.5	111.4	19.5
Chisholm	11.2	14.7	23.6	11.0	17.1	19.0	14.6	8.8	38.9	19.1	17.8	101.7	17.8
Strawberry	.....	.....	.....	16.2	22.3	14.2	12.6	3.2	43.0	15.5	18.1	98.9	17.3
Ferguson Yellow Dent	7.5	17.3	15.8	12.2	15.3	9.8	18.1	10.0	38.6	22.4	16.7	95.4	16.7
Hastings' Prolific	5.9	17.7	16.1	12.3	16.0	10.0	7.5	8.8	38.4	13.7	14.6	83.4	14.6
Bloody Butcher	3.9	5.5	8.3	7.9	.....	.....	13.5	10.8	43.6	22.0	14.4	81.8	14.3
Oklahoma White Wonder	6.4	12.1	8.3	7.0	11.5	5.6	10.8	8.1	40.2	24.0	13.4	76.6	13.4
Davis' Prolific	.....	14.0	12.1	9.5	16.6	.....	.....	.....	.....	.....	13.0	76.5	13.4
St. Charles White	4.3	17.2	17.5	5.4	.....	.....	.....	.....	.....	.....	11.1	72.6	12.7
Thomas	.....	.....	.....	.....	12.1	3.8	11.5	3.0	29.0	16.3	12.6	66.7	11.7
Virginia White Dent	3.6	18.0	11.2	8.0	.....	.....	.....	.....	.....	.....	10.2	66.7	11.7
Blount's Prolific	.....	.....	.....	.....	12.9	6.3	11.0	6.6	.....	.....	9.2	63.4	11.1
Average	7.1	15.4	13.8	10.0	16.0	11.6	12.7	8.4	39.1	19.3	15.3	87.4	15.3

Table 6.—Late planting, all varieties, annual and average yields, Texas Substation No. 2, Troup.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	13.0	26.4	17.5	17.8	19.9	26.6	17.4	12.0	36.8	22.8	21.0	120.0	21.0
Chisholm	5.6	19.8	26.8	14.9	20.3	26.9	13.8	5.8	34.4	24.1	19.2	109.7	19.2
Ferguson Yellow Dent	5.6	22.9	26.6	18.6	15.5	19.9	15.8	7.0	33.4	16.8	18.2	104.0	18.2
Hastings' Prolific	6.7	17.2	25.6	14.8	17.5	10.8	7.2	8.1	43.1	18.7	17.0	97.1	17.0
Bloody Butcher	6.2	12.7	13.9	15.9	.....	.....	13.2	12.2	37.4	22.5	16.8	95.5	16.7
Strawberry	.....	.....	.....	13.7	13.5	15.9	10.8	5.1	35.0	22.7	16.7	91.3	16.0
Davis Prolific	.....	11.2	15.9	14.6	19.5	.....	.....	.....	.....	.....	15.3	90.0	15.8
Virginia White Dent	10.3	14.5	12.8	14.4	.....	.....	.....	.....	.....	.....	13.0	85.0	14.9
Oklahoma White Wonder	7.5	10.3	16.7	14.6	17.5	16.0	12.3	4.0	34.8	13.2	14.7	84.0	14.7
St. Charles White	6.6	13.9	18.4	6.6	.....	.....	.....	.....	.....	.....	11.4	74.5	13.0
Thomas	.....	.....	.....	.....	13.5	6.8	7.5	4.2	26.1	19.6	12.9	68.3	12.0
Blount's Prolific	.....	.....	.....	.....	15.6	9.9	8.5	3.5	.....	.....	9.4	64.8	11.3
Average	7.7	16.5	19.4	14.6	17.0	16.6	11.8	6.9	35.1	20.0	16.6	94.9	16.6

Table 7.—Average yields of all varieties for three planting dates, Texas Substation No. 2, Troup.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	14.6	25.5	13.7	15.8	18.9	24.4	14.9	15.5	34.6	20.1	19.8	113.2	19.8
Chisholm	9.4	20.3	20.1	13.1	16.9	22.9	15.7	8.7	36.6	21.7	18.5	105.7	18.5
Ferguson Yellow Dent	8.5	22.4	20.0	15.0	15.1	17.5	16.0	12.1	30.6	22.7	18.0	102.9	18.0
Davis' Prolific	.....	19.5	14.6	13.9	18.5	.....	.....	.....	.....	.....	16.6	97.7	17.1
Strawberry	.....	.....	.....	17.1	18.1	14.3	13.3	4.9	37.0	17.1	17.4	95.1	16.6
Bloody Butcher	6.0	11.4	12.1	14.2	.....	.....	15.3	10.9	40.3	23.2	16.7	94.9	16.6
Hastings' Prolific	6.5	20.6	19.2	16.9	15.0	10.7	8.0	8.3	38.4	15.9	16.0	91.4	16.0
Oklahoma White Wonder	6.8	13.1	10.8	12.9	14.7	14.6	12.6	7.8	39.5	18.0	15.1	86.3	15.1
Virginia White Dent	6.6	18.4	14.4	11.8	.....	.....	.....	.....	.....	.....	12.8	83.7	14.6
St. Charles White	5.0	17.4	16.3	8.5	.....	.....	.....	.....	.....	.....	11.8	77.1	13.5
Blount's Prolific	.....	.....	.....	.....	15.3	8.3	12.0	8.0	.....	.....	10.9	75.2	13.2
Thomas	.....	.....	.....	.....	12.4	6.9	9.7	4.2	30.3	19.2	13.8	73.0	12.8
Average	7.9	18.7	15.7	13.9	16.1	15.0	11.8	8.9	35.9	19.7	16.4	93.7	16.4

Table 8.—The effect of time of planting on yields of different varieties, Texas Substation No. 2, Troup, 1918-1927.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Surcropper	18.9	19.5	21.0	3.2	11.1
Hastings' Prolific	16.3	14.6	17.0	—10.4	4.3
Chisholm	18.6	17.8	19.2	— 4.3	3.2
Strawberry	16.5	17.3	16.0	4.8	— 2.9
Ferguson Yellow Dent	19.0	16.7	18.2	—12.1	— 4.2
Bloody Butcher	18.7	14.3	16.7	—23.5	—10.7
St. Charles White	14.9	12.7	13.0	—14.8	—12.8
Virginia White Dent	17.4	11.7	14.9	—32.9	—14.4
Oklahoma White Wonder	17.2	13.4	14.7	—22.1	—14.5
Thomas	14.5	11.7	12.0	—19.3	—17.2
Davis Prolific	22.0	13.4	15.8	—39.1	—29.1
Blount's Prolific	17.0	11.1	11.3	—34.7	—33.5
Average	17.6	15.3	16.6	—13.1	— 5.7

Table 8 shows the effect of late planting on different varieties. The effect varies from a reduction of 33.5 per cent in the case of Blount's Prolific to a gain of 11.1 per cent in the case of Surcropper. In general, the varieties which produced the lowest average yields are those which suffered the greatest reduction from late planting. The most productive varieties suffered the least reduction or actually appeared to benefit from late planting.

Results at Nacogdoches

Substation No. 11 is located in Nacogdoches County, about one-half mile north of Nacogdoches. The soil is classed as Nacogdoches and Ruston fine sandy loam. The average date of the last killing frost in the spring is March 15 for the thirteen-year period, 1914-1926. The average rainfall for the ten-year period of the test was 51.77 inches, with 25.22 inches occurring during the growing season, from March to July, inclusive.

The yields of corn in this region fluctuate widely from year to year, due probably to irregularity in the distribution of rainfall, to large run-off loss, and to the fact that the upland soils, as typified by experimental plats on the station, show the effects of drouth very quickly. Lack of moisture is frequently a limiting factor in corn production, even though the average rainfall for this region would be ample for the corn crop were it favorably distributed and completely retained.

The variety-date test of corn was conducted at Substation No. 11 every year of the ten-year period. Conditions affecting the test during this period have been as follows:

In 1918, all varieties were injured by drouth.

In 1919, the late planting was severely damaged by the corn ear worm.

In 1922, young corn plants in the medium and late plantings were severely damaged by a heavy storm on April 27.

In 1923, all plantings were damaged by heavy rains and low temperatures, the earlier plantings apparently suffering the greatest injury.

In 1925, a pre-seasonal rainfall below normal, followed by a drouth during the growing season, caused a complete failure of some varieties.

The average dates of planting for the ten-year period were March 8, March 23, and April 17, and the stands were 87.4, 85.4, and 85.8 per cent, respectively. The yields of the date checks were 12.9, 12.2, and

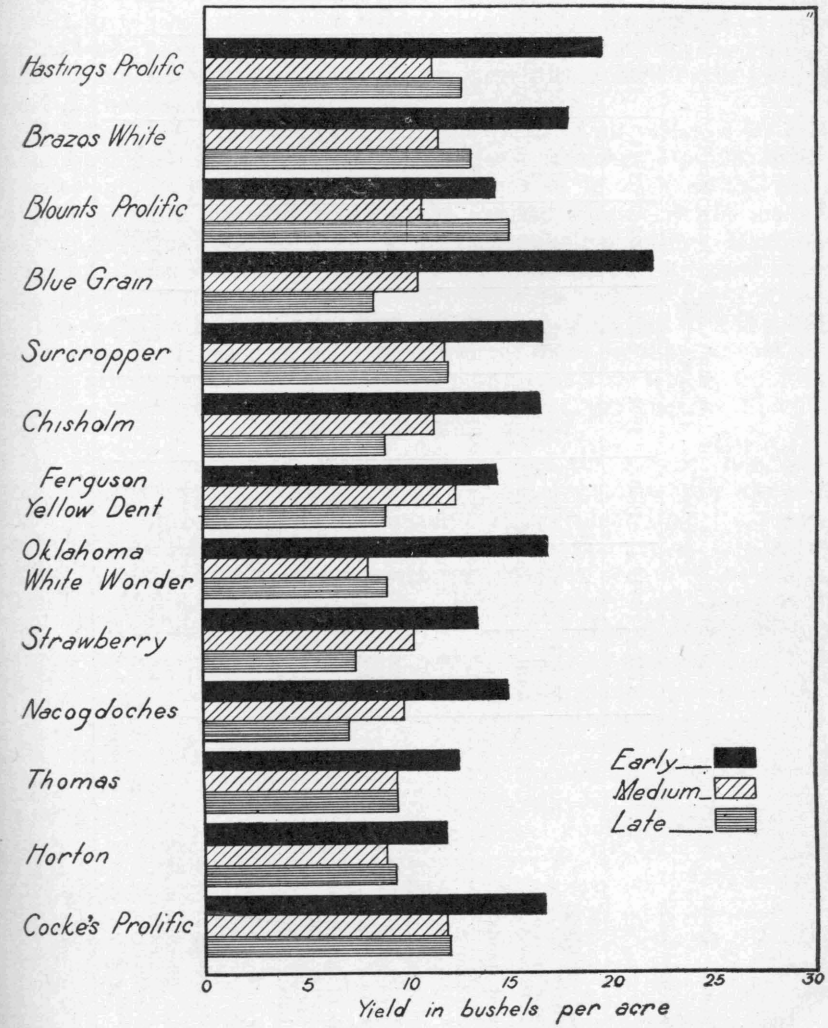

Fig. 4.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 11, Nacogdoches. These results are applicable to the counties in Region No. 2 of the map (Fig. 15).

Table 9.—Dates of planting, per cent stand, and average yields of date checks and varieties in early, medium, and late plantings, Texas Substation No. 11, Nacogdoches.

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average
Dates of planting:											
Early	Mar. 15	Mar. 4	Mar. 5	Mar. 3	Mar. 7	Mar. 5	Mar. 7	Mar. 9	Mar. 9	Mar. 16	Mar. 8
Medium	April 1	Mar. 29	Mar. 20	Mar. 16	Mar. 17	Mar. 22	Mar. 19	Mar. 23	April 1	Mar. 23	Mar. 23
Late	April 17	April 16	April 16	April 23	May 4	May 5	April 8	April 16	April 9	Mar. 30	April 17
Per cent stand:											
Early	95.9	96.2	58.0	91.6	94.0	47.0	86.7	97.4	87.1	90.3	87.4
Medium	84.4	97.3	93.2	89.3	84.7	56.3	82.5	93.5	89.2	83.1	85.4
Late	89.9	72.3	90.3	87.4	90.9	88.1	98.0	70.6	85.8	85.0	85.8
Yields of date checks:											
Early	13.5	27.4	15.5	16.6	9.8	6.4	6.4	0.3	28.4	4.6	12.9
Medium	13.5	20.7	16.4	17.4	10.5	6.3	8.1	0.2	24.0	4.7	12.2
Late	13.8	15.9	18.0	11.9	8.5	7.7	6.4	0.3	26.9	6.9	11.6
Yields of all varieties:											
Early	11.1	28.1	14.6	20.9	15.8	8.5	9.5	4.6	31.8	15.2	16.0
Medium	6.3	21.8	15.9	18.1	6.0	5.5	4.9	0.2	21.3	7.3	10.7
Late	15.8	7.1	9.4	14.8	11.7	9.8	3.6	2.3	20.5	5.1	10.0
Days difference in planting:											
Early-medium	17	25	15	13	10	17	12	14	23	7	15.3
Medium-late	16	18	27	38	48	44	20	24	8	7	25.0
Early-late	33	43	42	51	58	61	32	38	31	14	40.3
Bushels difference in yield:											
Early-medium	—4.8	—6.3	1.3	—2.8	—9.8	—3.0	—4.6	—4.4	—10.5	—7.9	—5.3
Medium-late	9.5	—14.7	—6.5	—3.3	5.7	4.3	—1.3	2.1	—0.8	—2.2	—0.7
Early-late	4.7	—21.0	—5.2	—6.1	—4.1	1.3	—5.9	—2.3	—11.3	—10.1	—6.0

11.6 bushels, compared to 16.0, 10.7, and 10.0 bushels for all varieties. The yields of the date checks and all varieties are not in close agreement, although the yields of the three plantings rank alike in both series.

Considering the average yield of all varieties, the early planting ranked first in seven of the ten years, and ranked second in the remaining three years. The lower ranking of the early planting in 1923 is probably due to the poor stand, which averaged only 47.0 per cent.

The average difference of 15.3 days between the early and the medium plantings is accompanied by a reduction in yield of 5.3 bushels or a loss of .35 bushels per day. The difference of 25.0 days between the medium and the late plantings, however, is associated with a decrease in yield of only .7 bushels, which is practically negligible.

Tables 10, 11, 12, and 13 set forth the yields of all varieties for each planting and their averages for all plantings. Hastings' Prolific, Brazos White, and Surcropper were above the median in each of the three plantings, while Strawberry and Cocke Prolific were below the median in each planting. Considering the averages of all plantings, Hastings' Prolific, Brazos White, and Blount's Prolific are the three highest ranking varieties in the order named.

The variation in reaction to time of planting of all varieties is shown in Table 14. It may be noted that every variety in the test suffered loss in productiveness by the delay in planting. This loss varied from 62.3 per cent in the case of Blue Grain to 5.6 per cent in Blount's Prolific.

It is noted that the varieties which suffered the greatest loss from late planting are also, with one or two exceptions, those which yielded above the average in the early planting. It is evident from the results of these tests that the maximum production in this region can be attained by early planting of late-maturing varieties, such as Blue Grain, Hastings' Prolific, and Brazos White. If these varieties are to be grown, they must be planted early in order to avoid a loss of approximately 40 per cent.

Table 10.—Early planting, all varieties, annual and average yields, Texas Substation No. 11, Nacogdoches.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Blue Grain	.....	.....	16.9	.....	17.7	9.6	12.3	2.8	56.2	16.4	19.2	174.5	22.0
Hastings' Prolific	3.9	36.1	21.2	28.5	22.1	13.4	10.8	1.5	41.4	14.7	19.4	154.0	19.4
Brazos White	7.7	24.6	18.9	28.2	20.2	13.2	6.9	5.6	30.4	22.6	17.8	141.3	17.8
Oklahoma White Wonder	16.9	29.9	20.0	20.6	16.0	5.7	5.4	5.7	29.1	18.2	16.8	133.3	16.8
Surcropper	17.0	26.7	14.8	19.3	13.2	6.9	12.1	7.6	23.9	24.2	16.6	131.7	16.6
Chisholm	14.1	31.4	7.7	20.2	17.2	10.1	14.7	5.8	27.2	15.7	16.4	130.2	16.4
Nacogdoches	.....	.....	.....	18.4	12.3	14.2	8.3	0.3	37.6	4.9	13.7	118.1	14.9
Ferguson Yellow Dent	9.8	30.6	11.8	14.5	16.2	6.3	4.3	5.5	28.9	16.3	14.4	114.3	14.4
Blount's Prolific	11.4	.....	7.9	.....	14.2	4.9	13.3	8.5	.....	.....	10.0	112.4	14.2
Strawberry	.....	.....	14.5	*15.1	13.3	3.4	5.9	5.6	32.8	11.2	12.7	106.7	13.4
Thomas	7.5	17.7	13.4	23.0	11.8	6.1	10.8	1.5	24.3	8.5	12.5	99.2	12.5
Horton	.....	.....	.....	.....	.....	.....	.....	.....	17.9	14.1	16.0	93.6	11.8
Cocke Prolific	11.6	.....	13.2	.....	.....	.....	.....	.....	.....	.....	12.4	84.4	10.6
Average	11.1	28.1	14.6	20.9	15.8	8.5	9.5	4.6	31.8	15.2	16.0	127.0	16.0

*Average of two strains.

Table 11.—Medium planting, all varieties, annual and average yields, Texas Substation No. 11, Nacogdoches.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Ferguson Yellow Dent	8.1	32.4	19.6	20.6	3.8	4.9	5.6	0.9	23.4	5.1	12.4	98.4	12.4
Surcropper	10.4	29.1	14.8	14.5	7.0	6.4	7.8	0.0	22.4	6.8	11.9	94.4	11.9
Brazos White	3.4	26.5	16.5	18.7	9.3	6.4	5.8	0.0	21.5	7.0	11.5	91.3	11.5
Ch sholm	4.2	29.0	20.4	18.3	3.5	6.6	3.8	0.0	18.3	8.5	11.3	89.7	11.3
Hastings' Prolific	2.9	16.2	16.9	15.0	7.8	7.1	4.1	0.4	30.5	10.2	11.1	88.1	11.1
Blount's Prolific	16.7	19.4	11.0	.....	7.7	3.3	6.1	0.0	.....	.....	7.5	84.3	10.6
Blue Grain	.....	.....	.....	.....	5.5	6.7	6.4	0.0	26.8	9.3	9.1	82.7	10.4
Strawberry	.....	29.7	20.0	*16.5	4.4	6.1	2.9	0.0	16.0	11.7	9.7	81.5	10.3
Nacogdoches	.....	.....	.....	22.6	4.8	5.7	4.0	0.6	19.7	5.7	9.0	77.6	9.8
Thomas	6.9	20.6	12.6	23.1	6.5	1.9	3.0	0.3	16.0	3.9	9.5	75.4	9.5
Horton	.....	.....	.....	.....	.....	.....	.....	.....	17.1	7.1	12.1	70.8	8.9
Oklahoma White Wonder	2.5	6.1	15.3	14.0	5.2	5.6	4.6	0.0	23.0	4.6	8.1	64.3	8.1
Cocke Prolific	2.0	9.3	11.7	.....	.....	.....	.....	.....	.....	.....	6.9	46.9	5.9
Average	6.3	21.8	15.9	18.1	6.0	5.5	4.9	0.2	21.3	7.3	10.7	84.9	10.7

*Average of two strains.

Table 12.—Late planting, all varieties, annual and average yields, Texas Substation No. 11, Nacogdoches.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Blount's Prolific	20.6	10.6	8.0	.....	15.0	8.1	3.0	8.6	.....	.....	10.6	119.1	15.0
Brazos White	24.2	9.0	15.5	12.5	18.7	19.9	6.6	0.3	16.0	8.2	13.1	104.0	13.1
Hastings Prolific	21.9	8.0	6.7	15.7	30.4	5.9	2.9	0.8	30.6	2.9	12.6	100.0	12.6
Surcropper	19.7	5.1	11.3	18.0	13.0	12.3	7.7	0.6	24.5	8.1	12.0	95.2	12.0
Thomas	13.3	3.1	6.3	16.7	10.8	11.5	3.7	0.9	24.6	4.2	9.5	75.4	9.5
Horton	.....	.....	.....	.....	.....	.....	.....	.....	18.7	6.6	12.7	74.3	9.4
Oklahoma White Wonder	13.3	6.1	8.8	17.4	11.8	11.6	1.6	0.2	13.5	5.4	9.0	71.4	9.0
Chisholm	14.7	6.1	8.8	16.9	5.3	7.0	2.8	2.7	22.5	2.1	8.9	70.6	8.9
Ferguson Yelow Dent	5.4	8.3	11.6	16.9	2.8	10.6	1.1	4.7	23.7	4.3	8.9	70.6	8.9
Blue Grain	.....	.....	.....	.....	7.1	5.4	3.7	0.0	21.7	5.3	7.2	65.5	8.3
Cocke Prolific	9.3	4.7	8.1	.....	.....	.....	.....	.....	.....	.....	8.7	59.2	7.5
Strawberry	....	10.1	8.8	*14.5	3.9	8.8	2.9	1.7	14.4	4.1	7.0	58.8	7.4
Nacogdoches	.....	.....	.....	4.4	10.3	7.0	3.1	0.0	15.8	4.8	6.5	56.0	7.1
Average	15.8	7.1	9.4	14.8	11.7	9.8	3.6	2.3	20.5	5.1	10.0	79.4	10.0

*Average of two strains.

Table 13.—Average yields of all varieties for three planting dates, Texas Substation No. 11, Nacogdoches.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Hastings' Prolific	9.6	20.1	14.9	19.7	20.1	8.8	5.9	0.9	34.2	9.3	14.4	114.3	14.4
Brazos White	11.8	20.0	17.0	19.8	16.1	13.2	6.4	2.0	22.6	12.6	14.2	112.7	14.2
Blount's Prolific	16.2	15.0	9.0	.....	12.3	5.4	7.5	5.7	.....	.....	9.9	111.2	14.0
Blue Grain	.....	.....	16.9	.....	10.1	7.2	7.5	0.9	34.9	10.3	12.1	110.0	13.9
Surcropper	15.7	20.3	13.6	17.3	11.1	8.5	9.2	2.7	23.6	13.0	13.5	107.1	13.5
Chisholm	11.0	22.2	12.3	18.5	8.7	7.9	7.1	2.8	22.7	8.8	12.2	96.8	12.2
Ferguson Yellow Dent	7.8	23.8	14.3	17.3	7.6	7.3	3.7	3.7	25.3	8.6	11.9	94.4	11.9
Oklahoma White Wonder	10.9	14.0	14.7	17.3	11.0	7.6	3.9	2.0	21.9	9.4	11.3	89.7	11.3
Strawberry	.....	13.3	14.4	15.4	7.2	6.1	3.9	2.4	21.1	9.0	9.9	83.2	10.5
Nacogdoches	.....	.....	.....	15.1	9.1	9.0	5.1	0.3	24.4	5.1	9.7	83.6	10.5
Thomas	9.2	13.8	10.8	20.9	9.7	6.5	5.8	0.9	21.6	5.5	10.5	83.3	10.5
Horton	.....	.....	.....	.....	.....	.....	.....	.....	17.9	9.3	13.6	79.5	10.0
Cocke Prolific	7.6	4.7	11.0	.....	.....	.....	.....	.....	.....	.....	8.7	59.2	7.5

Table 14.—The effect of time of planting on yields of different varieties, Texas Substation No. 11, Nacogdoches, 1918-1927.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Blount's Prolific	14.2	10.6	15.0	—25.4	— 5.6
Horton	11.8	8.9	9.4	—24.6	—20.3
Thomas	12.5	9.5	9.5	—24.0	—24.0
Brazos White	17.8	11.5	13.1	—35.4	—26.4
Surcropper	16.6	11.9	12.0	—28.3	—27.7
Cocke Prolific	10.6	5.9	7.5	—44.3	—29.2
Hastings' Prolific	19.4	11.1	12.6	—48.2	—35.1
Ferguson Yellow Dent	14.4	12.4	8.9	—13.9	—38.2
Strawberry	13.4	10.3	7.4	—23.1	—44.8
Chisholm	16.4	11.3	8.9	—31.1	—45.7
Oklahoma White Wonder	16.8	8.1	9.0	—51.8	—46.4
Nacogdoches	14.9	9.8	7.1	—34.2	—52.3
Blue Grain	22.0	10.4	8.3	—52.7	—62.3
Average	16.0	10.7	10.0	—33.1	—37.5

Results at Beaumont

Texas Substation No. 4 is located in Jefferson County, about six and one-half miles west of Beaumont. The soils are largely Crowley and Lake Charles clay. The precipitation in this region is very high, averaging 55.32 inches for the period 1918-1927. Of this amount, 23.90 inches fell during the growing season. The average date of last killing frost in the spring is February 23 for a period of twenty-nine years. However, the combination of heavy soils and high rainfall frequently renders early planting of crops impossible or results in a complete loss of the crop after planting. The early plantings are also subject to considerable damage by corn-root worms, as is amply illustrated by the summary of seasonal conditions affecting the experiment, as follows:

In 1918, the medium and late plantings were complete failures and no yields were recorded.

In 1919, the early planting was lost as a result of excessive rains and cold weather.

No yields whatever are presented for 1920. The early planting was completely ruined by corn-root worms, the medium planting could not be made because of unfavorable weather, while in the late planting only six to seventeen plants per plat survived and no accurate yield data could be obtained.

In 1921, no test was conducted.

In 1922, all plantings were abandoned because of heavy rains, which destroyed all varieties except a few plants of the Nacogdoches variety.

In 1923, the early planting was submerged by rains and the soil remained too wet to make additional plantings.

In 1924, the early planting was omitted on account of adverse weather conditions; the medium planting was completely destroyed by root worms, while the late planting was severely injured by these insects.

In 1926, results are available only for the medium and late plantings.

As a result of the unfavorable conditions affecting this experiment, it is difficult to measure the effects of time of planting on yield. The available data are presented in Tables 15, 16, and 17. The corrected yields furnish a fairly satisfactory comparison of the varieties included in the test, but the comparison of early, medium, and late plantings tells only the yields that may be expected when all three plantings are matured. It does not take into consideration the fact that it was impossible to plant at an early date or that the early plantings were completely destroyed in five of the ten years during which the test was conducted or attempted.

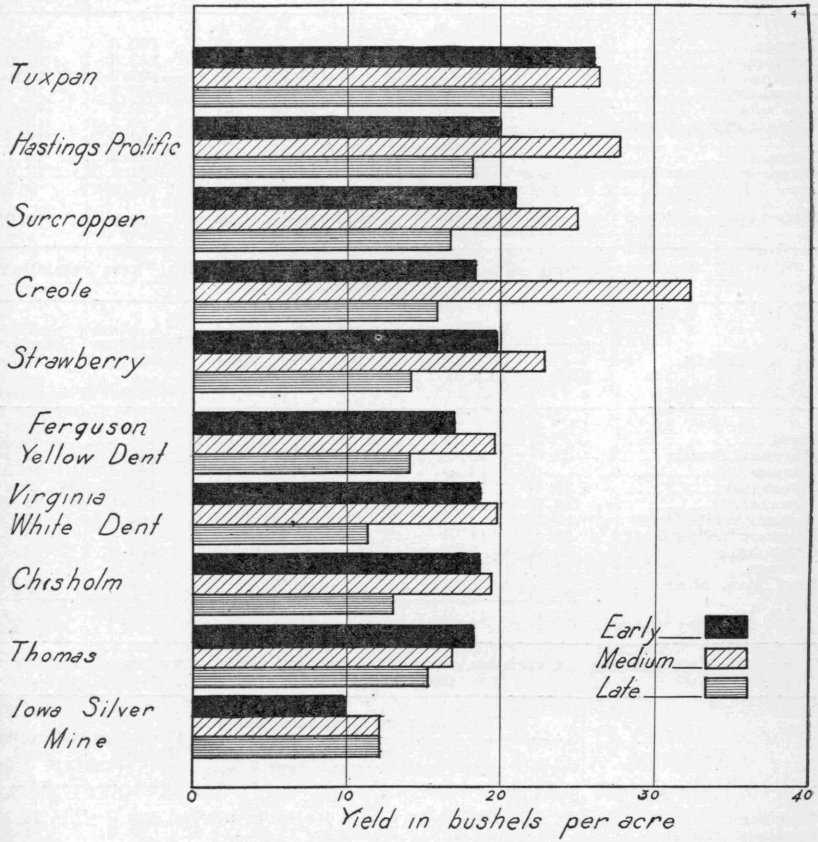

Fig. 5.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 4, Beaumont. These results are applicable to the counties in Region No. 3 of the map (Fig. 15).

Table 18 shows that the three highest yielding varieties were Tuxpan, Hastings' Prolific, and Surcropper. Table 19 indicates that all of the varieties included in the test, except Iowa Silvermine, are subject to a loss from late planting when it is possible to compare them. Three con-

clusions can be drawn from these results: (1) that corn is a very unsatisfactory crop in this region, (2) that early planted corn is more productive than late-planted corn in years when the early plantings are not destroyed by unfavorable weather and insects, (3) that early planting results in a complete loss in approximately half of the seasons, and hence is generally impracticable.

Table 15.—Early planting, all varieties, annual and average yields, Texas Substation No. 4, Beaumont.

Variety	Yield in bushels per acre				Percentage rating	Corrected yield
	1918	1925	1927	Average		
Tuxpan	.....	19.4	19.7	19.6	140.0	26.0
Surcropper	34.0	18.1	19.4	23.8	112.8	21.0
Hastings' Prolific	37.7	12.4	17.7	22.6	107.2	19.9
Strawberry	.....	12.1	17.4	14.8	105.7	19.7
Chisholm	33.2	13.9	16.1	21.1	100.0	18.6
Virginia White Dent	35.2	.....	.....	35.2	99.7	18.5
Creole	34.5	.....	.....	34.5	97.7	18.2
Thomas	35.4	12.5	13.7	20.5	97.2	18.1
Ferguson Yellow Dent	36.4	12.9	14.0	21.2	91.4	17.0
Iowa Silver Mine	.....	11.8	2.8	7.3	52.1	9.7
Average	35.2	14.1	15.1	21.5	101.9	19.0

Table 16.—Medium planting, all varieties, annual and average yields, Texas Substation No. 4, Beaumont.

Variety	Yield in bushels per acre					Percentage rating	Corrected yield
	1919	1925	1926	1927	Average		
Creole	28.2	.....	.....	.....	28.2	174.1	32.4
Hastings' Prolific	33.0	10.2	24.9	27.2	23.8	149.7	27.8
Tuxpan	.....	14.9	22.9	29.6	22.5	142.4	26.5
Surcropper	29.4	14.0	18.8	23.5	21.4	134.6	25.0
Strawberry	24.0	12.1	20.9	21.2	19.6	123.3	22.9
Virginia White Dent	17.3	.....	.....	.....	17.3	106.8	19.9
Ferguson Yellow Dent	14.4	11.7	19.4	21.5	16.8	105.7	19.7
Chisholm	23.0	7.5	14.6	20.8	16.5	103.8	19.3
Thomas	11.5	13.2	15.4	17.5	14.4	90.6	16.9
Iowa Silver Mine	.....	8.3	.....	10.0	9.1	65.0	12.1
Average	22.6	11.5	19.6	21.4	18.8	118.2	22.0

Table 17.—Late planting, all varieties, annual and average yields, Texas Substation No. 4, Beaumont.

Variety	Yield in bushels per acre						Percentage rating	Corrected yield
	1919	1924	1925	1926	1927	Average		
Tuxpan	.....	20.7	14.6	24.1	15.4	18.7	124.7	23.2
Hastings' Prolific	10.4	15.8	9.9	22.9	15.5	14.9	98.0	18.2
Surcropper	13.8	12.7	9.0	22.0	11.1	13.7	90.1	16.8
Creole	13.8	.....	.....	.....	.....	13.8	85.2	15.8
Thomas	11.5	11.1	9.7	18.0	11.9	12.4	81.6	15.2
Strawberry	8.1	16.0	7.2	18.6	7.9	11.6	76.3	14.2
Ferguson Yellow Dent	8.1	12.1	5.9	19.7	11.5	11.5	75.6	14.1
Chisholm	7.4	11.6	5.3	17.8	11.1	10.6	69.7	13.0
Virginia White Dent	9.8	.....	.....	.....	.....	9.8	60.5	11.3
Iowa Silver Mine	.....	1.3	5.8	.....	10.1	5.7	42.2	7.8
Average	10.4	12.7	8.4	20.4	11.8	12.7	83.6	15.5

Table 18.—Average yields of all varieties for three planting dates, Texas Substation No. 4, Beaumont.

Variety	Yield in bushels per acre							Percentage rating	Corrected yield
	1918	1919	1924	1925	1926	1927	Average		
Tuxpan	.....	.....	20.7	16.3	23.5	21 6	20.5	136.7	25.4
Hastings' Prolific	37.7	21.7	15.8	10.8	23.9	20.1	21.7	116.6	21.7
Shrcropper	34.0	21.6	12.7	13.7	20.4	18.0	20.1	108.1	20.1
Creole	34.5	21.0	.....	.....	.....	.....	27.7	107.8	20.0
Strawberry	.....	16.0	16.0	10.5	19.8	15.5	15.6	102.6	19.1
Ferguson Yellow Dent	36.4	11.2	12.1	10.2	19.6	15.8	17.6	94.6	17.6
Virginia White Dent	35.2	13.6	.....	.....	.....	.....	24.4	94.9	17.6
Chisholm	33.2	15.2	11.6	8.9	16.2	16.0	16.8	90.3	16.8
Thomas	35.4	11.5	11.1	11.8	16.7	14.4	16.8	90.3	16.8
Iowa Silver Mine	.....	.....	1.3	8.6	7.6	.....	5.8	43.0	8.0

Table 19.—The effect of time of planting on yields of different varieties, Texas Substation No. 4, Beaumont.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Iowa Silver Mine	9.7	12.1	12.1	24.6	24.6
Hastings' Prolific	19.9	27.8	18.2	39.7	— 8.5
Tuxpan	26.0	26.5	23.2	1.9	—10.8
Creole	18.2	32.4	15.8	78.0	—13.2
Thomas	18.1	16.8	15.2	— 6.6	—16.0
Ferguson Yellow Dent	17.0	19.7	14.1	15.9	—17.1
Surcropper	21.0	25.0	16.8	19.0	—20.0
Strawberry	19.7	22.9	14.2	16.2	—27.9
Chisholm	18.6	19.3	13.0	3.8	—30.1
Virginia White Dent	18.5	19.9	11.3	7.6	—38.9
Average	19.0	22.0	15.5	15.8	—18.4

Results at College Station

The Main Station Farm is located at College Station, in Brazos County. The soil, classed as Lufkin fine sandy loam, is typical of a rather extensive region and is characterized by a light-gray fine sandy loam, underlain with a highly impervious subsoil. The growing season begins rather early, the average date of last killing frost in the spring for a period of twenty-three years falling on March 12. The precipitation is fairly high, averaging 42.82 inches annually for the ten-year period, 1918-1927, of which 19.12 inches fell during the growing season, from March to July, inclusive. Because of the gradual decline in rainfall as the season advances, and the shallow root system resulting from the almost impervious subsoil, the corn crop frequently suffers from drouth and is also subject to severe lodging during storms.

Two years' results are omitted from the tables setting forth the results of tests at College Station. In 1923, the early and medium plantings failed to germinate and were replanted at the same time as the late planting, so that the test was merely a comparison of varieties. In 1925,

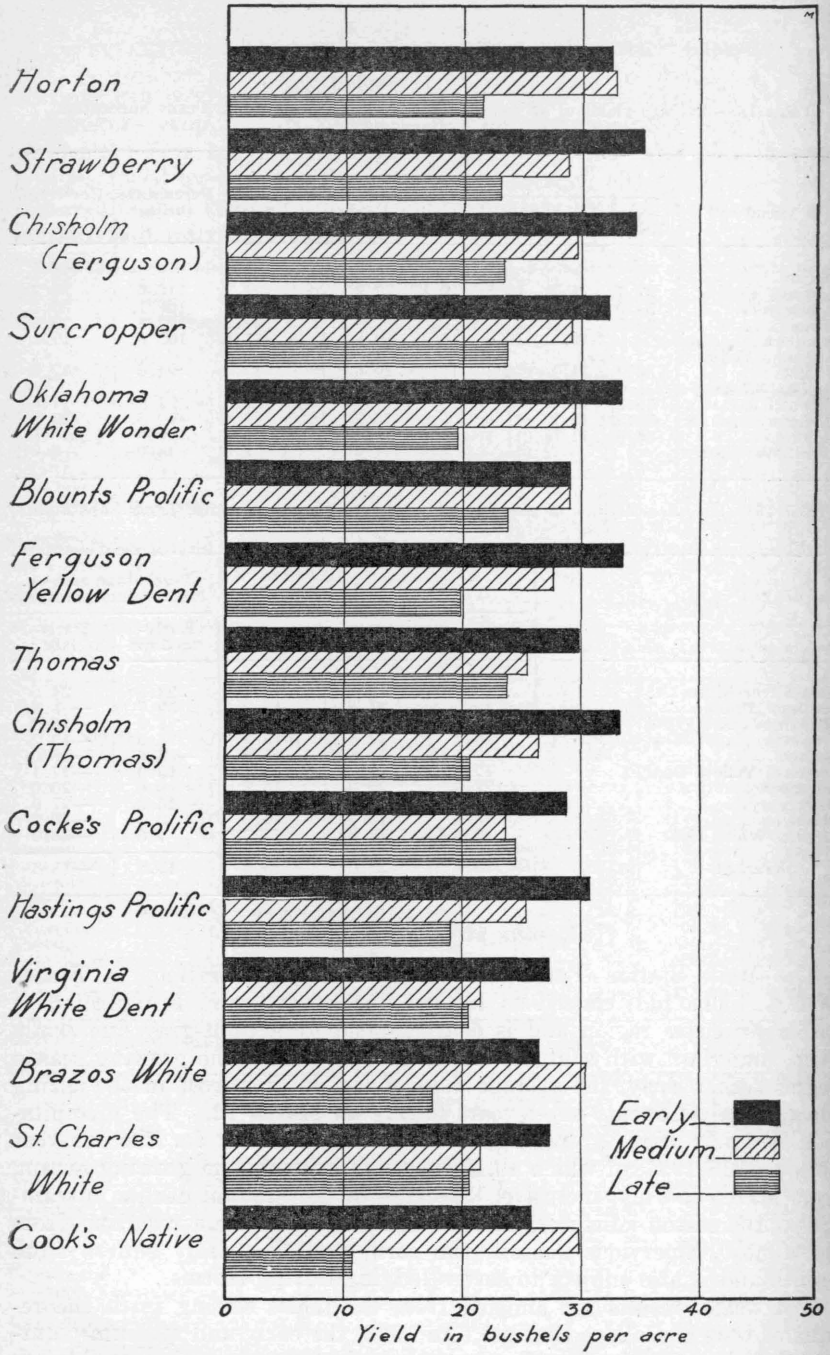

Fig. 6.—The average yields of varieties in early, medium, and late plantings at the Main Station Farm, College Station. It should be noted that this chart is based on the results exclusive of 1926, while the averages in Table 24 include 1926. Hence the ranking of the varieties does not follow Table 24. These results are applicable to the counties in Region No. 4 of the map (Fig. 15).

all varieties in all plantings failed to produce grain because of severe drouth.

Table 20 shows that the average dates of planting for the eight years included in this report were March 7, March 20, and April 3. The early planting ranked first in yield in seven of the eight years, while the medium planting ranked first in the remaining years.

The average difference of thirteen days between the early and the medium plantings was accompanied by a loss of 4.8 bushels or an average daily loss of .37 bushels. The average difference of fourteen days between the medium and the late plantings was associated with a loss of 5.9 bushels per acre, an average daily loss of .43 bushels.

Tables 21, 22, and 23 show the yields of all varieties for three dates of planting. Strawberry, Chisholm, Horton, and Surcropper ranked above the median in all three plantings and are probably the best varieties for this region. St. Charles White and Nacogdoches were below the median in all plantings and appear to be of little value for this section. The results indicate that this section is adapted primarily to mid-season varieties characterized by fairly heavy stalks. Prolific varieties and late, tall-growing varieties appear to be unadapted.

Table 25 shows the reaction of varieties to late planting. All sixteen varieties yielded less in the late planting than in the early, and the loss varied from 10.2 per cent to 58.5 per cent. Chisholm, Horton, Strawberry, and Surcropper, which appear to be the best varieties, all show an intermediate loss as the result of late planting, and if these varieties are to be grown a loss of approximately 30 per cent can be avoided by early planting.

Table 20.—Dates of Planting, per cent stand, and average yields in bushels per acre of date checks and all varieties in early, medium, and late planting, Main Station Farm, College Station.

	1918	1919	1920	1921	1922	1924	1926	1927	8-year average
Dates of planting:									
Early	Mar. 8	Mar. 11	Mar. 5	Mar. 5	Mar. 11	Mar. 22	Feb. 26	Feb. 25	Mar. 7
Medium	Mar. 16	Mar. 20	*Mar. 18	Mar. 15	Mar. 21	Mar. 31	Mar. 16	Mar. 15	Mar. 20
Late	April 1	Mar. 29	Mar. 26	Mar. 25	Mar. 31	April 25	April 6	April 5	April 3
Per cent stand:									
Early	98.9	104.3	96.9	95.4	100.1	98.1	88.6	78.7	95.1
Medium	97.9	105.7	94.9	88.5	95.0	99.0	85.7	97.7	95.6
Late	98.0	98.0	.....	87.8	103.7	97.5	63.9	90.8	91.4
Yields of date checks:									
Early	24.1	48.8	41.2	36.7	26.7	21.9	.....	32.9	29.0
Medium	16.2	45.1	38.5	30.0	15.7	34.7	.....	26.5	25.8
Late	24.9	37.6	26.7	26.6	22.8	28.0	.....	24.8	23.9
Yields of all varieties:									
Early	21.3	53.0	47.4	39.1	28.2	24.8	20.5	32.0	33.3
Medium	14.9	52.2	30.8	28.0	24.2	33.2	20.0	25.9	28.5
Late	7.3	42.9	28.9	28.5	26.9	13.3	12.4	20.2	22.6
Days difference in planting:									
Early-medium	8	9	13	10	10	9	18	18	13
Medium-late	16	9	8	10	10	25	21	21	14
Early-late	24	18	21	20	20	34	39	39	27
Bushels difference in yield:									
Early-medium	— 6.4	— 0.8	—16.6	—11.1	— 4.0	8.4	— 0.5	— 6.1	— 4.8
Medium-late	— 7.6	— 9.3	—1.9	0.5	2.7	—19.9	— 7.6	— 5.7	— 5.9
Early-late	—14.0	—10.1	—18.5	—10.6	— 1.3	—11.5	— 8.1	—11.8	—10.7

*Average several dates.

Table 21.—Early planting of all varieties, annual and average yields, Main Station Farm, College Station.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1924	1926	1927		
Strawberry	.....	65.8	53.9	*41.5	33.5	27.8	24.5	25.5	126.7	35.1
Chisholm (Ferguson)	28.0	53.0	50.3	38.7	29.9	30.9	.....	35.8	124.5	34.5
Ferguson Yellow Dent	22.6	55.0	43.4	41.4	30.1	32.6	.....	32.4	120.3	33.3
Oklahoma White Wonder	.....	.....	.....	.....	.....	.....	27.1	37.3	119.9	33.2
Chisholm (Thomas)	22.0	59.0	.....	35.9	.....	.....	.....	.....	119.6	33.1
Horton	.....	.....	.....	.....	39.7	18.8	.....	37.3	117.3	32.5
Surcropper	29.9	54.1	39.7	35.0	24.7	31.8	.....	33.9	116.3	32.2
Hastings' Prolific	14.9	52.7	42.4	45.4	26.5	17.4	.....	37.8	110.8	30.7
Thomas	21.0	49.3	39.3	*35.7	32.5	19.6	.....	33.9	107.8	29.9
Blount's Prolific	25.5	48.6	.....	.....	27.3	28.5	.....	.....	104.7	29.0
Cocke's Prolific	.....	52.1	.....	.....	.....	.....	.....	.....	104.2	28.9
St. Charles White	10.2	44.0	57.7	.....	12.3	.....	.....	.....	98.4	27.3
Brazos White	.....	.....	.....	.....	.....	22.6	.....	30.4	95.0	26.3
Cook's Native	.....	.....	.....	.....	.....	22.9	.....	.....	93.1	25.8
Virginia White Dent	17.6	49.0	.....	.....	25.3	19.5	15.2	23.1	88.8	24.6
Nacogdoches	.....	.....	.....	.....	.....	.....	15.1	25.0	80.4	22.3
Average	21.3	53.0	47.4	39.1	28.2	24.8	20.5	32.0	104.2	28.9

*Average of two strains.

Table 22.—Medium planting all varieties, annual and average yields, Main Station Farm, College Station.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1924	1926	1927		
Horton	.....	.....	.....	.....	35.9	33.0	.....	28.0	118.8	32.9
Brazos White	.....	.....	.....	.....	.....	35.0	.....	25.8	109.0	30.2
Cook's Native	.....	.....	.....	.....	.....	26.5	.....	.....	107.7	29.8
Chisholm (Ferguson)	20.2	54.9	26.8	30.0	26.6	42.0	.....	28.5	106.9	29.6
Oklahoma White Wonder	.....	.....	.....	.....	.....	.....	.....	33.1	106.4	29.5
Surcropper	19.3	48.7	44.7	30.6	18.0	36.1	.....	28.0	105.2	29.1
Blount's Prolific	19.3	48.8	29.4	.....	23.9	39.5	.....	.....	104.7	29.0
Strawberry	.....	58.4	36.4	*29.0	25.1	32.5	20.0	22.0	103.9	28.8
Ferguson Yellow Dent	13.7	61.1	34.0	23.7	17.7	38.1	.....	26.8	100.3	27.8
Virginia White Dent	15.1	47.0	31.6	.....	28.4	28.3	.....	24.6	98.0	27.1
Chisholm (Thomas)	13.0	52.8	29.1	30.6	.....	.....	.....	.....	94.9	26.3
Thomas	14.6	47.0	26.1	*27.2	26.3	29.9	.....	25.3	91.8	25.4
Hastings' Prolific	7.9	63.1	29.9	24.9	24.2	24.6	.....	19.9	90.8	25.2
Cocke's Prolific	.....	47.3	25.2	.....	.....	.....	.....	.....	85.6	23.7
St. Charles White	10.7	46.0	25.7	.....	15.5	.....	.....	.....	77.5	21.5
Nacogdoches	.....	.....	.....	.....	.....	.....	.....	2 .6	72.7	20.1
Average	14.9	52.2	30.8	28.0	24.2	33.2	20.0	25.9	103.6	28.7

*Average of two strains.

Table 23.—Late planting of all varieties, annual and average yields, Main Station Farm, College Station.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1924	1926	1927		
Cocke's Prolific	3.9	46.7	28.3						88.4	24.5
Thomas	6.1	41.1	44.8	27.5	29.6	8.7		26.0	85.9	23.8
Blount's Prolific		45.0	25.4		27.9	17.6			85.8	23.8
Surcropper	13.3	39.2	25.2	30.3	30.3	22.3		22.6	85.6	23.7
Chisholm (Ferguson)	14.8	44.9	30.3	26.8	29.4	13.5		21.1	84.3	23.4
Strawberry		47.6	39.1	*29.1	24.0	11.5	12.4	14.6	83.1	23.0
Virginia White Dent		42.4	31.4		26.2	16.2		20.5	79.9	22.1
Horton					27.5	13.5		22.6	77.9	21.6
Chisholm (Thomas)	5.4	43.2	25.1	24.6					74.3	20.6
St. Charles White	4.3	34.6	22.8		31.8				74.1	20.5
Ferguson Yellow Dent	8.7	39.6	25.2	31.3	18.2	15.7		15.5	71.9	19.9
Oklahoma White Wonder								22.1	71.1	19.7
Hastings' Prolific	2.0	47.1	20.2	29.8	24.3	5.7		18.2	68.6	19.0
Brazos White						12.4		22.1	62.0	17.2
Nacogdoches								17.2	55.3	15.3
Cook's Native						9.5			38.6	10.7
Average	7.3	42.9	28.9	28.5	26.9	13.3	12.4	20.2	78.5	21.7

*Average of two strains.

Table 24.—Average yields of all varieties for three planting dates, Main Station Farm, College Station.

Variety	Yield in bushels per acre										Percentage rating	Corrected yields
	1918	1919	1920	1921	1922	1923	1924	1926	1927	Average		
Surcropper	20.8	47.3	36.5	32.0	24.3	24.0	30.1	23.4	28.2	29.6	106.9	29.6
Horton					34.4	17.8	21.8	20.1	29.3	24.7	106.0	29.4
Oklahoma White Wonder								18.6	30.8	24.7	103.8	28.8
Strawberry		57.3	43.1	33.2	27.5	16.9	23.9	19.0	20.7	30.2	103.8	28.8
Ferguson Yellow Dent	15.0	51.9	34.2	32.1	22.0	22.0	28.8	20.2	24.9	27.9	100.8	27.9
Chisholm (Ferguson)	21.0	50.9	35.8	31.8	28.6	15.1	28.8	5.8	28.5	27.4	98.9	27.4
Blount's Prolific	22.4	44.1	30.7		26.4	8.6	28.5			26.8	95.0	26.3
Chisholm (Thomas)	13.5	51.6	30.0	30.4						31.4	94.9	26.3
Thomas	13.9	45.8	36.7	30.1	29.5	11.2	19.4	20.1	28.4	26.1	94.2	26.0
Brazos White							23.3	14.6	26.1	21.3	88.4	24.5
Hastings' Prolific	8.3	54.3	30.8	33.4	25.0	9.2	15.9	12.9	25.3	23.9	86.3	23.9
Virginia White Dent	10.9	46.1	33.3		26.6	11.0	21.3	14.5	22.7	23.3	86.0	23.8
Cook's Native						16.1	19.6			17.8	83.2	23.0
St. Charles White	8.4	41.5	35.4		19.9					26.3	83.2	23.0
Cocke's Prolific	3.9	48.7	30.1							27.6	82.4	22.8
Nacogdoches								9.6	21.6	15.6	65.6	18.2

Table 25.—The effect of planting on yields of different varieties, Main Station Farm, College Station, 1918-1927.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Virginia White Dent	27.3	21.5	20.5	10.2	—10.2
Cocke's Prolific	28.9	23.7	24.5	—18.0	—15.2
Blount's Prolific	29.0	29.0	23.8	0.0	—17.9
Thomas	29.9	25.4	23.8	—15.0	—20.4
St. Charles White	27.3	21.5	20.5	—21.3	—24.9
Surcropper	32.2	29.1	23.7	— 9.6	—26.4
Nacogdoches	22.3	20.1	15.3	— 9.9	—31.4
Chisholm (Ferguson)	34.5	29.6	23.4	—14.2	—32.2
Horton	32.5	32.9	21.6	1.2	—33.5
Strawberry	35.1	28.8	23.0	—17.9	—34.5
Brazos White	26.3	30.2	17.2	14.8	—34.6
Chisholm (Thomas)	33.1	26.3	20.6	—20.6	—37.8
Hastings' Prolific	30.7	25.2	19.0	—17.9	—38.1
Ferguson Yellow Dent	33.3	27.8	19.9	—16.5	—40.2
Oklahoma White Wonder	33.2	29.5	19.7	—11.2	—40.7
Cook's Native	25.8	29.8	10.7	15.5	—58.5
Average	28.9	28.7	21.7	— .7	—24.9

Results at Angleton

Substation No. 3 is located in Brazoria County, about three and one-half miles northeast of Angleton. The soil, classed as Lake Charles and Edna clay and silt loam, is, in general, a heavy dark-gray to black clay, underlain by a subsoil of gummy clay, which varies from yellow to black in color. The region surrounding Angleton is extremely flat, with poor drainage. Experimental plats on the station, however, are fairly well drained, being in proximity to a large drainage system.

The rainfall at Angleton is comparatively high, averaging 47.99 inches annually for the ten-year period 1918-1927. The average monthly distribution of the rainfall during this period would indicate that from the standpoint of rainfall alone the region is extremely well adapted to corn, the precipitation in June and July being rather high. In some regions corn produces maximum yields in seasons when the moisture supply is rather limited during the earlier development of the plants followed by abundant moisture during and after blooming. From this standpoint, conditions at Angleton would appear to be ideal. At first glance it would appear that the necessity of managing the crop to "beat the drouth" is not so urgent as in other regions of the State. Nevertheless, the corn crop in this region frequently suffers from drouth as the result of unfavorable distribution of rainfall.

Offsetting the abundant average moisture supply during the growing season are the facts that high rainfall and poor drainage sometimes delay farming operations and frequently make it impossible to plant corn at the optimum time or to cultivate at the most favorable periods.

Another unfavorable factor is the prevalence of weevils, which frequently cause considerable damage to standing corn. The damage from this source appears to be unusually high in this region and suggests the

necessity of growing varieties with long heavy shucks, which serve as protection against insect damage.

All three plantings were made every year at Angleton during the

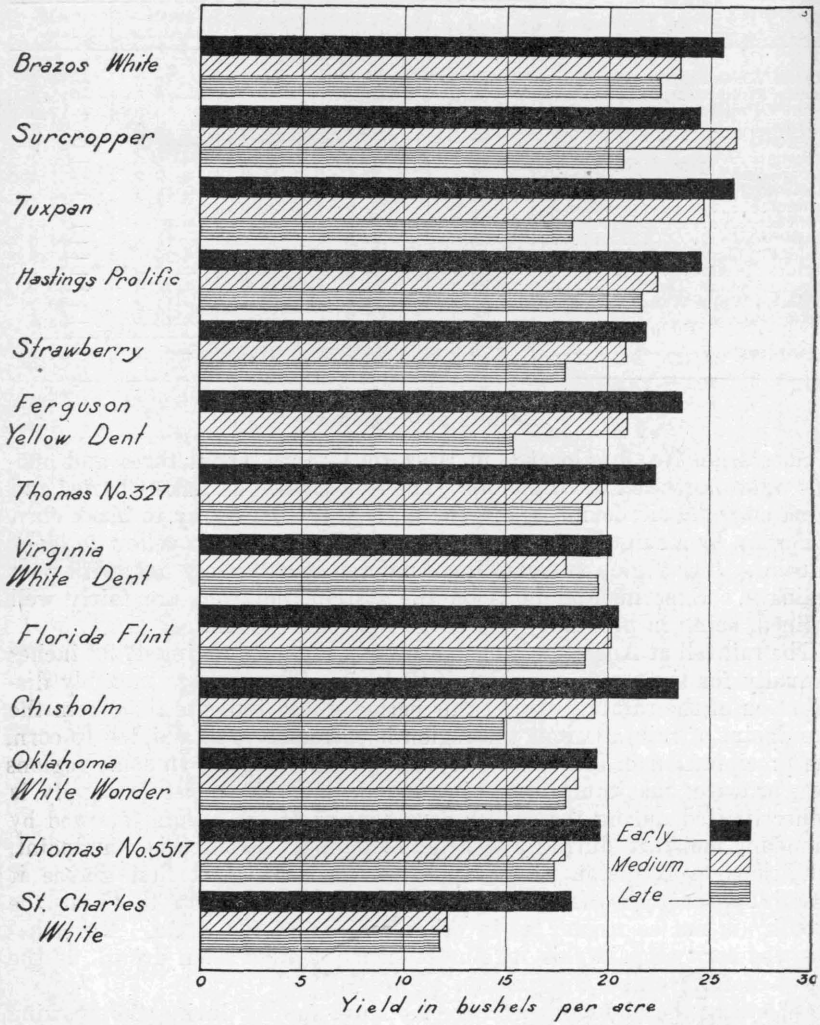

Fig. 7.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 3, Angleton. These results are applicable to the counties in Region No. 5 of the map (Fig. 15).

ten-year period, although there is considerable variation in the dates at which these were made.

In 1924, four of the varieties failed to produce a satisfactory stand

in the first planting of April 18 and were replanted on May 23. The yields of the medium and late plantings of these varieties have been omitted in determining the effect of time of planting on yield of different varieties, but have been included in comparing the average yields of the varieties for all plantings.

Yields are reported in bushels of shelled corn per acre, except those of 1921, which represent yields in bushels of ear corn per acre.

Table 26 shows the dates of planting for every year in the test and a comparison of the annual and average yields of the date checks and other varieties. The average dates of planting were March 23, April 16, and May 1. The date checks produced 23.2, 22.5, and 19.4 bushels, respectively, in the three plantings, while the average for all varieties was 23.0, 20.8, and 18.2, respectively. These averages agree fairly closely and indicate that soil variability is not a disturbing factor when the entire ten-year period is considered.

The average difference of 24.5 days between the early and medium plantings was accompanied by an average reduction in yield of 2.1 bushels per acre or .09 bushels for each day's delay in planting. The average difference of 14.5 days between the medium and late plantings is associated with a further reduction in yield of 2.6 bushels or an average loss of .18 bushels per day, a loss twice as great as the loss between the early and medium plantings.

Table 26 shows that the early planting made the highest yield in seven of the ten years, while it ranked third in the remaining three years, 1921, 1925, and 1927. Two of these years, 1921 and 1927, were characterized by the lowest May rainfall of the ten-year period, and it is probable that the earlier plantings were more severely injured by lack of moisture than the later ones. In 1925 the average stand of the early planting was low, and this probably accounts for the low yield of the early planting. On the whole, however, there can be no doubt that over a period of years early plantings produce the higher yields in this region and that the reduction in yield due to late planting becomes more pronounced as the season advances.

The yields for all varieties for each planting and the average yields for all plantings are shown in Tables 27, 28, 29, and 30. Brazos White, Surcropper, Hastings' Prolific, and Tuxpan were among the most productive varieties in all plantings and are probably the best varieties for general planting in this region. St. Charles White, Oklahoma White Wonder, and Thomas 5517 were below the median in all three plantings and appear to be unadapted to the region. The other varieties included were low in some plantings and high in others and may possess merit under certain conditions.

Table 31 shows that only one variety, Surcropper, made a higher yield in the medium planting than in the early, while in the late planting all varieties yielded less than in the early planting. There is considerable variation, however, in the reaction of different varieties to the effects of

late planting. Chisholm, Ferguson Yellow Dent, and St. Charles White suffered most, with a reduction of 36.8, 35.2, and 35.2 per cent, while Oklahoma White Wonder and Florida Flint were least affected, with a reduction of 7.7 and 8.3 per cent, respectively. Since both of these varieties were also low in the early planting, however, their ability to produce proportionately higher yields in the late plantings does not bring them to first rank in the late planting. Of the four varieties which gave the highest average yield in the early planting, Tuxpan suffered the greatest reduction, as a result of late planting, while Hastings' Prolific, Brazos White, and Surcropper were about equal, with a reduction of 11.8, 12.1, and 15.5 per cent, respectively. Since the Tuxpan variety is very generally grown in this region because of its heavy shucks, which serves as a protection against weevil damage, and as this variety is reduced in yield more than the average by late planting, it would appear that early planting is particularly important in this region, in spite of the fact that rainfall is not a limiting factor to the extent that it is in other regions.

Table 26.—Dates of planting and average yields in bushels per acre of date checks and all varieties in early, medium, and late plantings, Texas Substation No. 3, Angleton.

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average
Dates of planting:											
Early	Mar. 11	Mar. 12	Mar. 2	April 15	Mar. 10	Mar. 7	April 18	Mar. 26	April 25	Mar. 10	Mar. 23
Medium	Mar. 26	April 9	Mar. 30	April 25	April 25	April 10	May 20	April 24	May 3	Mar. 25	April 16
Late	April 10	April 19	April 13	May 9	May 12	May 10	May 23	May 7	May 18	April 8	May 1
Per cent stand:											
Early	81.7	75.1	72.8	86.5	98.2	79.1	89.9	83.9	108.1	99.2	87.5
Medium	80.4	77.4	77.2	87.2	87.3	85.4	96.4	108.9	89.0	99.2	88.8
Late	77.0	56.8	80.8	85.3	87.7	78.3	85.9	103.5	58.7	97.3	81.1
Yields of date checks:											
Early	14.2	25.3	42.8	7.7	22.3	18.0	17.3	41.0	14.7	28.7	23.2
Medium	13.9	32.2	39.5	12.9	14.7	21.9	11.3	36.0	12.5	29.9	22.5
Late	12.6	27.4	36.0	11.5	8.1	7.9	10.0	32.8	15.5	32.2	19.4
Yields of all varieties:											
Early	19.9	33.6	45.9	3.1	32.7	19.3	12.7	23.1	18.8	19.8	22.9
Medium	12.7	28.1	41.3	8.6	24.5	18.5	8.2	33.3	12.8	19.8	20.8
Late	14.4	16.7	39.8	6.9	4.4	13.1	7.2	34.7	15.9	28.9	18.2
Days difference in planting:											
Early-medium	15	28	28	10	46	34	32	29	8	15	24.5
Medium-late	15	10	14	14	17	30	3	13	15	14	14.5
Early-late	30	38	42	24	63	64	35	42	23	29	39.0
Bushels difference in yield:											
Early-medium	—7.2	— 5.5	—4.6	5.5	— 8.2	—0.8	—4.5	10.2	—6.0	0.0	—2.1
Medium-late	1.7	—11.4	—1.5	—1.7	—20.1	—5.4	—1.0	1.4	3.1	9.1	—2.6
Early-late	—5.5	—16.9	—6.1	3.8	—28.3	—6.2	—5.5	11.6	—2.9	9.1	—4.7

Table 27.—Early planting, all varieties, annual and average yields, Texas Substation No. 3, Angleton.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Tuxpan	22.4	42.5	44.3	4.5	29.4	22.6	17.3	30.1	19.2	28.8	26.1	122.0	26.1
Brazos White	.....	.....	.....	.....	36.0	22.0	14.4	25.8	22.7	22.2	23.9	119.5	25.6
Hastings' Prolific	8.9	43.0	46.3	7.6	32.0	20.5	15.5	30.8	21.8	18.7	24.5	114.5	24.5
Surcropper	30.7	28.1	44.7	1.8	32.6	23.4	.....	25.7	22.0	25.7	26.1	114.5	24.5
Ferguson Yellow Dent	26.2	35.8	52.3	1.7	31.3	22.7	.....	21.2	16.9	18.2	25.1	110.1	23.6
Chisholm	27.3	33.1	50.4	2.4	30.8	20.1	.....	21.9	17.8	20.3	24.9	109.2	23.4
Thomas 327	18.3	37.6	44.7	3.1	35.7	15.9	6.3	23.3	19.4	18.5	22.3	104.2	22.3
Strawberry	.....	.....	53.3	2.1	30.8	20.1	.....	18.8	17.3	20.5	23.3	101.7	21.8
Florida Flint	5.7	34.7	42.9	.....	.....	.....	.....	.....	.....	.....	27.8	95.5	20.5
Virginia White Dent	.....	26.7	.....	.....	33.4	14.4	11.2	21.2	16.8	14.4	19.7	93.8	20.1
Thomas 5517	.....	.....	.....	1.7	38.0	14.0	13.3	16.0	15.9	16.8	16.5	91.2	19.5
Oklahoma White Wonder	.....	.....	.....	.....	30.6	16.3	11.1	19.6	17.4	13.4	18.1	90.5	19.4
St. Charles White	19.4	20.7	34.4	.....	.....	.....	.....	.....	.....	.....	24.8	85.2	18.2
Average	19.9	33.6	45.9	3.1	32.7	19.3	12.7	23.1	18.8	19.8	22.9	107.0	22.9

Table 28.—Medium planting, all varieties, annual and average yields, Texas Substation No. 3, Angleton.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	29.8	28.3	42.8	10.7	29.4	21.2	12.9	43.3	18.8	26.7	27.9	122.4	26.2
Tuxpan	14.0	32.5	41.0	15.0	16.9	25.1	11.8	47.6	11.3	32.2	24.7	115.4	24.7
Brazos White	.....	.....	.....	.....	31.4	21.0	10.9	34.6	15.8	19.2	22.2	110.0	23.5
Hastings' Prolific	8.2	33.4	37.3	9.0	31.0	21.8	7.0	30.9	15.1	29.3	22.3	104.2	22.3
Ferguson Yellow Dent	12.7	27.1	49.1	5.0	21.3	17.2	6.4	35.3	15.0	18.2	22.3	97.8	20.9
Strawberry	.....	.....	47.9	8.3	21.7	14.7	6.1	37.8	10.7	15.2	22.3	97.4	20.8
Florida Flint	6.9	34.9	40.2	.....	.....	.....	.....	.....	.....	.....	27.3	93.8	20.1
Thomas 327	9.6	24.0	40.0	8.1	25.1	20.4	7.1	32.3	12.3	18.2	19.7	92.1	19.7
Chisholm	19.0	25.8	44.6	7.2	22.4	14.1	6.2	21.8	13.8	17.0	20.6	90.4	19.3
Oklahoma White Wonder	.....	.....	.....	.....	24.8	16.3	9.8	26.7	11.2	15.0	17.3	86.5	18.5
Virginia White Dent	.....	25.6	43.6	.....	22.2	16.5	6.2	23.0	9.8	11.2	19.8	83.5	17.9
Thomas 5517	.....	.....	.....	5.3	22.9	15.0	5.6	33.2	6.5	15.5	14.9	83.3	17.8
St. Charles White	1.7	21.6	26.0	.....	.....	.....	.....	.....	.....	.....	16.4	56.4	12.1
Average	12.7	28.1	41.3	8.6	24.5	18.5	8.2	33.3	12.8	19.8	20.8	95.8	20.8

Table 29.—Late planting, all varieties, annual and average yields, Texas Substation No. 3, Angleton.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Brazos White	.....	.....	.....	.....	6.1	23.3	7.1	35.7	23.9	29.9	21.0	105.0	22.5
Hastings' Prolific	14.8	22.0	46.3	12.7	5.5	14.9	7.1	33.5	17.8	41.5	21.6	100.9	21.6
Surcropper	21.9	16.9	39.2	3.9	7.3	18.2	12.9	43.1	12.9	35.5	22.1	96.9	20.7
Virginia White Dent	.....	14.6	55.9	.....	4.3	15.6	5.7	32.8	18.2	25.8	21.6	91.1	19.5
Florida Flint	15.3	18.5	42.9	.....	.....	.....	.....	.....	.....	.....	25.6	88.0	18.8
Thomas 327	14.4	18.3	39.5	7.6	6.3	13.9	7.1	33.2	18.5	27.9	18.7	87.4	18.7
Tuxpan	10.9	21.2	30.7	13.6	4.8	9.0	7.6	31.0	17.2	36.1	18.2	85.0	18.2
Oklahoma White Wonder	.....	.....	.....	.....	3.6	15.6	6.5	29.3	18.1	27.1	16.7	83.5	17.9
Strawberry	.....	.....	42.4	4.0	2.4	7.3	5.3	41.4	13.6	22.0	19.0	83.0	17.8
Thomas 5517	.....	.....	.....	9.7	2.9	10.7	6.0	26.6	20.2	26.1	14.6	80.7	17.3
Ferguson Yellow Dent	14.2	13.1	38.4	1.4	2.5	7.2	8.0	39.9	5.4	24.2	16.3	71.5	15.3
Chisholm	14.9	13.6	35.5	2.4	2.8	8.8	5.4	34.7	7.6	21.7	15.8	69.3	14.8
St. Charles White	9.0	11.8	27.1	.....	.....	.....	.....	.....	.....	.....	16.0	55.0	11.8
Average	14.4	16.7	39.8	6.9	4.4	13.1	7.2	34.7	15.9	28.9	18.2	85.0	18.2

Table 30.—Average yields of all varieties for three planting dates, Texas Substation No. 3, Angleton.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Brazos White	.....	.....	.....	.....	24.5	22.1	10.8	32.0	20.8	23.8	23.3	116.5	24.9
Surcropper	27.5	24.4	42.2	5.5	23.1	20.9	12.9	37.4	17.9	29.3	24.5	114.5	24.5
Tuxpan	15.8	32.1	38.7	11.0	17.0	18.9	12.2	36.2	15.9	32.4	23.0	107.5	23.0
Hastings' Prolific	10.6	32.8	43.3	9.8	22.8	19.1	9.9	31.7	18.2	29.8	22.8	106.5	22.8
Strawberry	.....	.....	47.9	4.8	18.3	14.0	5.7	32.7	13.9	19.2	20.2	95.3	20.4
Ferguson Yellow Dent	17.7	25.3	46.6	2.7	18.4	15.7	4.8	32.1	12.4	20.2	20.3	94.9	20.3
Thomas 327	14.1	26.6	41.4	6.3	22.4	16.7	6.8	29.6	16.7	21.5	20.2	94.4	20.2
Virginia White Dent	.....	22.3	51.8	.....	20.0	15.5	7.7	25.7	14.9	17.1	21.9	92.4	19.8
Florida Flint	9.3	29.4	42.0	.....	.....	.....	.....	.....	.....	.....	26.9	92.4	19.8
Chisholm	20.4	24.2	43.5	4.0	18.7	14.3	5.8	26.1	13.1	19.7	19.4	90.7	19.4
Oklahoma White Wonder	.....	.....	.....	.....	19.7	16.1	9.1	25.2	15.6	18.5	17.4	87.0	18.6
Thomas 5517	.....	.....	.....	5.6	21.3	13.2	8.3	25.3	14.2	19.5	15.3	84.5	18.1
St. Charles White	10.0	18.0	29.2	.....	.....	.....	.....	.....	.....	.....	19.1	65.6	14.0

Table 31.—The effect of time of planting on yields of different varieties, Texas Substation No. 3, Angleton, 1918-1927.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Virginia White Dent	20.1	17.9	19.5	—11.0	— 3.0
Oklahoma White Wonder	19.4	18.5	17.9	— 4.6	— 7.7
Florida Flint	20.5	20.1	18.8	— 2.0	— 8.3
Thomas No. 5517	19.5	17.8	17.3	— 8.7	—11.3
Hastings' Prolific	24.5	22.3	21.6	— 9.0	—11.8
Brazos White	25.6	23.5	22.5	— 8.2	—12.1
Surcropper	24.5	26.2	20.7	6.9	—15.5
Thomas No. 327	22.3	19.7	18.7	—11.7	—16.1
Strawberry	21.8	20.8	17.8	— 4.6	—18.3
Tuxpan	26.1	24.7	18.2	— 5.4	—30.3
St. Charles White	18.2	12.1	11.8	—33.5	—35.2
Ferguson Yellow Dent	23.6	20.9	15.3	—11.4	—35.2
Chisholm	23.4	19.3	14.8	—17.5	—36.8
Average	22.9	20.8	18.2	— 9.2	—20.5

Results at Denton

Texas Substation No. 6 is located in Denton County, about five and one-half miles northwest of Denton. The soil devoted to experimental plats consists of Denton clay and San Saba clay. These soils are difficult to handle during wet weather and corn planting is frequently delayed, or cultivation neglected, as a result. The growing season at Denton begins rather late, the average date of last killing frost for a period of fourteen years falling on March 28. The average rainfall for the ten-year period of the test was 33.37 inches, of which 15.64 inches, or almost half of the average total, occurred during the five months, March to July, inclusive. In spite of the fairly favorable distribution of rainfall, the corn crop frequently suffers from drouth. Especially is this true when planting is delayed by cold, wet weather in the spring.

Conditions affecting the ten-year test conducted at Denton have been as follows:

In 1921 and 1923, all varieties in the early planting were injured by cold weather and these were replanted as the "late" acre.

In 1922, all plantings were severely injured by wet weather late in May.

The seasons of 1924 and 1925 were two of the most unfavorable on record for corn production and the conditions are reflected by the extremely low yield recorded in the test. In 1925, the three plantings, though nineteen and seventeen days apart, all germinated on the same day.

In 1926 and 1927, only two plantings were made and, consequently, the results of these two years have been omitted from all averages showing the effects of time of planting. They have been included, however, in all averages shown in Table 36.

Table 32 shows that the average dates of planting were March 18,

April 4, and April 20. The difference of seventeen days between early and medium plantings was accompanied by a decrease in yield of 4.3 bushels, an average daily loss of .25 bushels per acre. The difference of sixteen days between the medium and late plantings was associated with a further decrease of 2.1 bushels per acre, or an average daily loss of .13 bushels.

Table 32 further shows that the early planting ranked first in seven of the ten years, while the medium planting ranked first in the remaining three.

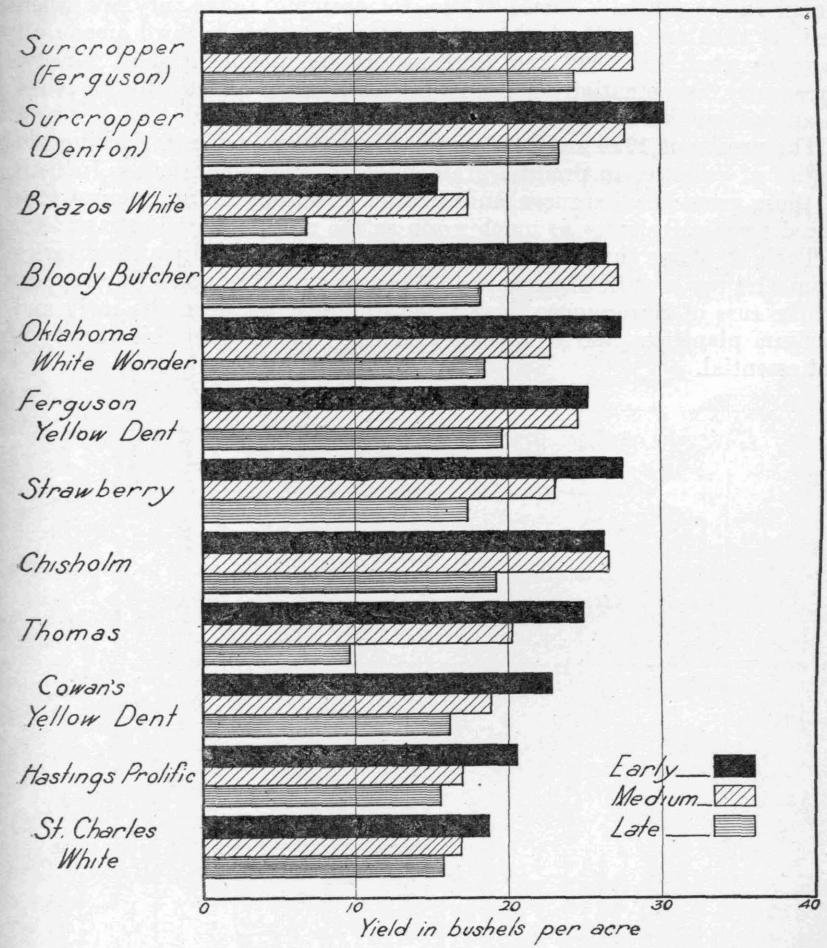

Fig. 8.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 6, Denton. It should be noted that these varieties are ranked according to the average yields from 1918 to 1927, while the yields represented by the columns are those of 1918 to 1925. This accounts for the apparent misplacement of Brazos White. These results are applicable to the counties in Region 6 of the map (Fig. 15

Tables 33, 34, and 35 show the average yield of all varieties at three dates of planting. Ferguson's Surcropper, Denton Surcropper, Bloody Butcher, and Chisholm ranked above the median in all plantings, while Brazos White, St. Charles White, Hastings' Prolific, Cowan's Yellow Dent, and Thomas were below the median in all plantings.

It should be pointed out again in this connection, however, that in computing the averages in these three tables, the results of 1926 and 1927 were omitted, while in the averages of Table 36 they are included. This accounts for some of the apparent disagreement of the results presented in the tables. Brazos White, for example, ranks very low when only its 1924 and 1925 yields are considered, but ranks third among all varieties when the 1926 and 1927 results are included. This variety, apparently, is potentially a high producer, but is practically valueless in an unfavorable season.

The results of 1924 and 1925 are particularly valuable in showing the ability of varieties to produce grain under drouth conditions. In both of those years the Ferguson and Denton selections of Surcropper produced practically twice as much grain as the next high-yielding variety.

Table 37 shows that the loss suffered as a result of late planting varies from 61.4 per cent in Thomas to 13.5 per cent in Ferguson's Surcropper. In the case of Surcropper, there is no difference between the early and medium plantings, and it appears that early planting of this variety is not essential.

Table 32.—Dates of planting, per cent stand, and average yields of date checks and varieties in early, medium, and late plantings, Texas Substation No. 6, Denton.

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average
Dates of planting:											
Early	Mar. 20	Mar. 10	Mar. 11	Mar. 25	Mar. 6	Mar. 22	April 12	Mar. 11	Mar. 15	Mar. 17	Mar. 18
Medium	April 1	Mar. 29	Mar. 29	April 14	Mar. 22	April 5	April 22	Mar. 30	April 4	April 4	April 4
Late	April 22	April 25	April 15	April 25	April 15	April 14	May 3	April 16	April 17	.....	April 20
Per cent stand:											
Early	105.0	93.7	86.5	96.9	.....	.....	.....	98.5	98.8	100.7	97.2
Medium	107.0	105.1	93.7	91.0	.....	.....	.....	98.6	.....	102.1	97.9
Late	107.6	97.2	102.5	94.7	.....	.....	.....	98.6	94.7	.....	97.6
Yields of date checks:											
Early	10.2	44.5	30.0	17.7	23.8	32.3	6.6	0.9	48.6	26.5	24.1
Medium	11.0	43.5	29.3	18.6	22.7	29.2	10.2	1.0	46.1	24.6	23.6
Late	7.8	46.6	28.6	17.3	14.6	28.8	3.6	0.6	50.8	.....	22.1
Yields of all varieties:											
Early	12.4	46.3	30.1	19.3	25.2	25.7	6.0	3.3	51.4	30.3	25.0
Medium	7.7	38.4	24.7	18.0	23.6	28.2	8.2	2.0	.....	35.9	20.7
Late	4.2	43.5	24.8	16.8	11.7	18.4	3.3	1.0	43.4	.....	18.6
Days difference in planting:											
Early-medium	12	19	18	20	16	14	10	19	20	18	17
Medium-late	21	27	17	11	24	9	11	17	13	.....	16
Early-late	33	46	35	31	40	23	21	36	33	.....	33
Bushels difference in yield:											
Early-medium	—4.7	—7.9	—5.4	—1.3	— 1.6	2.5	2.2	—1.3	.....	5.6	—4.3
Medium-late	—3.5	5.1	0.1	—1.2	—11.9	—9.8	—4.9	—1.0	.....	.....	—2.1
Early-late	—8.2	—2.8	—5.3	—2.5	—13.5	—7.3	—2.7	—2.3	—8.0	.....	—6.4

Table 33. —Early planting, all varieties, annual and average yields, Texas Substation No. 6, Denton.

Variety	Yield in bushels per acre											Percentage rating*	Corrected yield*
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Aver-age		
Surcropper (Denton)	.....	.....	29.4	22.3	25.8	30.3	13.5	9.0	48.2	29.7	21.7	126.9	30.1
Surcropper (Ferguson)	16.8	40.2	30.6	23.1	19.4	33.7	13.2	8.3	50.3	31.1	23.2	118.4	28.1
Strawberry	15.7	61.6	35.0	18.9	24.4	21.7	2.2	1.5	57.1	29.2	22.6	115.3	27.3
Oklahoma White Wonder	12.5	47.6	.....	19.6	25.1	36.8	3.2	1.7	57.6	31.4	20.9	114.8	27.2
Bloody Butcher	.....	.....	.....	21.2	27.1	23.7	6.6	1.8	49.8	32.1	16.1	111.0	26.3
Chisholm	8.0	51.7	32.4	18.9	19.9	31.5	8.0	3.1	44.0	27.7	21.7	110.7	26.2
Ferguson Yellow Dent	15.7	45.9	30.8	16.2	30.2	20.7	4.7	2.6	51.3	28.0	20.8	106.1	25.1
Thomas	.....	.....	.....	.....	27.2	27.3	2.4	0.3	47.7	31.7	14.3	105.1	24.9
Cowan's Yellow Dent	16.3	36.5	.....	20.5	30.9	22.4	1.7	.....	.....	.....	21.4	96.4	22.8
Hastings' Prolific	7.6	47.3	31.2	13.1	21.5	9.3	.....	.....	.....	.....	21.7	87.1	20.6
St. Charles White	6.2	39.8	21.0	.....	.....	.....	.....	.....	.....	.....	22.3	78.8	18.7
Brazos White	.....	.....	.....	.....	.....	.....	4.0	1.4	56.6	31.4	2.7	65.8	15.6
Average	12.4	46.3	30.1	19.3	25.2	25.7	6.0	3.3	51.4	30.3	21.0	107.1	25.4

*Results of 1926 and 1927 not included.

Table 34.—Medium planting, all varieties, annual and average yields, Texas Substation No. 6, Denton.

Variety	Yield in bushels per acre											Percentage rating*	Corrected yield*
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Aver-age		
Surcropper (Ferguson)	13.2	35.3	32.5	24.3	29.2	31.8	15.1	3.8	43.5	39.3	23.2	118.4	28.1
Surcropper (Denton)	.....	.....	22.7	21.3	26.1	31.5	13.7	4.9	42.8	32.7	20.0	116.9	27.7
Bloody Butcher	.....	.....	.....	17.4	20.9	35.2	7.8	1.8	54.5	40.2	16.6	114.5	27.1
Chisholm	13.1	40.9	35.6	18.4	25.4	30.3	9.0	1.5	41.4	35.5	21.8	111.2	26.4
Ferguson Yellow Dent	7.0	41.9	26.5	19.0	24.8	29.7	10.6	2.8	60.8	33.3	20.3	103.6	24.6
Strawberry	7.2	48.4	25.5	16.7	19.3	26.9	6.0	1.7	50.3	33.9	19.0	96.9	23.0
Oklahoma White Wonder	7.0	38.4	30.6	13.1	26.0	31.4	3.5	0.2	49.2	38.2	18.8	95.9	22.7
Thomas	.....	.....	.....	.....	22.5	20.1	3.5	0.2	47.1	31.1	11.6	85.3	20.2
Cowan's Yellow Dent	7.4	21.7	8.8	21.0	25.2	31.7	8.4	.....	.....	.....	17.7	79.7	18.9
Brazos White	.....	.....	.....	.....	.....	.....	4.6	1.3	52.4	39.3	3.0	73.2	17.4
Hastings' Prolific	1.4	42.2	23.0	10.9	17.0	13.0	.....	.....	.....	.....	17.9	71.9	17.0
St. Charles White	5.4	38.3	16.9	.....	.....	.....	.....	.....	.....	.....	20.2	71.4	16.9
Average	7.7	38.4	24.7	18.0	23.6	28.2	8.2	2.0	49.1	35.9	18.8	96.0	22.8

*Results of 1926-27 not included. †Date of planting same as for early acre.

Table 35.—Late planting, all varieties, annual and average yields. Texas Substation No. 6, Denton.

Variety	Yield in bushels per acre										Percentage rating*	Corrected yield*
	1918	1919	1920	1921	1922	1923	1924	1925	1926	Average*		
Surcropper (Ferguson)	11.1	43.4	36.5	15.6	17.6	26.9	6.9	3.1	45.0	20.1	102.6	24.3
Surcropper (Denton)	.....	.....	29.8	19.5	16.2	24.2	7.6	4.1	40.8	16.9	98.8	23.4
Ferguson Yellow Dent	5.5	45.0	23.7	16.2	12.8	21.0	4.7	0.5	38.2	16.2	82.7	19.6
Chisholm	5.4	43.1	24.0	18.8	12.4	20.3	2.6	0.3	27.2	15.9	81.1	19.2
Bloody Butcher	.....	.....	.....	18.7	12.6	22.3	3.7	0.4	51.3	11.5	79.3	18.8
Oklahoma White Wonder	2.3	47.7	31.8	19.0	9.6	10.1	1.8	0.1	43.5	15.3	78.1	18.5
Strawberry	4.3	49.0	21.4	14.6	9.2	15.9	0.7	0.1	48.2	14.4	73.5	17.4
Cowan's Yellow Dent	2.6	38.1	8.0	18.0	14.2	22.9	1.8	.....	.....	15.1	68.0	16.1
St. Charles White	1.7	37.2	17.9	.....	.....	.....	.....	.....	.....	18.9	66.8	15.8
Hastings' Prolific	0.6	44.6	30.3	11.1	5.1	6.6	.....	.....	.....	16.4	65.9	15.6
Thomas	.....	.....	.....	.....	7.4	13.8	0.8	0.0	42.9	5.5	40.4	9.6
Brazos White	.....	.....	.....	.....	.....	.....	2.2	0.1	53.4	1.2	29.3	6.9
Average	4.2	43.5	24.8	16.8	11.7	18.4	3.3	1.0	43.4	15.5	79.1	18.7

*Results of 1926 not included.

Table 36.—Average yields of varieties for three planting dates, Texas Substation No. 6, Denton.

Variety	Yield in bushels per acre										Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper (Ferguson)	13.7	39.6	33.2	21.0	22.7	30.8	11.7	5.1	46.3	34.5	25.9	109.3	25.9
Surcropper (Denton)	.....	.....	27.3	21.0	22.7	28.7	11.6	6.0	47.6	31.9	24.6	107.9	25.6
Brazos White	.....	.....	.....	.....	.....	.....	3.6	0.9	54.1	35.4	23.5	106.8	25.3
Bloody Butcher	.....	.....	.....	19.1	20.2	27.1	6.0	1.3	51.8	36.2	23.1	106.0	25.1
Oklahoma White Wonder	7.3	44.6	31.2	17.2	20.2	26.1	2.8	0.7	50.1	34.8	23.5	99.2	23.5
Ferguson Yellow Dent	9.4	44.3	27.0	17.1	22.6	23.8	6.7	2.0	50.1	30.7	23.4	98.7	23.4
Strawberry	9.1	53.0	27.3	16.7	17.6	21.5	3.0	1.1	51.8	31.6	23.3	98.3	23.3
Chisholm	8.8	45.2	30.7	18.7	19.2	27.4	6.5	1.6	37.5	31.6	22.7	95.8	22.7
Thomas	.....	.....	.....	.....	19.0	20.4	2.2	0.2	45.9	31.4	19.8	88.4	21.0
Cowan's Yellow Dent	8.8	32.1	8.4	19.8	23.4	25.7	4.0	.....	.....	.....	17.5	78.8	18.7
Hastings' Prolific	3.2	44.7	28.2	11.7	14.5	9.6	.....	.....	.....	.....	18.6	74.7	17.7
St. Charles White	4.4	38.4	18.6	.....	.....	.....	.....	.....	.....	.....	20.5	72.4	17.2

Table 37.—The effect of time of planting on yields of different varieties, Texas Substation No. 6, Denton, 1918-1925.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Surcropper (Ferguson)	28.1	28.1	24.3	0.0	—13.5
St. Charles White	18.7	16.9	15.8	— 9.6	—15.5
Ferguson Yellow Dent	25.1	24.6	19.6	— 2.0	—21.9
Surcropper (Denton)	30.1	27.7	23.4	— 8.0	—22.3
Hastings' Prolific	20.6	17.0	15.6	—17.5	—24.3
Chisholm	26.2	26.4	19.2	0.8	—26.7
Bloody Butcher	26.3	27.1	18.8	3.0	—28.5
Cowan's Yellow Dent	22.8	18.9	16.1	—17.1	—29.4
Oklahoma White Wonder	27.2	22.7	18.5	—16.5	—32.0
Strawberry	27.3	23.0	17.4	—15.8	—36.3
Brazos White	15.6	17.4	6.9	11.5	—55.8
Thomas	24.9	20.2	9.6	—18.9	—61.4
Average	25.4	22.8	18.7	—10.2	—26.4

Results at Temple

Texas Substation No. 5, in Bell County, was located, before its removal to a new site in 1927 and during the period of this test, about 4.5 miles southwest of Temple. The soils on this location are dark-brown to black clays of the Simmons and Lewisville series. These soils are not strictly typical of the Blacklands region, but in other respects conditions of Substation No. 5 are fairly representative of the region. The average date of last killing frost for a period of 13 years is March 30. The average annual rainfall during the period of the test was 36.98 inches, of which 16.32 inches occurred during the months from March to July, inclusive.

No results are available from Temple for the three years, 1925-1927, inclusive. In 1925, all varieties failed to produce ears and were cut for fodder. In 1926, only one planting was made, and in 1927, all plats were destroyed by root worms. The fact that no results from these unfavorable years are included, causes the average yields from 1918-1924 to be unusually high, though the averages of different varieties and different plantings are strictly comparable.

Table 38 shows that the average dates of planting were March 10, March 24, and April 12, respectively. The difference of 14 days between the early and the medium plantings was associated with a decrease in yield of 8.3 bushels, an average decrease of .59 bushels per day. On the other hand, the difference of 19 days between the medium and the late plantings resulted in an average gain of .7 bushels per acre. These results, however, are contrary to those of the date checks, in which the same variety was planted at three different dates on each acre. In the latter case the greater decrease resulted from the late planting.

Tables 39, 40, and 41 show the yields of all varieties in each planting. Ferguson Yellow Dent, Surcropper, Mosshart Yellow Dent, and Strawberry ranked above the median in each planting while St. Charles White,

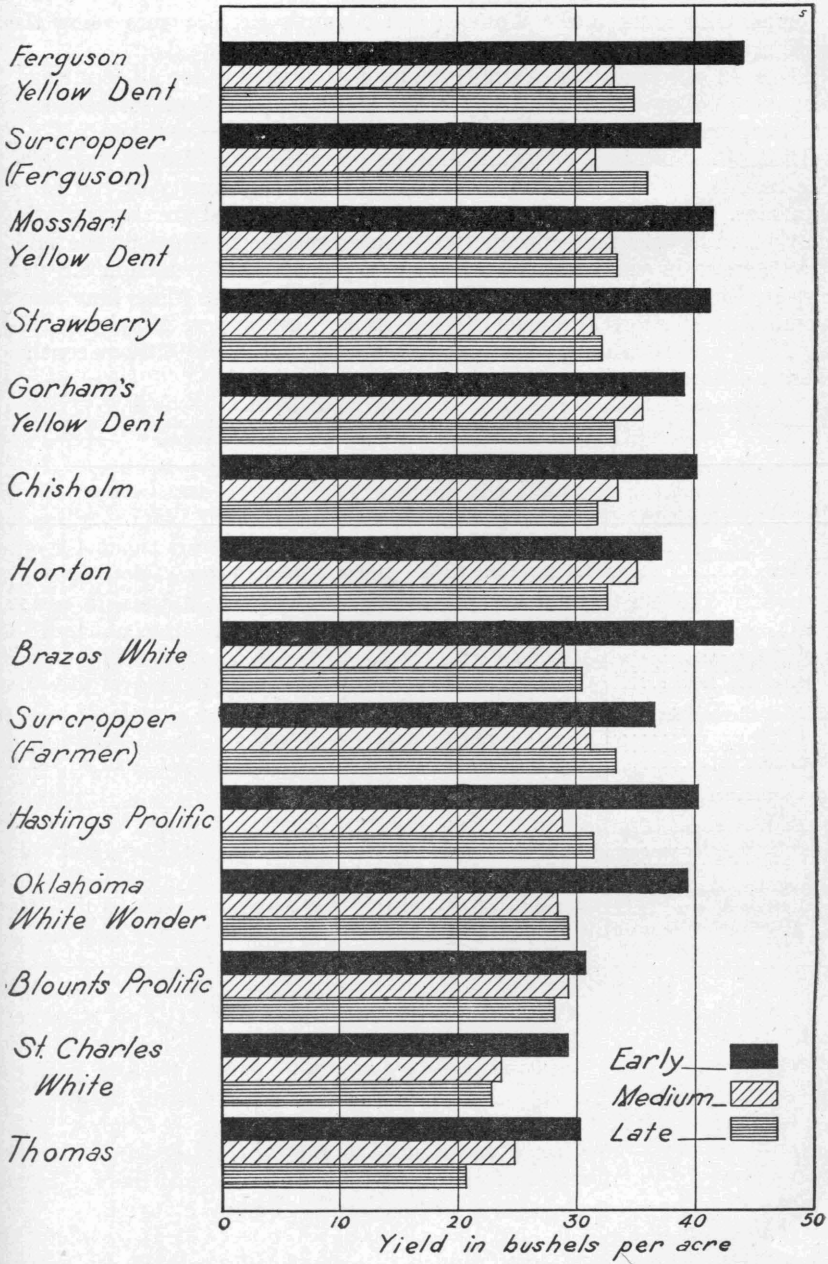

Fig. 9.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 5, Temple. These results are applicable to the counties in Region No. 7 of the map (Fig. 15).

Thomas, Oklahoma White Wonder, and Blount's Prolific were below the median in each planting.

Table 42 sets forth the average yields of each variety for all plantings. Ferguson Yellow Dent, Surcropper, Mosshart Yellow Dent, Strawberry, and Gorham's Yellow Dent are the five most productive varieties.

Table 43 shows the effect of time of planting on different varieties. The results are very conclusive in showing the superiority of the early plantings. In each of the fourteen varieties included in the test, the early planting was more productive than either the medium or the late. The decrease in yield resulting from late planting ranged from 8.8 per cent in Blount's Prolific to 31.2 per cent in Thomas. The four most promising varieties, Ferguson Yellow Dent, Surcropper, Mosshart Yellow Dent, and Strawberry show an average reduction of 16.3 per cent as a result of late planting.

Table 38. —Dates of planting, and average yields of date checks and varieties in early, medium and late plantings, Texas Substation No. 5, Temple.

	1918	1919	1920	1921	1922	1923	1924	Av.
Dates of planting:								
Early	Mar. 20	Mar. 1	Mar. 1	Mar. 3	Mar. 6	Mar. 12	Mar. 27	Mar. 10
Medium	April 9	Mar. 13	Mar. 13	Mar. 17	Mar. 13	Mar. 23	April 16	Mar. 24
Late	April 25	April 5	Mar. 29	Mar. 31	April 11	April 6	May 6	April 12
Yields of date checks:								
Early	5.8	52.0	43.5	49.0	37.6	43.9	42.6	39.2
Medium	2.4	48.7	48.6	53.1	37.3	42.5	28.5	37.4
Late	0.2	48.5	40.1	56.3	23.5	38.5	19.4	32.4
Yields of all varieties:								
Early	2.7	56.4	58.1	46.5	38.3	42.4	32.9	39.6
Medium	1.7	41.0	38.0	50.4	30.0	32.9	24.8	31.3
Late	0.4	49.9	43.0	53.1	25.6	38.1	14.0	32.0
Days difference in planting:								
Early-medium	20	12	12	14	7	11	20	14
Medium-late	16	23	16	14	29	14	20	19
Early-late	36	35	28	28	36	25	40	33
Bushels difference in yield:								
Early-medium	—1.0	—15.4	—20.1	3.9	—8.3	—9.5	—8.1	—8.3
Medium-late	—1.3	8.9	5.0	2.7	—4.4	5.2	—10.8	0.7
Early-late	—2.3	— 6.5	—15.1	6.6	—12.7	—4.3	—18.9	—7.6

Table 39.—Early planting, all varieties, annual and average yields, Texas Substation No. 5, Temple.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	Average		
Ferguson Yellow Dent	4.1	55.8	76.1	50.1	42.2	47.3	33.3	44.1	124.6	44.1
Brazos White	0.2	.....	67.2	48.7	36.2	49.4	37.3	39.8	121.7	43.1
Mosshart Yellow Dent	.....	54.2	49.2	49.6	44.8	47.7	42.6	48.0	117.4	41.6
Strawberry	0.8	57.3	61.3	53.1	37.8	43.4	35.5	41.3	116.7	41.3
Surcropper (Ferguson)	5.9	61.1	56.0	40.4	42.5	45.3	32.7	40.6	114.7	40.6
Hastings' Prolific	.....	67.6	74.9	51.5	27.6	32.8	24.1	46.4	113.4	40.1
Chisholm	6.4	59.7	50.9	46.3	37.7	46.6	33.1	40.1	113.3	40.1
Oklahoma White Wonder	1.5	62.0	60.4	43.7	33.8	43.5	30.1	39.3	110.0	39.3
Gorham's Yellow Dent	0.7	61.0	58.5	44.8	38.6	.....	.....	40.7	110.6	39.2
Horton	.....	.....	.....	41.6	39.3	39.9	32.9	38.4	104.9	37.1
Surcropper (Farmer)	2.5	49.0	51.9	42.0	41.3	44.1	.....	38.5	103.8	36.7
Blount's Prolific	3.4	43.0	.....	.....	.....	.....	.....	23.2	86.9	30.8
Thomas	.....	.....	.....	.....	.....	26.8	27.4	27.1	85.0	30.1
St. Charles White	1.1	49.7	32.9	.....	.....	.....	.....	27.9	82.5	29.2
Average	2.7	56.4	58.1	46.5	38.3	42.4	32.9	39.6	111.9	39.6

Table 40.—Medium planting, all varieties, annual and average yields, Texas Substation No. 5, Temple.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	Average		
Gorham's Yellow Dent	0.7	51.4	44.0	51.5	37.9	.....	.....	37.1	100.7	35.6
Horton	.....	.....	.....	51.8	34.1	36.3	23.6	36.4	99.5	35.2
Chisholm	0.3	40.1	46.6	49.4	33.5	29.3	35.6	33.5	94.6	33.5
Mosshart Yellow Dent	.....	29.9	45.0	54.0	38.0	36.7	26.0	38.3	93.6	33.1
Ferguson Yellow Dent	0.7	43.5	36.8	56.5	36.8	31.6	25.8	33.1	93.5	33.1
Surcropper (Ferguson)	7.5	41.3	35.8	45.3	23.6	37.0	31.1	31.7	89.6	31.7
Strawberry	2.8	41.0	42.5	52.6	36.9	35.0	10.0	31.5	89.0	31.5
Surcropper (Farmer)	2.4	39.3	40.2	46.5	31.4	36.0	.....	32.6	87.9	31.1
Blount's Prolific	2.3	41.9	.....	.....	.....	.....	.....	22.1	82.8	29.3
Brazos White	0.5	.....	30.7	48.5	16.9	33.4	30.7	26.8	82.0	29.0
Hastings' Prolific	.....	41.2	42.0	49.9	15.5	30.7	20.9	33.4	81.7	28.9
Oklahoma White Wonder	0.1	48.4	20.8	48.9	25.4	26.9	27.9	28.3	79.9	28.3
Thomas	.....	.....	.....	.....	.....	28.7	16.2	22.4	70.2	24.8
St. Charles White	0.3	33.3	33.9	.....	.....	.....	.....	22.5	66.6	23.6
Average	1.7	41.0	38.0	50.4	30.0	32.9	24.8	31.3	88.4	31.3

Table 41.—Late planting, all varieties, annual and average yields, Texas Substation No. 5, Temple.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	Average		
Surcropper (Ferguson)	0.6	57.2	48.4	51.9	35.7	40.8	18.4	36.1	102.0	36.1
Ferguson Yellow Dent	0.3	55.0	50.4	56.2	17.2	45.5	20.3	35.0	98.9	35.0
Mosshart Yellow Dent	.....	55.5	43.9	55.6	21.5	43.7	11.2	38.6	94.4	33.4
Surcropper (Farmer)	0.2	43.7	42.4	50.8	30.4	41.0	.....	34.8	93.8	33.2
Gorham's Yellow Dent	0.5	47.4	45.2	50.0	28.7	.....	.....	34.4	93.5	33.1
Horton	.....	.....	.....	56.6	24.4	41.1	12.9	33.8	92.4	32.7
Strawberry	0.0	55.0	55.6	57.7	23.6	38.1	15.4	32.2	91.0	32.2
Chisholm	1.8	47.5	41.1	54.2	33.2	33.5	12.1	31.9	90.1	31.9
Hastings' Prolific	.....	60.6	38.5	52.0	24.4	29.7	12.1	36.2	88.5	31.3
Brazos White	0.0	.....	44.2	53.3	17.6	37.6	16.3	28.2	86.2	30.5
Oklahoma White Wonder	0.4	45.1	37.2	45.6	25.1	38.3	13.7	29.3	82.8	29.3
Blount's Prolific	0.3	42.0	.....	.....	.....	.....	.....	21.2	79.4	28.1
St. Charles White	0.2	39.7	25.9	.....	.....	.....	.....	21.9	64.8	22.9
Thomas	.....	.....	.....	.....	.....	29.9	7.5	18.7	58.6	20.7
Average	0.4	49.9	43.0	53.1	25.6	38.1	14.0	32.0	90.4	32.0

Table 42.—Average yields of all varieties for three planting dates, Texas Substation No. 5, Temple.

Variety	Yield in bushels per acre								Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	Average		
Ferguson Yellow Dent	1.7	51.4	54.4	54.3	32.1	41.5	26.5	37.4	105.7	37.4
Surcropper (Ferguson)	4.7	53.2	46.7	45.9	33.9	41.0	27.4	36.1	102.0	36.1
Mosshart Yellow Dent	.....	46.5	46.0	53.1	34.8	42.7	26.6	41.6	101.7	36.0
Strawberry	1.2	51.1	53.1	54.5	32.8	38.8	20.3	36.0	101.7	36.0
Gorham's Yellow Dent	0.6	53.3	49.2	48.8	35.1	.....	.....	37.4	101.6	36.0
Chisholm	2.8	49.1	46.2	50.0	34.8	36.5	26.9	35.2	99.4	35.2
Horton	.....	.....	.....	50.0	32.6	39.1	23.1	36.2	98.9	35.0
Brazos White	0.2	.....	47.4	50.2	23.6	40.1	28.1	31.6	96.6	34.2
Surcropper (Farmer)	1.7	44.0	44.8	46.4	34.4	40.4	.....	35.3	95.2	33.7
Hastings' Prolific	.....	56.5	51.8	51.1	22.5	31.1	19.0	38.7	94.6	33.5
Oklahoma White Wonder	0.7	51.8	39.5	46.1	28.1	36.2	23.9	32.3	91.2	32.3
Blount's Prolific	2.0	42.3	.....	.....	.....	.....	.....	22.2	83.2	29.5
St. Charles White	0.5	40.9	30.9	.....	.....	.....	.....	24.1	71.3	25.2
Thomas	.....	.....	.....	.....	.....	28.5	17.0	22.7	71.2	25.2
Average	1.6	49.1	46.4	50.0	31.3	37.8	23.9	34.3	96.9	34.3

Table 43.—The effect of time of planting on yield of different varieties, Texas Substation No. 5, Temple, 1918-1924.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Blount's Prolific	30.8	29.3	28.1	—4.9	— 8.8
Surcropper (Farmer)	36.7	31.1	33.2	—15.2	— 9.5
Surcropper (Ferguson	40.6	31.7	36.1	—21.9	—11.1
Horton	37.1	35.2	32.7	— 5.1	—11.9
Gorham's Yellow Dent	39.2	35.6	33.1	— 9.2	—15.6
Mosshart Yellow Dent	41.6	33.1	33.4	—20.4	—19.7
Chisholm	40.1	33.5	31.9	—16.5	—20.4
Ferguson Yellow Dent	44.1	33.1	35.0	—24.9	—20.5
St. Charles White	29.2	23.6	22.9	—19.2	—21.6
Hastings' Prolific	40.1	28.9	31.3	—27.9	—21.9
Strawberry	41.3	31.5	32.2	—23.7	—22.0
Oklahoma White Wonder	39.3	28.3	29.3	—28.0	—25.5
Brazos White	43.1	29.0	30.5	—32.7	—29.2
Thomas	30.1	24.8	20.7	—17.6	—31.2
Average	39.6	31.3	32.0	—21.0	—19.2

Results at Beeville

Texas Substation No. 1 is located in Bee County about 5.6 miles northeast of Beeville. The soils, Goliad loam and a loam of a series not yet named, are typical of an extensive area, and are very productive in seasons of adequate rainfall. The growing season begins early, the average date of last killing frost for a period of 24 years falling on February 23.

The limiting factor in corn production in this region is rainfall. The average precipitation for the ten-year period of the test was 31.61 inches, of which 13.37 inches occurred during the growing season, February to June. Furthermore, the rainfall is so distributed that the crop is subject to drouth both at the beginning and at the end of the growing season. Planting is frequently delayed, or early growth retarded by lack of moisture in the spring and promising crops are often reduced by drouth in June. A study of the rainfall distribution indicates that early maturing varieties are needed in this region and suggests that early planting may not be as important as it is in other regions.

Conditions affecting the ten-year test conducted at Beeville were as follows:

All plantings suffered from drouth in 1918, 1923, and 1927, and from chinch bug injury in 1926 and 1927.

In 1924, through accident or error, the late planting was omitted. Consequently, in computing the average yields of each variety for three plantings, the data from the early and medium plantings in 1924 have also been omitted, though these data are shown in the tables.

Table 44 shows that the average dates of planting were March 5, March 20, and April 6. The early planting ranked first in four of the ten years, the medium planting in four years, and the late planting in the two remaining years. The average yields of all varieties in the three plantings show a slight superiority of the medium planting over

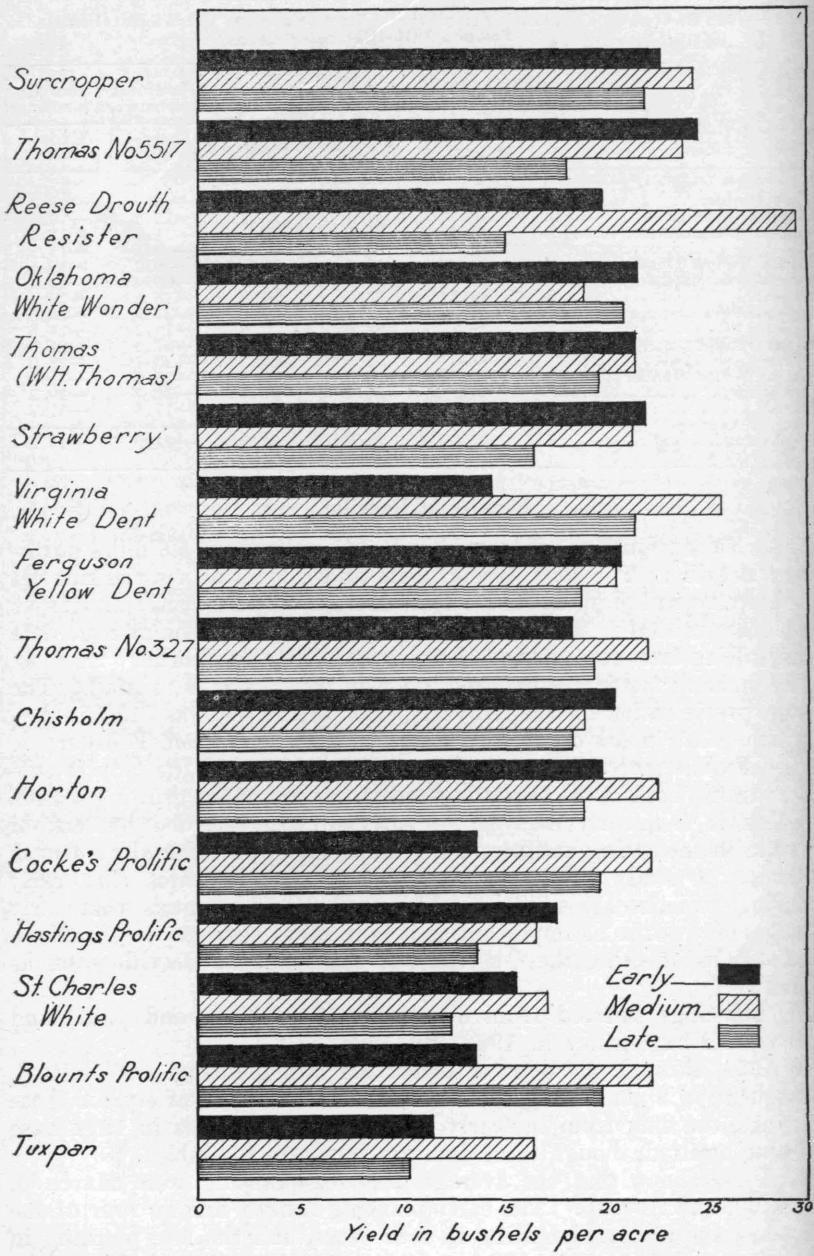

Fig. 10.—The average yields of varieties in early, medium, and late plantings at Texas Substation No. 1, Beeville. These results are applicable to the counties in Region No. 8 of the map (Fig. 15).

the other two. The averages of the date checks during the same period, however, show the early planting to be the most productive. The difference, though probably not significant, may be accounted for by the fact that the date checks were planted each year to a medium or later-maturing variety, while the test as a whole included many early varieties.

The average difference of 15 days between the early and the medium plantings was associated with an average gain of 1.2 bushels per acre. The difference of 17 days between the medium and the late plantings was accompanied by a loss of 2.1 bushels, or an average daily loss of .12 bushels.

Table 45, 46, and 47 show the yields of all varieties at three dates of planting. Surcropper, Thomas, and Horton ranked above the median in all three plantings, while Hastings Prolific, St. Charles White, Tuxpan, and Blount's Prolific were below the median in each planting.

Considering all plantings together, the results in Table 48 show Surcropper, Thomas (T. S. No. 5517), and Reese Drouth Resister to be the highest-yielding varieties.

It may be of interest to note that Thomas (T. S. No. 5517) is a selection developed by the Beeville Station through ear-to-row breeding. It originated from the Thomas variety commonly grown in this region and shown in the tables as T. S. No. 327. The selection proved to be superior to the original in the early and medium plantings but was less productive in the late plantings.

Table 49 shows the reaction of all varieties to delayed planting. The effects varied from a loss of 26.5 per cent in Thomas to a gain of 48.6 per cent in Virginia White Dent, these results showing a striking contrast with those at other stations. It is noted, however, that the most productive varieties, Reese Drouth Resister, Thomas, Surcropper, and Horton, all show a loss in the late planting, though all but Thomas show a slight gain in the medium plantings as compared to the early.

Table 44.—Dates of planting, per cent stand, and average yields of date checks and varieties in early, medium, and late plantings, Texas Substation No. 1, Beeville.

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average
Dates of planting:											
Early	Mar. 13	Mar. 7	Mar. 24	Feb. 28	Feb. 15	Mar. 13	Mar. 3	Mar. 2	Mar. 1	Mar. 2	Mar. 5
Medium	April 3	Mar. 21	April 2	Mar. 8	Mar. 8	Mar. 23	Mar. 18	Mar. 17	Mar. 22	Mar. 16	Mar. 20
Late	April 13	April 7	April 13	Mar. 23	April 5	April 21	April 2	Mar. 31	April 3	April 1	April 6
Per cent stand:											
Early	90.6	81.9	91.8	99.0	97.2	84.9	81.3	92.1	88.8	94.2	*90.9
Medium	88.1	90.6	118.0	89.2	83.0	81.0	85.1	93.4	73.5	88.0	*90.7
Late	92.4	96.5	107.8	.....	93.8	.....	.....	93.5	93.0	82.5	*94.2
Yields of date checks:											
Early	10.2	49.6	11.3	20.3	24.2	10.0	32.0	24.7	14.7	6.5	20.4
Medium	11.7	44.6	12.2	17.2	19.8	7.5	32.0	21.1	19.3	7.6	19.3
Late	8.0	37.8	22.1	16.3	23.6	5.6	33.7	15.5	21.6	3.9	18.8
Yields of all varieties:											
Early	7.9	35.3	19.4	17.0	24.5	6.5	31.2	26.5	21.8	5.2	18.9
Medium	15.4	36.7	19.4	16.0	22.2	11.4	26.7	19.4	24.8	8.7	20.1
Late	7.2	43.5	24.1	15.0	20.6	5.7	.....	13.1	21.1	5.3	18.0
Days difference in planting:											
Early-medium	21	14	9	9	22	10	15	15	21	14	15
Medium-late	10	17	11	15	28	29	15	14	12	16	17
Early-late	31	31	20	24	50	39	30	29	33	30	32
Bushels difference in yield:											
Early-medium	7.5	1.7	0.0	—1.0	—2.3	4.9	—9.4	— 7.1	3.0	3.5	1.2
Medium-late	—8.2	6.8	4.7	—1.0	—1.6	—5.7	.....	— 6.3	—3.7	—3.4	—2.1
Early-late	—0.7	8.5	4.7	—2.0	—3.9	—0.8	.....	—13.4	0.7	0.1	—1.4

*7-year average.

Table 45.—Early planting, all varieties, annual and average yields, Texas Substation No. 1, Beeville.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Thomas (T. S. No. 5517)	.....	.....	.....	27.9	28.5	6.8	27.5	28.4	23.1	4.6	19.9	118.5	24.5
Surcropper	12.2	43.0	32.5	14.1	27.5	10.4	24.2	26.3	19.5	9.6	21.7	109.0	22.6
Strawberry	.....	.....	.....	16.1	26.2	5.5	31.4	28.4	26.4	4.4	17.8	106.0	21.9
Oklahoma White Wonder	.....	47.5	17.3	.....	24.8	8.4	41.5	27.1	24.1	4.8	22.0	103.8	21.5
Thomas (W. H. Thomas)	.....	.....	.....	.....	.....	.....	.....	.....	25.3	5.2	15.3	103.3	21.4
Ferguson Yellow Dent	16.7	49.3	13.6	25.9	22.8	6.3	28.0	29.0	20.7	3.9	19.8	99.5	20.6
Chisholm	17.9	45.2	17.6	16.3	25.1	7.9	31.0	22.1	16.7	6.7	19.5	98.0	20.3
Horton	.....	.....	.....	.....	.....	8.0	.....	29.4	21.0	4.6	20.7	96.2	19.9
Reese Drouth Resister	.....	.....	.....	.....	.....	.....	.....	.....	22.0	6.2	14.1	95.3	19.7
Thomas (T. S. No. 327)	8.4	36.4	11.0	23.6	24.5	.....	.....	.....	.....	.....	20.8	88.3	18.3
Hastings' Prolific	.....	.....	.....	8.1	23.8	3.8	45.0	28.0	19.2	2.1	14.2	84.5	17.5
St. Charles White	2.0	27.2	28.7	.....	.....	.....	.....	.....	.....	.....	19.3	73.9	15.3
Virginia White Dent	3.5	.....	20.5	.....	.....	.....	.....	.....	.....	.....	12.0	69.4	14.4
Cocke's Prolific	4.1	26.7	20.7	.....	.....	.....	.....	.....	.....	.....	17.2	65.9	13.6
Tuxpan	.....	.....	.....	3.9	22.4	1.6	.....	.....	.....	.....	9.3	55.7	11.5
Blount's Prolific	8.6	5.0	12.6	.....	19.6	5.8	21.2	20.0	.....	.....	11.9	54.1	11.2
Average	7.9	35.3	19.4	17.0	24.5	6.5	31.2	26.5	21.8	5.2	18.2	91.3	18.9

Table 46.—Medium planting, all varieties, annual and average yields, Texas Substation No. 1, Beeville.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Reese Drouth Resister	.....	.....	.....	.....	.....	.....	.....	.....	22.5	19.4	21.0	141.9	29.4
Virginia White Dent	13.0	.....	29.8	.....	.....	.....	.....	.....	.....	.....	21.4	123.7	25.6
Surcropper	18.3	36.5	27.5	16.3	23.3	17.7	27.5	26.7	29.8	13.3	23.3	117.1	24.2
Thomas (T. S. No. 5517)	.....	.....	.....	21.4	27.0	8.1	28.1	19.9	26.0	7.7	18.4	109.5	22.7
Horton	.....	46.8	.....	.....	.....	14.5	.....	18.1	25.0	8.9	22.7	108.6	22.5
Cocke's Prolific	11.3	39.1	33.5	.....	.....	.....	.....	.....	.....	.....	28.0	107.3	22.2
Thomas (T. S. No. 327)	19.8	43.1	19.0	20.3	23.5	.....	.....	.....	.....	.....	25.1	106.4	22.0
Thomas (W. H. Thomas)	.....	.....	.....	.....	.....	.....	.....	.....	22.2	8.3	15.3	103.3	21.4
Strawberry	.....	.....	.....	15.6	29.7	10.8	29.1	19.4	22.6	5.0	17.2	102.4	21.2
Ferguson Yellow Dent	17.2	47.1	11.9	15.6	21.1	14.9	29.1	15.8	23.1	11.0	19.7	99.0	20.5
Chisholm	16.9	43.9	8.9	15.5	17.0	12.6	25.3	22.2	24.3	2.8	18.2	91.4	18.9
Oklahoma White Wonder	.....	34.5	10.3	.....	20.7	13.0	27.7	21.5	27.6	6.4	19.1	90.1	18.7
St. Charles White	11.8	36.9	16.1	.....	.....	.....	.....	.....	.....	.....	21.6	82.8	17.1
Hastings' Prolific	.....	.....	.....	13.0	17.4	8.6	25.9	12.6	24.9	4.0	13.4	79.8	16.5
Tuxpan	.....	.....	.....	10.6	24.6	4.5	.....	.....	.....	.....	13.2	79.0	16.4
Blount's Prolific	14.7	2.4	17.8	.....	18.2	9.8	21.2	18.1	.....	.....	13.5	61.4	12.7
Average	15.4	36.7	19.4	16.0	22.2	11.4	26.7	19.4	24.8	8.7	19.3	97.0	20.1

Table 47.—Late planting, all varieties, annual and average yields, Texas Substation No. 1, Beeville.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	11.4	43.2	29.5	21.7	21.1	11.2	.....	16.4	27.1	8.3	21.1	106.0	21.9
Virginia White Dent	5.0	.....	30.7	.....	.....	.....	.....	.....	.....	.....	17.9	103.5	21.4
Oklahoma White Wonder	.....	52.3	22.3	.....	22.7	8.6	.....	14.0	21.6	6.7	21.2	100.0	20.7
Cocke's Prolific	4.5	45.2	24.7	.....	.....	.....	.....	.....	.....	.....	24.8	95.0	19.7
Thomas (W. H. Thomas)	.....	.....	.....	.....	.....	.....	.....	.....	21.3	6.8	14.0	94.6	19.6
Thomas (T. S. No. 327)	6.8	42.6	21.7	15.7	23.3	.....	.....	.....	.....	.....	22.0	93.2	19.3
Ferguson Yellow Dent	7.1	49.7	23.1	20.3	22.2	4.5	.....	16.5	16.7	3.0	18.1	91.0	18.8
Horton	.....	49.7	.....	.....	.....	5.5	.....	14.2	22.6	2.4	18.9	90.4	18.7
Chisholm	8.5	36.5	30.7	12.0	20.5	6.7	.....	15.1	24.5	4.1	17.6	88.4	18.3
Thomas (T. S. No. 5517)	.....	.....	.....	22.3	23.4	6.0	.....	11.8	16.5	7.9	14.6	86.9	18.0
Strawberry	.....	.....	.....	12.2	23.6	5.5	.....	12.6	22.6	3.5	13.3	79.2	16.4
Blount's Prolific	12.0	42.0	20.4	.....	12.8	5.9	.....	9.9	.....	.....	17.2	78.2	16.2
Reese Drouth Resister	.....	.....	.....	.....	.....	.....	.....	.....	16.3	5.1	10.7	72.3	15.0
Hastings' Prolific	.....	.....	.....	6.0	21.2	3.5	.....	7.7	22.2	5.6	11.0	65.5	13.6
St. Charles White	2.6	30.6	13.5	.....	.....	.....	.....	.....	.....	.....	15.6	59.8	12.4
Tuxpan	.....	.....	.....	10.2	14.7	0.0	.....	.....	.....	.....	8.3	49.7	10.3
Average	7.2	43.5	24.1	15.0	20.6	5.7	.....	13.1	21.1	5.3	17.3	86.9	18.0

Table 48.—Average yields of all varieties for three planting dates, Texas Substation No. 1, Beeville.

Variety	Yield in bushels per acre											Percentage rating	Corrected yield
	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
Surcropper	14.0	40.9	29.8	17.4	24.0	13.1	25.9	23.1	25.5	10.4	22.4	108.2	22.4
Thomas (T. S. No. 5517)	.....	.....	.....	23.9	26.3	7.0	27.8	20.0	21.9	6.7	19.1	104.4	21.6
Reese Drouth Resister	.....	.....	.....	.....	.....	.....	.....	.....	20.3	10.2	15.3	103.4	21.4
Oklahoma White Wonder	.....	44.8	16.6	.....	22.7	10.0	34.6	20.9	24.4	6.0	22.5	102.3	21.2
Thomas (W. H. Thomas)	.....	.....	.....	.....	.....	.....	.....	.....	22.9	6.8	14.9	100.7	20.8
Strawberry	.....	.....	.....	14.6	26.5	7.3	30.3	20.1	23.9	4.3	18.1	98.9	20.5
Virginia White Dent	7.2	.....	27.0	.....	.....	.....	.....	.....	.....	.....	17.1	98.8	20.5
Ferguson Yellow Dent	10.3	48.7	16.2	20.6	22.0	8.6	28.6	20.4	20.2	6.0	20.2	97.6	20.2
Thomas (T. S. No. 327)	11.7	40.7	17.2	19.9	23.8	.....	.....	.....	.....	.....	22.7	96.2	19.9
Chisholm	14.4	41.9	19.1	14.6	20.9	9.1	28.2	19.8	21.8	4.5	19.4	93.7	19.4
Horton	.....	44.7	.....	.....	.....	9.3	.....	20.6	22.9	5.3	20.6	93.6	19.4
Cocke's Prolific	6.6	37.0	26.3	.....	.....	.....	.....	.....	.....	.....	23.3	89.3	18.5
Hastings' Prolific	.....	.....	.....	9.0	20.8	5.3	35.5	16.1	22.1	3.9	16.1	88.0	18.2
St. Charles White	5.5	31.6	19.4	.....	.....	.....	.....	.....	.....	.....	18.8	72.0	14.9
Blount's Prolific	11.8	16.5	16.9	.....	16.9	7.2	21.2	16.0	.....	.....	15.2	66.7	13.8
Tuxpan	.....	.....	.....	8.2	20.6	2.0	.....	.....	.....	.....	10.3	61.7	12.8

Table 49.—The effect of time of planting on yields of different varieties, Texas Substation No. 1, Beeville, 1918-1927.

Variety	Yield in bushels per acre			Percentage gain or loss between plantings	
	Early	Medium	Late	Early-medium	Early-late
Virginia White Dent	14.4	25.6	21.4	77.8	48.6
Blount's Prolific	11.2	12.7	16.2	13.4	47.7
Cocke's Prolific	13.6	22.2	19.7	63.2	44.8
Thomas (No. 327)	18.3	22.0	19.3	20.2	5.5
Surcropper	22.6	24.2	21.9	7.1	— 3.1
Oklahoma White Wonder	21.5	18.7	20.7	—13.0	— 3.7
Horton	19.9	22.5	18.7	13.1	— 6.0
Thomas (W. H. Thomas)	21.4	21.4	19.6	0.0	— 8.4
Ferguson Yellow Dent	20.6	20.5	18.8	— 0.5	— 8.7
Chisholm	20.3	18.9	18.3	— 6.9	— 9.9
Tuxpan	11.5	16.4	10.3	42.6	—10.4
St. Charles White	15.3	17.1	12.4	11.8	—19.0
Hastings' Prolific	17.5	16.5	13.6	— 5.7	—22.3
Reese Drouth Resister	19.7	29.4	15.0	49.2	—23.9
Strawberry	21.9	21.2	16.4	— 3.2	—25.1
Thomas (No. 5517)	24.5	22.7	18.0	— 7.3	—26.5
Average	18.9	20.1	18.0	6.3	— 4.8

Results at Chillicothe

Texas Substation No. 12 is located in Hardeman County 5½ miles southwest of Chillicothe. The average annual rainfall for the period of the test was 28.14 inches, of which 14.35 inches occurred during the months of March to July, inclusive.

The test at Chillicothe was conducted according to a somewhat different plan from those at other stations, being part of a test designed to compare the productiveness of corn and grain sorghums at six dates of planting. Only four varieties of corn were included and these were planted at successive intervals of approximately fifteen days, from March 15 to June 1.

The annual and corrected average yields of these four varieties for each planting are shown in Table 50. The percentage rating in this table was determined by dividing the average yield of a variety for any planting by the average yield of all varieties at all plantings for the same period of years.

Mexican June made the highest yield in each of the six plantings, Surcropper ranked second in average yield, while Chisholm and Strawberry were practically alike. All varieties showed a general reduction in yield as planting was delayed after March 15 and the average yields of the June 1 planting were 28.7 per cent lower than those of March 15.

The data from Chillicothe, because they include six plantings, are particularly useful in showing the differences between varieties in their reaction to late planting. This is illustrated by the regression lines in Figure 12. These regression lines represent a statistical estimate, based on the nine years' data in Table 50 of the average yields of each variety at any date of planting between March 15 and June 1.

These lines show, not only that Mexican June is clearly the most productive variety, but also that it is less subject to reduction in yield

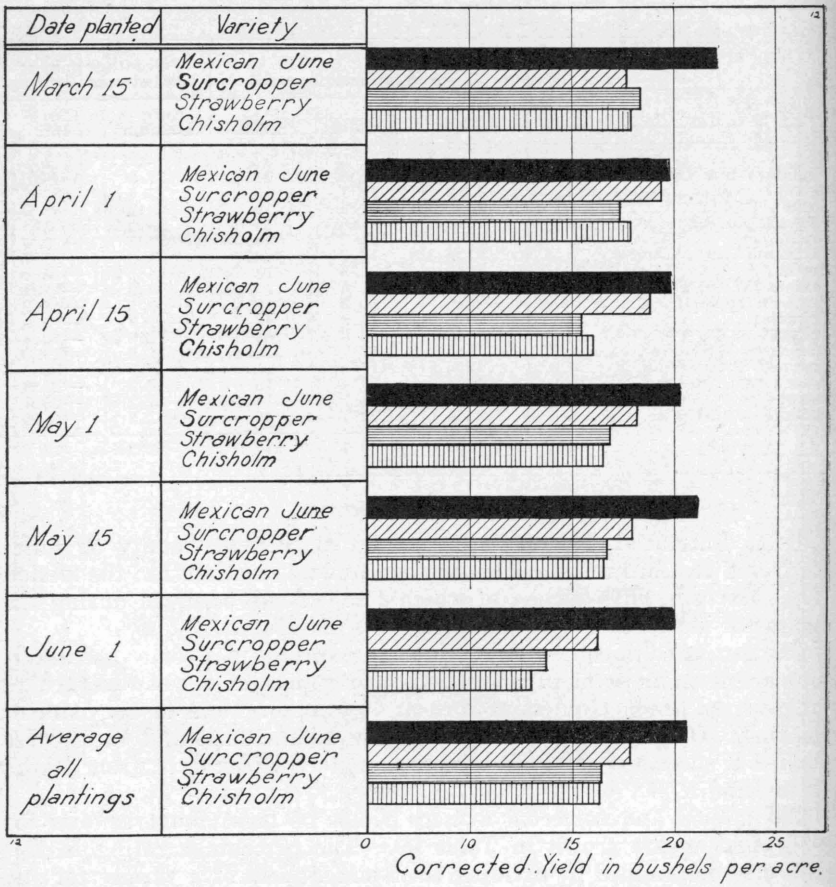

Fig. 11.—Yields of four varieties of corn at six dates of planting, Texas Substation No. 12, Chillicothe. These results are applicable to Northwest Texas, and to the heavier soils in the counties of Region No. 9 see map (Fig. 15).

as a result of late planting. In this respect Surcropper ranks next, while Strawberry and Chisholm rank third and fourth, respectively.

These results are rather convincing in refuting the opinion very commonly expressed that June corn is most productive when planted later than other varieties of corn are ordinarily planted. It is true, that the *differences* in yield between June corn and other varieties become more pronounced and noticeable as planting is delayed, but so far as *actual* yields are concerned June corn resembles other varieties in making higher yields at earlier plantings. It differs from other varieties mainly in the degree of reduction that results from late planting.

Although very little corn is grown in Hardeman County, the results from Chillicothe are useful in showing approximately what may be expected from corn in regions of Texas, that have an annual rainfall of less than 30 inches and are also subject to hot, dry winds.

It is doubtful whether any variety except Mexican June deserves consideration under these conditions and incidentally it may be mentioned that even this variety does not compare with the sorghums in grain production.

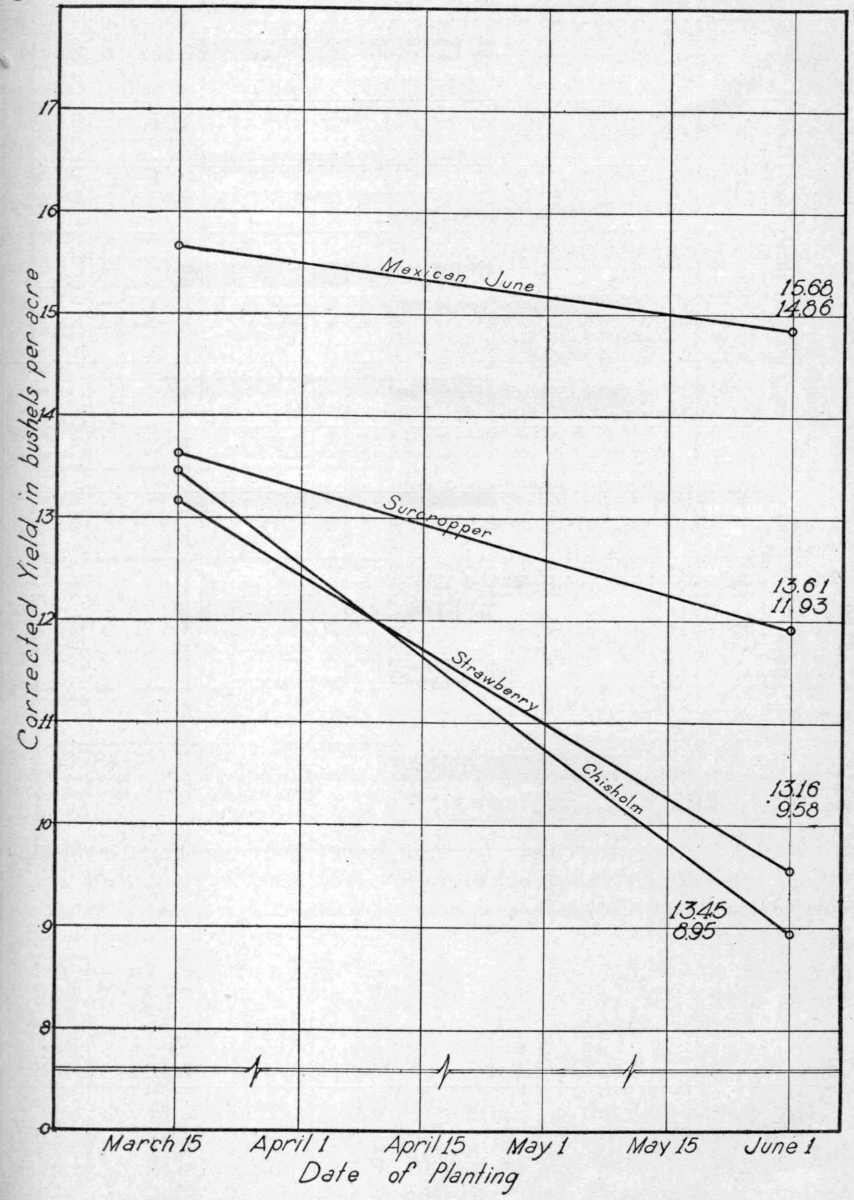

Fig. 12.—The effect of time of planting corn on four varieties at Texas Substation No. 12, Chillicothe. These regression lines which are based on the data in Table 50, illustrate the differences between varieties in their reaction to time of planting.

Table 50.—Annual and average yields of four varieties at six dates of planting, Texas Substation No. 12, Chillicothe.

Date Planted	Variety	Yield in bushels per acre									Percentage rating	Corrected yield
		1919	1920	1921	1922	1923	1924	1925	1926	1927		
Mar. 15	Mexican June	5.3	18.6	21.4	28.1	.....	.....	.....	31.6	21.4	133.5	17.0
	Surcropper	24.2	12.8	9.1	16.0	3.4	.....	.....	9.5	21.0	99.3	12.6
	Strawberry	.....	.....	20.4	10.8	5.4	.....	.....	18.4	17.2	104.4	13.3
	Chisholm	29.6	17.0	22.8	5.1	4.2	.....	.....	0	19.5	101.4	12.9
	Average	19.7	16.1	18.4	15.0	4.3	.....	.....	14.9	19.8	112.3	14.3
April 1	Mexican June	9.6	17.5	15.9	16.4	.....	15.9	.....	20.8	27.0	115.0	14.6
	Surcropper	29.8	17.7	22.0	14.3	5.7	7.0	.....	3.0	23.6	112.4	14.3
	Strawberry	.....	.....	15.9	7.7	2.6	14.3	.....	12.5	27.0	97.8	12.4
	Chisholm	23.8	12.3	18.9	12.5	2.3	11.1	.....	2.4	27.0	100.7	12.8
	Average	21.1	15.8	18.2	12.7	3.5	12.1	.....	9.7	26.2	108.8	13.8
April 15	Mexican June	5.7	20.5	14.4	10.0	.....	12.9	0	27.4	32.2	109.2	13.9
	Surcropper	15.2	15.8	9.0	7.3	6.7	13.8	0	20.2	26.2	100.0	12.7
	Strawberry	.....	.....	10.3	5.6	.4	7.2	0	23.2	24.0	81.5	10.4
	Chisholm	11.8	13.0	9.8	7.8	2.3	8.7	2.3	24.4	19.1	86.6	11.0
	Average	10.9	16.4	10.9	7.7	3.1	10.6	.6	23.8	25.4	96.1	12.2
May 1	Mexican June	.4	29.2	13.2	8.2	.....	10.9	1.1	34.5	37.5	119.9	15.2
	Surcropper	15.9	11.9	9.2	6.1	1.1	10.9	0	33.9	28.9	103.2	13.1
	Strawberry	.....	.....	7.3	2.4	0	5.0	0	31.6	35.2	93.6	11.9
	Chisholm	15.6	12.2	8.3	9.1	.1	5.0	0	26.8	27.4	91.3	11.6
	Average	10.6	17.8	9.5	6.4	.4	8.0	.3	31.7	32.2	102.4	13.0
May 15	Mexican June	0	30.7	7.3	3.2	.....	21.7	11.4	36.9	32.2	127.0	16.1
	Surcropper	5.0	12.8	4.9	6.4	0	14.5	4.9	35.1	31.9	100.8	12.8
	Strawberry	.....	.....	5.4	.4	0	11.5	4.0	30.4	27.8	91.1	11.6
	Chisholm	1.3	16.9	4.1	2.6	.....	19.3	2.1	30.4	26.6	90.6	11.5
	Average	2.1	20.1	5.4	3.2	0	16.8	5.6	33.2	29.6	100.8	12.8
June 1	Mexican June	0	.....	3.8	0	.....	25.8	27.8	29.2	24.8	116.9	14.8
	Surcropper	0	.....	7.4	.6	0	16.9	13.2	27.4	19.9	87.7	11.1
	Strawberry	.....	.....	.7	0	0	6.8	13.1	23.8	14.2	67.7	8.6
	Chisholm	0	.....	3.0	0	0	11.9	7.1	17.3	17.6	58.2	7.4
	Average	0	.....	3.7	.2	0	15.4	15.3	24.4	19.1	80.3	10.2
Average all plantings	Mexican June	3.5	23.3	12.7	11.0	.....	17.4	10.1	30.1	29.2	122.0	15.5
	Surcropper	15.0	14.2	10.3	8.4	2.8	12.6	4.5	21.5	25.2	100.0	12.7
	Strawberry	.....	.....	10.0	4.9	1.4	9.0	4.3	23.2	24.2	88.7	11.3
	Chisholm	13.7	14.3	11.1	6.2	1.5	11.2	2.9	16.9	22.9	82.2	11.2

Results at Spur

Texas Substation No. 7 is located in Dickens County, one mile west of Spur. The soils, Abilene clay loam and Miles clay loam, are potentially very productive. The main limiting factor in corn production in this region is a lack of sufficient moisture at critical periods in the development of the corn plant, the average annual rainfall in the region being less than 22 inches. The average date of last killing frost in the spring for a period of 17 years falls on March 27.

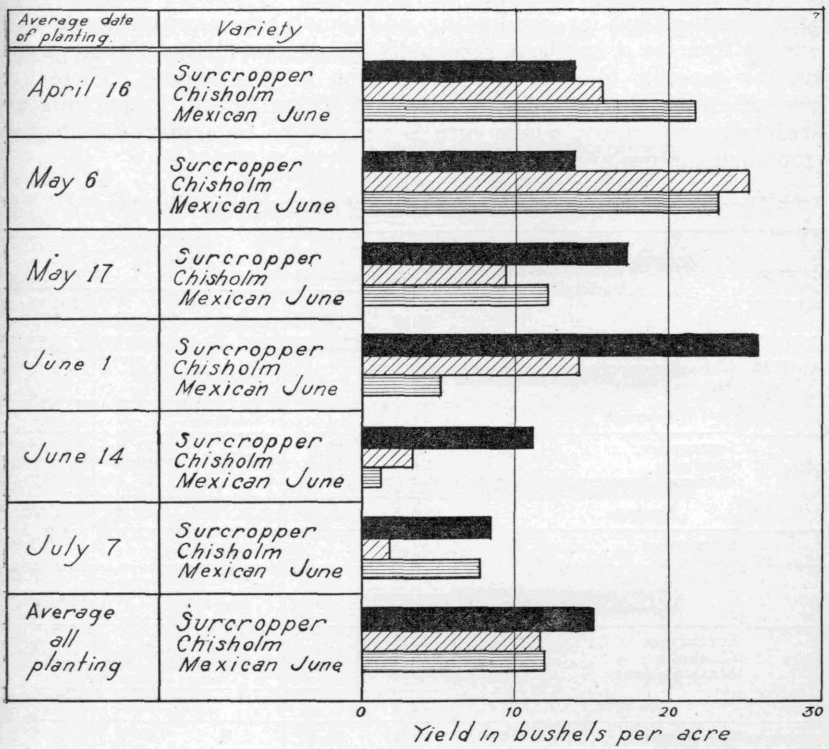

Fig. 13.—Yields of three varieties of corn at six dates of planting in 1919, Texas Substation No. 7, Spur.

A variety-date-of-planting test with corn was conducted at Spur from 1919 to 1923, inclusive. Because the dates of planting varied greatly from year to year, and some varieties were grown only a single season, the results are difficult to interpret. It is possible, however, to make an approximate summary for three varieties for the period 1919-1921. These are shown in Table 51. In addition to the data shown here, it may be mentioned that in 1922, four varieties planted on April 17 made a few ears, while eight varieties planted on May 30 were complete failures. In 1923, Surcropper, Strawberry, and Pioneer were complete

failures in two plantings, while three varieties of corn received from Colorado produced an average of 11.4 bushels per acre when planted on April 1 and an average of 7.7 bushels when planted on May 1.

These results considered in connection with those in Table 51 show that the earlier plantings are in general the more productive. The data are less conclusive in indicating the most productive variety, although each of the averages in Table 49 shows Surcropper to be higher in yield than either Chisholm or Mexican June. Further tests would be needed to substantiate such a conclusion. There is, however, very little justification for conducting additional experimental work with corn at Spur as it has been repeatedly demonstrated that the sorghums are far superior to corn as a grain crop in this region. There are, however, a number of counties in West Texas in which the soils are predominantly sandy, where corn is proving to be a more satisfactory crop than the grain sorghums.

Table 51.—Yields of three varieties at several dates of planting, Texas Substation No. 7, Spur.

Average date of planting	Variety	Yield in bushels per acre			Average	
		1919	1920	1921	1919-1920	1919 and 1921
April 16	Surcropper	13.8	.....	.....	.....	.....
	Chisholm	15.6	.....	.....	.....	.....
	Mexican June	21.8	.....	.....	.....	.....
	Average	17.1	.....	.....	.....	.....
May 6	Surcropper	13.9	11.9	.....	12.9	.....
	Chisholm	25.2	12.8	.....	19.0	.....
	Mexican June	23.3	11.3	.....	17.3	.....
	Average	20.8	12.0	.....	16.4	.....
May 17	Surcropper	17.2	.....	4.6	.....	10.9
	Chisholm	9.2	.....	.....	.....	.....
	Mexican June	12.0	.....	2.0	.....	7.0
	Average	12.8	.....	3.3	.....	9.0
June 1	Surcropper	25.8	.....	.....	.....	.....
	Chisholm	14.1	.....	.....	.....	.....
	Mexican June	5.0	.....	.....	.....	.....
	Average	15.0	.....	.....	.....	.....
June 14	Surcropper	11.3	22.6	5.0	17.0	8.2
	Chisholm	3.2	11.9	.....	7.6	.....
	Mexican June	1.2	12.8	3.7	7.0	2.5
	Average	5.2	15.8	4.4	10.5	5.4
July 7	Surcropper	8.4	.....	.....	.....	.....
	Chisholm	1.9	.....	.....	.....	.....
	Mexican June	7.8	.....	.....	.....	.....
	Average	6.0	.....	.....	.....	.....
Average all plantings	Surcropper	15.1	17.2	4.8	16.2	10.0
	Chisholm	11.5	12.4	.....	12.0	.....
	Mexican June	11.9	12.0	2.8	12.0	7.4

Results at Pecos

Texas Substation No. 9, before its removal to a new site in 1922 and during the period of the test here reported, was located 3.5 miles west of Pecos in Reeves County. The soil types on this location are Reeves silty clay loam and Reeves fine sandy loam. Crops in this region can ordinarily be grown only under irrigation, as the average annual rainfall is less than 12 inches, although it was practically 15 inches during the three years covered by the test. Due to high temperatures, excessive wind movement, and considerable evaporation, this region is less suitable to corn than other crops, even though the limited rainfall could be adequately supplemented by irrigation.

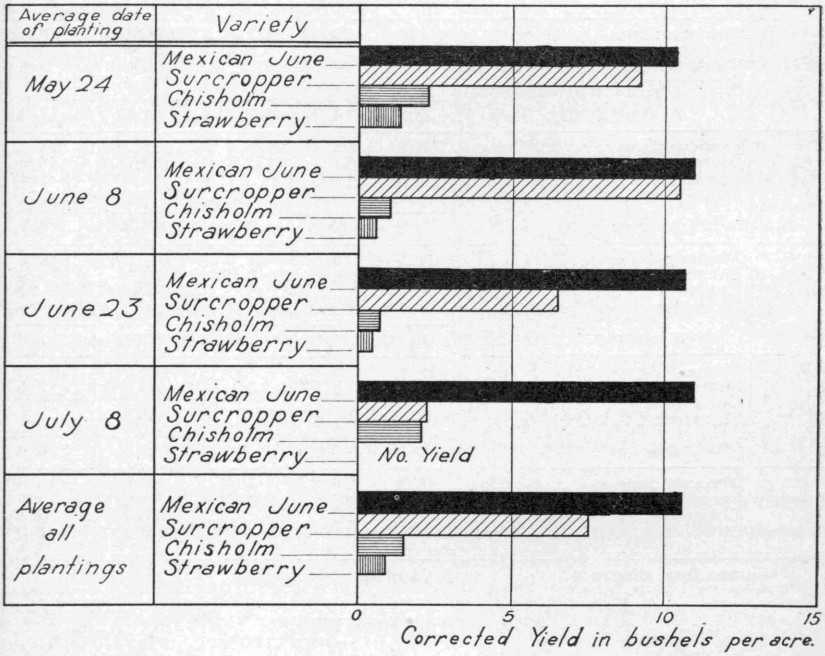

Fig. 14.—Yields of corn varieties at successive dates of planting at Texas Substation No. 9, Pecos. This corn was grown under partial irrigation.

A variety date-test was conducted at Pecos during the three years, 1919-1921, inclusive. Four varieties were included and four dates of planting are tested. The dates of planting were not identical each year but were sufficiently alike to be considered together in averaging the results. As Mexican June was the only variety grown every year, the average yields of this variety are used as a standard in computing the percentage rating and the corrected yields.

Table 52 shows the results of the three years' test at Pecos. Mexican June is clearly the most productive variety, exceeding all other varieties

in average yields for each of the four comparisons and in actual yields in ten of the eleven individual comparisons.

The effects of time of planting are not so pronounced. The yields of Mexican June are practically identical at each of the four dates of planting. Other varieties show a slight decrease as planting is delayed, though the highest average yield for all varieties combined occurs in the second planting.

Table 52.—Annual and average yields of four varieties at four dates of planting, Texas Substation No. 9, Pecos.

Average date of planting	Variety	Yield in bushels per acre			Percentage rating	Corrected yield
		1919	1920	1921		
May 24	Mexican June	2.1	16.9	*12.2	98.1	10.4
	Surcropper	.....	11.5	† 8.4	84.8	9.0
	Chisholm	2.2	.....	.....	26.8	2.8
	Strawberry	.....	.....	1.2	15.4	1.6
	Average	2.2	14.2	7.3	74.5	7.9
June 8	Mexican June	3.3	23.2	* 6.7	104.7	11.1
	Surcropper	.....	21.1	† 2.6	100.0	10.6
	Chisholm	1.0	.....	.....	12.2	1.3
	Strawberry	.....	.....	.5	6.4	.7
	Average	2.2	22.2	3.3	86.8	9.2
June 23	Mexican June	11.5	16.3	* 4.5	101.9	10.8
	Surcropper	.....	11.8	† 2.9	62.7	6.6
	Chisholm	.7	.....	.....	8.5	.9
	Strawberry	.....	.....	.4	5.1	.5
	Average	6.1	14.0	2.6	71.7	7.6
July 8	Mexican June	15.8	6.7	.....	100.0	11.2
	Surcropper	.....	3.9	.....	24.7	2.6
	Chisholm	1.9	.....	.....	23.2	2.4
	Strawberry	.....	.....	.....	.....	.....
	Average	8.8	5.3	.....	62.5	6.6
Average all plantings	Mexican June	8.2	15.8	* 7.8	100.0	10.6
	Surcropper	.....	12.1	† 4.6	71.2	7.5
	Chisholm	1.4	.....	.....	17.1	1.8
	Strawberry	.....	.....	.7	9.0	1.0

*Average three strains. †Average two strains.

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The writer of this Bulletin is responsible only for the interpretation given the data. Credit for the planning and direction of this experiment should go to Mr. A. B. Conner, who planned and directed the work from 1918 to 1923, and to Mr. E. B. Reynolds, under whose supervision the experiment has been continued since 1923. Particular credit is due the superintendents and former superintendents of the substations who performed the field operations and collected the data. The size of this task may be appreciated when it is considered that this test involved a total of approximately 300 acres under controlled experimental conditions and comprised over 4,000 individual plats.

Sections of the Bulletin dealing with the results of each station separately have been read and approved by the present superintendents of the respective stations, and former superintendents who are still members of the staff. In this connection the writer wishes to acknowledge the assistance and helpful suggestions of Messrs. R. A. Hall, P. R. Johnson, R. H. Stansel, R. H. Wyche, Henry Dunlavy, P. B. Dunkle, R. E. Dickson, J. J. Bayles, H. F. Morris, J. R. Quinby, G. T. McNess, D. T. Killough, and H. E. Rea.

SUMMARY AND CONCLUSIONS

1. A comparison of the yield of corn planted at different dates in eleven localities of Texas, shows that early-planted corn is usually more productive than medium-planted corn and practically always more productive than late-planted corn.

2. The loss in yield due to late planting varies with the season, the variety, and the locality. In general, the optimum time of planting is approximately the same as the average date of last frost.

3. There is an intimate relationship between time of planting and date of silking. The later that corn is planted the shorter is the period between planting and silking.

4. Some varieties of corn exhibit a wide range of adaptation to *regional* conditions and are almost equally productive in all regions of the State. Other varieties exhibit a medium or narrow range of regional adaptation and are productive in some regions and inferior in others.

5. Some varieties exhibit a wide range of adaptation to *seasonal* conditions, being only slightly affected by time of planting; others are greatly affected by time of planting.

6. Maximum yields of corn can be obtained only by planting at the optimum time and growing varieties which are well adapted to the region.

7. On the basis of the experimental results reported in this Bulletin, recommendations regarding time of planting and choice of varieties are made for various regions in Texas: These regions, which are shown in figure 15; were determined on the basis of soil type, rainfall, and temperature, which are undoubtedly the main factors affecting the adaptability of corn varieties in Texas. This division is necessarily rather arbitrary but in general the counties within each region resemble each other more closely than they resemble counties in other regions. It may be noted that the figures for rainfall, average annual temperature, and average date of last frost show the approximate range within each region. In the case of rainfall, the lower figure applies to the western part of the region, the higher figure to the eastern part. In the case of average temperature and date of last frost, the lower figure applies to the southern part of the region and the higher figure to the northern part. In other words, the rainfall decreases from east to west while the mean annual temperature decreases from north to south and

the average date of last frost becomes increasingly later from north to south.

A brief description of the conditions in each region, together with recommendations regarding the time of planting and the choice of varieties follows:

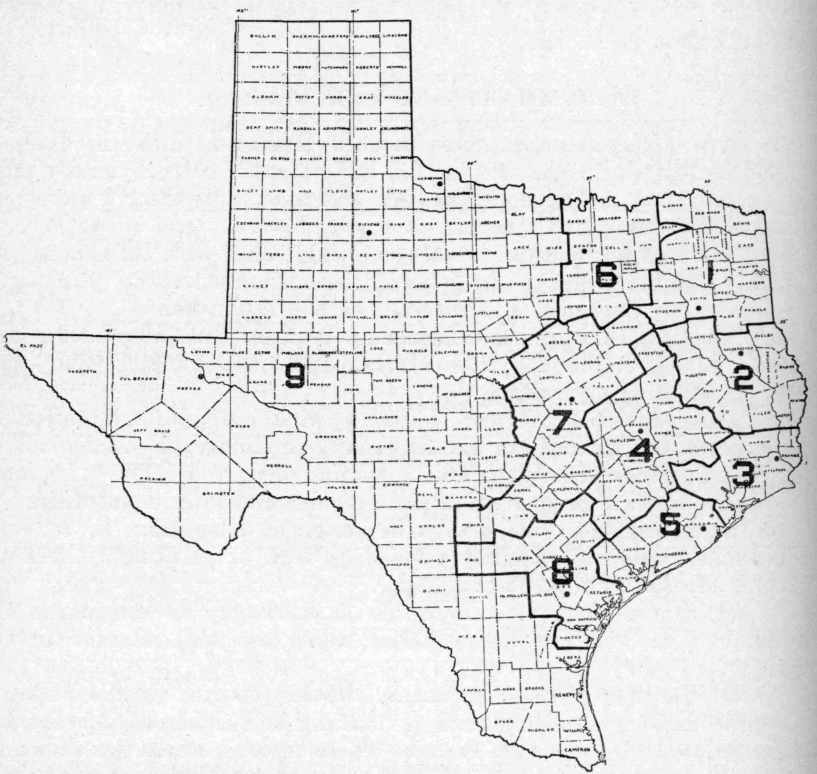

Fig. 15.—Map showing the regions to which the experimental results presented in this Bulletin are applicable. Black dots indicate the location of the experimental tests in each region.

Region No. 1

Location: Northeast Texas.

Soils: Shallow, light colored, fine sandy loams on clay subsoil.

Average annual rainfall: 40-47 inches.

Average annual temperature: 64°-65° F.

Average date last frost: March 15-March 25.

Optimum planting time: Same as last frost date.

Varieties for maximum yield: Davis Prolific, early planting; Surcropper, late planting; Chisholm, medium or late planting.

Varieties for early planting: Davis Prolific, Ferguson Yellow Dent, Surcropper.

Varieties for medium planting: Surcropper, Chisholm, Strawberry.

Varieties for late planting: Surcropper, Chisholm, Ferguson Yellow Dent.

Varieties for all planting dates: Surcropper, Chisholm, Ferguson Yellow Dent.

Region No. 2

Location: Central East Texas.

Soils: Mainly fine sandy loams, underlain by very nearly impervious subsoil, in southern part, considerable areas of red sandy soils.

Average annual rainfall: 40-50 inches.

Average annual temperature: 66°-67° F.

Average date last frost: March 5-March 15.

Optimum planting time: Same as last frost date.

Varieties for maximum yield: Blue Grain, early planting; Hastings' Prolific, early planting; Brazos White, early planting.

Varieties for early planting: Blue Grain, Hastings' Prolific, Brazos White.

Varieties for medium planting: Ferguson Yellow Dent, Surcropper, Brazos White.

Varieties for late planting: Blount's Prolific, Brazos White, Hastings' Prolific.

Varieties for all planting dates: Hastings' Prolific, Brazos White, Blount's Prolific, Blue Grain.

Region No. 3

Location: Southeast Texas.

Soils: Northern part, sandy soils with heavy subsoils, southern part heavy dark gray and black clays.

Average annual rainfall: 45-52 inches.

Average annual temperature: 68°-69° F.

Average date of last frost: February 20-March 5.

Optimum planting date: March 15-March 30. Earlier plantings are injured by excessive moisture and root worms.

Varieties for all planting dates: Tuxpan, Hastings' Prolific, Surcropper.

Region No. 4

Location: East Central Texas.

Soils: Shallow sandy soils on very heavy, almost impervious subsoils. Considerable areas of rolling black lands in western part.

Average annual rainfall: 35-45 inches.

Average annual temperature: 66°-68° F.

Average date of last frost: March 1-March 20.

Optimum planting date: Same as last frost date.

Varieties for maximum yield: Strawberry, early planting; Chisholm, early planting; Ferguson Yellow Dent, early planting.

Varieties for early planting: Strawberry, Chisholm, Ferguson Yellow Dent.

Varieties for medium planting: Horton, Brazos White, Chisholm.

Varieties for late planting: Thomas, Blount's Prolific, Surcropper.

Varieties for all planting dates: Surcropper, Horton, Strawberry, Chisholm.

Region No. 5

Location: Central Gulf Coastal Plains.

Soils: Dark grey and black clays and clay loams. Some alluvial soils in central part between Colorado and Brazos rivers.

Average annual rainfall: 35-47 inches.

Average annual temperature: 69°-70° F.

Average date last frost: February 25-March 5.

Optimum planting date: Same as last frost date when soil conditions permit.

Varieties for maximum yields: Tuxpan, early planting; Brazos White, early planting; Surcropper, medium planting.

Varieties for early planting: Tuxpan, Brazos White, Hastings' Prolific.

Varieties for medium planting: Tuxpan, Brazos White, Surcropper.

Varieties for late planting: Brazos White, Hastings' Prolific, Surcropper.

Varieties for all planting dates: Tuxpan, Brazos White, Surcropper, Hastings' Prolific.

Region No. 6

Location: North Central Texas.

Soils: Mainly black or brown clays, strongly calcareous, narrow strip of sandy soil in western part.

Average annual rainfall: 32-38 inches.

Average annual temperature: 64°-65° F.

Average date last frost: March 15-March 30.

Optimum planting date: Same as last frost date.

Varieties for maximum yield: Denton Surcropper, early planting; Ferguson; Surcropper, early or medium planting; Strawberry, early planting.

Varieties for early planting: Denton Surcropper, Ferguson Surcropper, Strawberry.

Varieties for medium planting: Ferguson Surcropper, Denton Surcropper, Bloody Butcher.

Varieties for late plating: Ferguson Surcropper, Denton Surcropper, Ferguson Yellow Dent.

Varieties for all planting dates: Ferguson Surcropper, Denton Surcropper, Bloody Butcher.

Region No. 7

Location: Central Texas.

Soils: Mainly black and brown, calcareous clay soils. This region includes the main part of the Blacklands region.

Average annual rainfall: 28-36 inches.

Average annual temperature: 66°-68° F.

Average date of last frost: March 1-March 20.

Optimum planting date: Same as last frost date.

Varieties for maximum yields: Ferguson Yellow Dent, early planting; Brazos White, early planting; Mosshart Yellow Dent, early planting.

Varieties for early planting: Ferguson Yellow Dent, Brazos White, Mosshart Yellow Dent.

Varieties for medium planting: Gorham's Yellow Dent, Horton, Chisholm.

Varieties for late planting: Surcropper, Ferguson Yellow Dent, Mosshart Yellow Dent.

Varieties for all planting dates: Ferguson Yellow Dent, Surcropper, Mosshart Yellow Dent.

Region No. 8

Location: South Central Texas.

Soils: Mainly dark soils, more or less calcareous, ranging from fine sandy loams to clays.

Average annual rainfall: 25-31 inches.

Average annual temperature: 69°-71° F.

Average date last frost: February 5-February 28.

Optimum planting date: February 15-March 1.

Varieties for maximum yields: Reese Drouth Resister, medium planting; Thomas, early planting; Surcropper, medium planting.

Varieties for early planting: Thomas, Surcropper, Strawberry.

Varieties for medium planting: Reese Drouth Resister, Surcropper, Thomas.

Varieties for late planting: Surcropper, Oklahoma White Wonder, Virginia White Dent.

Varieties for all planting dates: Thomas, Surcropper, Reese Drouth Resister.

Region No. 9

Region No. 9 includes the entire western half of Texas. It includes many diverse soil types, ranging from fine sandy soils to clays. So far as corn is concerned, this region is uniform only in that it has a relatively low rainfall, ranging from 10-30 inches. For this reason, the grain sorghums prove to be superior to corn practically throughout the region, except in certain irrigated areas and in several counties, such as Collingsworth, Wheeler, Terry, and Gaines, where the soil is too sandy for grain sorghums but appears to be well adapted to corn in spite of

the low rainfall. Areas in Region No. 9 that are subject to hot dry winds, should grow no variety except Mexican June. Areas that are not subject to this hazard will probably find Surcropper more productive. These two varieties should meet the needs of practically the entire region. The limited data available on effect of time of planting in this region indicate that corn should be planted as early as seasonal conditions permit.