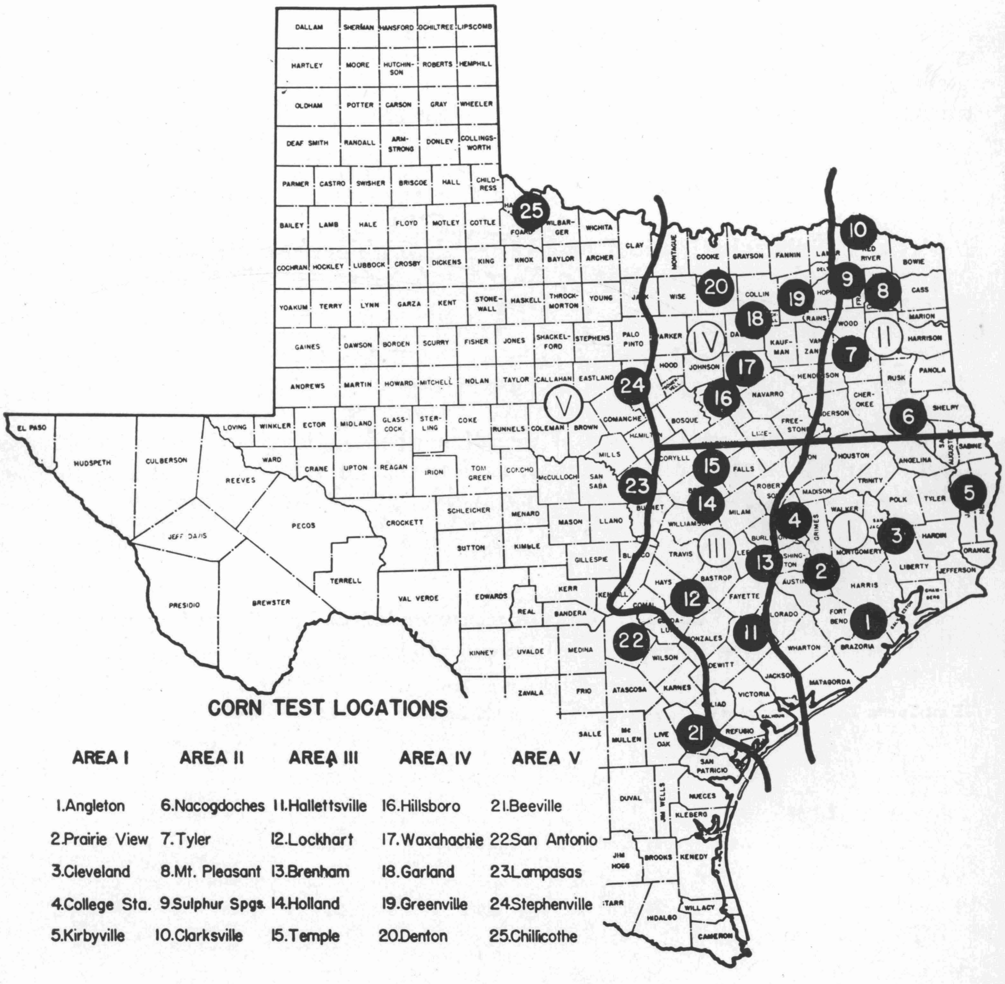
Bulletin 776

Corn Hybrids for Texas



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TEXAS AGRICULTURAL EXPERIMENT STATION

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DIGEST

The Texas corn acreage planted to hybrids increased from less than 1 percent of the total acreage in 1941 to 74.5 percent in 1953. Most of the present acreage is devoted to the newer, better-adapted hybrids—Texas 26, 28 and 30. These new hybrids usually outyield the older Texas hybrids by at least 10 percent.

Corn is one of the most important grain crops grown in Texas. In recent years, between 2,000,000 and 3,000,000 acres annually have been devoted to corn production. Corn and grain sorghums together furnish the major portion of the feed grain produced in the State.

Cultural and management practices which supply the high moisture and fertility requirements of corn are essential for good production. A discussion of such practices, with particular emphasis on optimum plant number, adequate fertilization and adapted soil-building crops, is presented in this bulletin. Recommendations concerning these important practices are summarized in Table 1.

Corn performance tests are conducted throughout the corn-growing region of the State each year to provide growers with information to be used as a basis for selecting the hybrids best suited to the various soil and climatic conditions in Texas. This bulletin contains information on hybrid and variety performance at 21 locations for the 3-year period, 1951-53. Texas has been divided into five areas for testing purposes. These areas, with the test locations in each, are shown on the front cover.

Information on yield and other characteristics of the hybrids and varieties tested is presented in tabular form as 3-year averages for each location and each area.

Considering both yield and other desirable characters, Texas 26, 28, 30, 15W and TRF 3 are recommended for production in Texas. A brief description is given of these five hybrids with their areas of recommendation.

The average yield for all entries at all locations was nearly 40 bushels per acre, which is almost two and one-half times the State's average corn yield for this 3-year period.

If each corn grower would practice good soil and water conservation measures, use commercial fertilizers as needed on his farm, and plant an adapted hybrid with the desired plant population, the State's average yield might approach 40 bushels per acre.

Table 1. General recommendations by soil areas for corn production in Texas

Soil areas	Planting dates	Plants per acre	Spacing, inches in row	Fertilizer at planting time[1]	Side-dressing of nitrogen[2]	Soil-improving legumes	Hybrids
East Texas Timber Country	Mar. 5-30	6,500-9,000	18-24			Hairy vetch, Single-tary peas, Austrian Winter peas, lespedeza	30, 28, 26, 15W
Loams and sandy loams				30-60-30	60		
Sandy soils				30-60-60	60		
Gulf Coast Prairie	Mar. 15-Apr. 15	9,000	18			Melilotus indica, Hubam and Madrid sweetclovers	30, 28, 15W
Blackland				40-40-0	40		
Loams and sandy loams				40-40-20	60		
Blackland Prairie	Mar. 1-20	6,500-9,000	18-24			Hubam, Madrid and Evergreen sweetclovers	28, 26, 30, 15W, TRF 3
Blackland				40-40-0	30		
Mixed Land				40-40-20	30		
Grand Prairie	Mar. 1-20	6,500	24			Hubam, Madrid and Evergreen sweetclovers	28, 26, 30, TRF 3
Blackland				40-40-0	30		
Mixed land				40-40-20	30		
West Cross Timbers	Mar. 15-30	6,500	24	15-30-15	30	Hairy vetch, Hubam and Madrid sweetclovers	28, 26, 30, TRF 3
Rio Grande Plain	Feb. 15-Mar. 1	6,500	24			Hubam clover and Melilotus indica	26, 28, TRF 3
Blackland				20-0-0	30		
Sands and sandy loams				20-40-0	30		
Lower Rio Grande Valley and Winter Garden dist. (under irrigation)	Feb. 1-Mar. 1	13,000	12			Hubam clover and Melilotus indica	28, 30
Clays and loams				40-40-0	90		
Sands and sandy loams				40-80-0	90		
Rolling Plains	Mar. 25-Apr. 10	6,500	24			Alfalfa, hairy vetch, Hubam and Madrid sweetclovers	28, 26
Clay loams				20-20-0	30		
Sands and sandy loams				30-30-0	30		
High Plains (irrigated)	Apr. 10-May 1	9,000	18			Alfalfa, hairy vetch, sweetclovers	28, 30
Clay loams				30-0-0	60		
Sands and sandy loams				30-30-0	60		

[1] Shown as pounds per acre of nitrogen (N), phosphoric acid (P_2O_5) and potash (K_2O), respectively.
[2] Shown as pounds per acre of nitrogen (N).

Corn Hybrids for Texas

T. E. McAFEE and J. S. ROGERS*

CORN HYBRIDS play an increasingly important role in Texas corn production. The Texas corn acreage planted to hybrids has increased from less than 1 percent of the total acreage in 1941 to 74.5 percent in 1953. In recent years, most of the Texas corn acreage has been devoted to the newer, better-adapted hybrids Texas 26, 28 and 30. These hybrids usually outyield the older Texas hybrids by at least 10 percent, and they are superior in other important characteristics, such as lodging and insect resistance.

Corn hybrid acreages, total corn acreages and average yields per acre from 1941 through 1953 are shown in Table 2. An increase in the average yield, as a result of the increase in acreage planted to corn hybrids, is not readily apparent from these data. The average per-acre yields for 1949 and 1950—22.5 and 21.0 bushels, respectively—afford some evidence that the expanded use of corn hybrids has increased yields. The low average yields for 1951-53 were caused by highly unfavorable weather conditions. Yields for this 3-year period would have been even lower had it not been for the widespread use of improved corn hybrids. More favorable growing seasons will provide better evidence of the ability of these hybrids to increase corn production in Texas.

Corn is one of the most important field crops grown in Texas. The acreage devoted to corn production in recent years has been exceeded only by that of cotton, grain sorghum and wheat. Corn and grain sorghums furnish the major portion of the feed grain produced in the State.

Annual Texas corn production is about 55,000,000 bushels. This amount fluctuates as a result of variable weather conditions and changing acreages. Most of this production is confined to the central and eastern parts of the State where moisture conditions are relatively favorable for corn production. However, some production does occur in certain parts of West Texas, but limited rainfall during the growing season in these areas makes corn production hazardous. Approximately three-fourths of the total corn crop is now fed as grain on the farm where it is produced. There is a tendency, however, for an increasing portion to be sold to local buyers soon after harvest. About 2.5 percent of the total Texas corn acreage is harvested as silage, and about 1 percent of the annual corn crop is used for human consumption.

In recent years, there has been a marked decline in total corn acreage in Texas as a result of expanded sorghum and cotton acreages. This trend, as well as the corn hybrid acreages and average per-acre yields for 1940-53, are shown in Figure 1. During this period, the annual harvested corn acreage dropped from slightly under 5,000,000 to a low of just over 2,000,000 in 1953. Future corn acreages will depend primarily on the relative value of competing crops, such as

Table 2. Total corn acreage, corn hybrid acreage; percentage of acreage planted to corn hybrids and average yield of corn in Texas, 1941-53[1]

Year	Harvested acreage	Hybrid acreage	Percentage planted to hybrids	Average yield, bu. per acre
1941	4,546,000	31,820	0.7	15.0
1942	4,910,000	58,920	1.2	14.5
1943	4,714,000	70,710	1.5	16.0
1944	3,960,000	118,800	3.0	14.4
1945	3,406,000	401,908	11.8	16.0
1946	3,236,000	744,280	23.0	17.0
1947	2,945,000	1,060,200	36.0	16.5
1948	2,709,000	1,368,045	50.5	16.5
1949	2,587,000	1,319,370	51.0	22.5
1950	2,921,000	1,664,970	57.0	21.0
1951	2,278,000	1,480,700	65.0	18.5
1952	2,232,000	1,595,880	71.5	18.5
1953	2,053,000	1,529,485	74.5	16.5
Av.	3,269,000			17.1

[1]Data from the Bureau of Agricultural Economics, U. S. Department of Agriculture.

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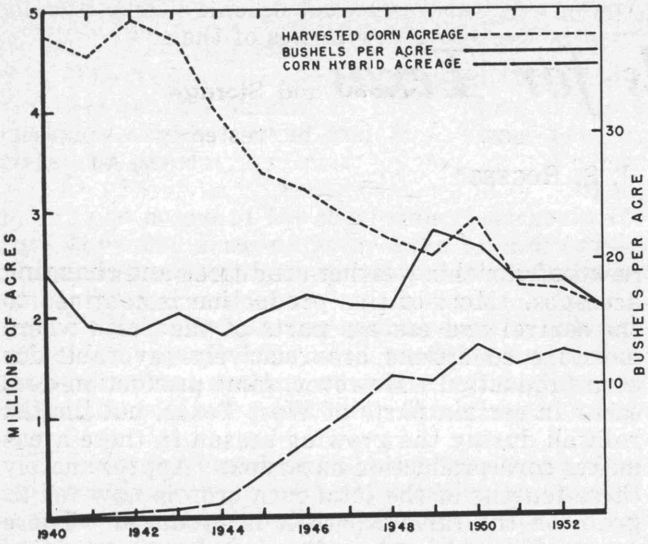

Figure 1. Harvested corn acreage, corn hybrid acreage and average yield of corn per acre in Texas, 1940-53.

cotton and grain sorghum, and the acreage control program which may be in effect.

Although a large acreage is planted to corn each year, the total Texas production is limited by the low average yield. The average yield for 1941-53 was only 17.1 bushels per acre. A shortage of moisture during the latter part of the growing season is a major cause of low yield. This limiting effect of insufficient moisture can be reduced through the proper use of fertilizers and soil-improving crops, and the planting of adapted hybrids.

CULTURAL AND MANAGEMENT PRACTICES

Corn is a rapid-growing plant and uses a large amount of water and fertilizer elements from the soil in a short period of time. During its period of rapid growth, corn requires more water per acre than any other field crop. The high requirement for water and plant food elements by corn is due to the large amount of plant material per acre that corn produces. For good corn production, cultural and management practices should be followed that will supply these high requirements. Wider use of such practices and the planting of adapted hybrids should do much to increase corn yields in Texas.

Water Conservation

Most of the corn in Texas is grown during the 5 months from March 1 through July 31. Lack of available moisture during the latter part of this period is one of the most acute problems confronting corn producers in Texas. Rainfall during the growing season is inadequate for good production in most years. Every effort should be made to hold the moisture received in the late fall and winter, as well as that received during the growing season, for use by the corn crop. Two important factors in water conservation are the intake and water-holding capacity of the soil. Improving the physical properties of the soil through the use of deep-rooted legumes and grasses in cropping systems will help to increase the supply of water available to the growing crop.

Soil-building Crops

The importance of soil organic matter should not be overlooked in any discussion of fertility practices for corn growing in Texas. Organic matter affects most of the important factors determining soil productivity, and long-time programs should include cropping systems that provide sources of organic matter. These sources will include crop residue, green-manure crops, deep-rooted grasses and legumes, and barnyard manure. The use of well-fertilized, adapted legumes and grasses in cropping systems will help solve the fertility and soil moisture problems. Fertilizers, such as phosphoric acid and potash, enable the legume crop to produce large yields of green material that can be used for grazing and hay, while the residue can be plowed under for soil improvement.

Fertilizers

Corn cannot produce good yields unless proper nutrients in sufficient quantities are available. The application of proper amounts and ratios of commercial fertilizers at or before the time of planting is recommended for those soils which respond to inorganic fertilizers. Side-dressings of nitrogen fertilizers in the early stages of growth give significant increases in yield where soil moisture conditions are favorable. A general fertilizer recommendation for each soil area is given in Table 1. Although it is impossible to make one general fertilizer recommendation for an area that will apply to every farm, good results will be obtained from using these recommendations.

Seedbed Preparation

Seedbed preparation usually consists of some type of plowing with a disc or moldboard plow in the fall or winter, followed by harrowing and bedding, and sometimes by rebedding. Regardless of the method used in seedbed preparation, corn requires a seedbed that is deep, well pulverized, in good physical tilth and free of weeds and clods at planting time. In areas where shortage of moisture at planting time is a problem, the seedbed should be prepared well in advance of planting time. Early preparation usually insures enough soil moisture for germination and early seedling growth.

Planting Dates

Dates for planting corn in Texas are subject to both regional and seasonal variation, but in most areas planting is begun near the average date of the last frost. As a result, most of the corn is planted during March. A rule adhered to by some successful corn growers is to plant when the soil at planting depth has reached a daily mean temperature of at least 55° F. This practice ordinarily insures quick and better germination, better stands and a good growing condition for the young seedling. Because of inadequate moisture during the latter part of the growing season, the planting date should enable the crop to be grown with the least injury possible from summer drouths. However, if the soil is still cold at planting, the reduced yield from poor stands and weak, slow-growing plants may be just as great as from summer drouth.

Planting Rates

The optimum number of corn plants per acre, or stand, is largely an individual problem and should receive special consideration by each grower. The planting rate depends largely on the fertility of the soil, the rainfall, and especially on the capacity of the soil to store and hold moisture. Commonly-used spacings of 30 to 36 inches in the row (about 4,000 to 6,000 plants per acre), under favorable moisture and fertility conditions, will not produce maximum corn yields. Results from spacing and fertilizer studies show that plant spacings of about 24 inches in the row (6,500 to 7,000 plants per acre) are best in dry areas, and for light sandy soils and other soils with only medium to low fertility. On highly fertile sandy or sandy loam soils, and on heavier soils with fairly high fertility, spacings of about 18 inches in the row (8,500 to 9,000 plants per acre) are recommended. Bottomland and some upland soils may produce maximum yields with thicker spacings (12,000 plants per acre) if a high level of fertility is maintained and if water conservation measures are practiced. Thick spacings also are required for maximum yields when corn is grown under irrigation.

Cultivation

Corn is cultivated primarily to control weeds and, to a less extent, to aerate the soil. Te be effective and economical, since cultivation is an expensive and time-consuming operation, the grower should be familiar with the functions, benefits and limitations of cultivation. The number of times to cultivate corn is an individual problem and depends primarily on the weed problem of the individual farm. Two to four cultivations of the growing crop usually are required for proper weed control; the last cultivation should be made when the corn is approximately waist high.

Deep cultivation, such as practiced by many growers, almost always reduces corn yields. It destroys or injures many roots, and weakens the corn plant. Deep cultivation is sometimes beneficial at the first cultivation to aerate the soil; injury is not likely to occur at this time as the young root system has not become widely distributed in the upper few inches of the soil.

Harvesting and Storage

The amount of corn harvested by mechanical pickers is increasing each year. However, much of the Texas corn crop is still harvested by hand. The method of harvest is not nearly as important as the time of harvest. Corn should be harvested as soon as it is dry enough for safe storage (about 15 percent moisture). Early harvesting is important to prevent as much damage as possible in the field from insects, ear rots and rodents. Stalk breakage and root lodging increase rapidly after the corn plant is dry. As a result, ears frequently are damaged and a higher percentage is lost in the harvesting process.

A large amount of the Texas corn crop is ruined in storage each year by weevils, rats and other rodents. Corn should be stored in a clean, insect-free bin or crib that is tight enough for effective fumigation. Where the corn crib has been made tight, 1,000 bushels of corn can be treated with 6 to 8 gallons of a mixture of three parts of ethylene dichloride and one part of carbon tetrachloride. This mixture and other suitable fumigants are on the market under various trade names. The vapors from most of these fumigants are dangerous to inhale and the manufacturers' precautions should be observed.

PERFORMANCE TESTS

The primary purpose of the corn performance tests conducted by the Texas Agricultural Experiment Station is to supply growers with information to be used as a basis for selecting the hybrids best suited to the various soil and climatic conditions in Texas. This testing program also affords an opportunity for comparing new hybrid combinations with those now grown throughout the State. New hybrids developed by the Texas Station are released after results from the tests have proved them superior to present hybrids.

Yields based on 3-year tests are considerably more reliable than those for one year, and furnish satisfactory information on which to predict future performance. This bulletin contains information on hybrid and variety performance for the 3-year period, 1951-53, at 21 locations throughout the State.

Description of Tests

Texas has been divided into five areas for testing purposes. These areas, with the test locations in each, are shown on the front cover. An attempt was made to include five test locations in each area. The division of the State in this manner affords an opportunity to determine any differences in adaptation to moisture levels or latitudes that may exist among the corn hybrids and varieties tested.

The five areas and test locations in each are shown with the soil type and meteorological data for each location in Table 3. Tests were conducted at four locations in addition to the ones shown. Due to unfavorable environmental conditions, tests were lost at Sulphur Springs in area 2, at Hillsboro in area 4 and at Lampasas and Chillicothe in area 5. Most of the tests were conducted at substations, but some were grown with cooperating farmers.

Each test contained 25 entries. They were selected from Texas hybrids developed by the Texas Agricultural Experiment Station and are now being grown by farmers; commercial hybrids developed by commercial seed companies; experimental hybrids—new hybrid combinations developed by the Experiment Station; and open-pollinated varieties.

Of the 25 entries, 13 were tested at all locations during 1951-53, while at least 15 were kept constant within each area for this same period. The remaining entries, which were primarily experimental hybrids, varied with areas and years and are not included in this report. Data are presented for all entries which were tested at all locations in an area for the entire 3-year period.

All tests were designed as 5 x 5 (25 entry) triple lattices with six replications. Triple lattice analyses were made for each test, and yield adjustments were made when significant gains in precision were obtained. Where no gain in precision was obtained, randomized block analyses were used.

A combined analysis was made for each location of the entries which were constant for the 3-year period. Average yields of the individual entries in each test, rather than the individual plot yields, were used in making these combined analyses. Actual averages were used in those experiments analyzed as a randomized block while adjusted averages were used in the case of triple lattice analyses. Standard errors were computed from the interaction of varieties x years, and the difference required for significance is reported for each location. A combined analysis also was made for each area, and the differences between varieties were tested for significance by the within-variety variance. The differences required for significance for both areas and individual locations are shown in Tables 5 through 9. The difference in yield between any two entries must equal or exceed the amount shown at the bottom of each column to give odds of 19 to 1 that such difference is real and not due to chance.

Discussion of Results

Information on the yield and other characteristics of the hybrids and varieties tested is complete for each of the 3 years at 15 of the 21 locations covered by this report. Only 2 years' results are available at the other six locations. The Clarksville test in 1952 and the Cleveland, Greenville and Stephenville tests in 1953 were lost because of unfavorable climatic conditions. Tests were not conducted at Waxahachie and San Antonio in 1951.

Table 4 emphasizes the differences among the hybrids and varieties tested in characteristics other than yield. Data are included on the 13 hybrids and varieties tested at all locations. Texas 15W, a white hybrid, was superior to all other hybrids in freedom from root lodging. Watson 124, Keystone 222, Texas 24, Funk G711 and Texas 30 were superior to other yellow hybrids in resistance to root lodging. Texas 15W again

Table 3. Soil types and meteorological data of locations at which tests were conducted

Area and test location	Soil types	Rainfall: Length of record, yrs.	Rainfall: Inches, Average annual	Rainfall: Inches, Average for growing season[1]	Length of growing season: Length of record, yrs.	Average no. of days	Average date: Last killing frost in spring	Average date: First killing frost in fall
Area 1								
Angleton	Lake Charles clay	39	48.09	19.81	37	281	Feb. 25	Dec. 3
Cleveland	Hockley fine sandy loam	42	51.15	22.26	39	261	Mar. 7	Nov. 23
Prairie View	Hockley fine sandy loam	42	40.45	17.79				
College Station	Miller clay	7	41.02	19.32	9	253	Mar. 6	Nov. 14
Kirbyville	Bowie fine sandy loam	22	49.36	21.93	12	242	Mar. 16	Nov. 13
Area 2								
Nacogdoches	Nacogdoches and Bowie fine sandy loam	35	49.36	22.04	34	248	Mar. 13	Nov. 16
Tyler	Kirvin and Bowie fine sandy loam	48	44.49	20.40	46	249	Mar. 15	Nov. 19
Mt. Pleasant	Kirvin fine sandy loam	29	43.87	20.18	26	228	Mar. 25	Nov. 8
Clarksville	Norwood clay loam	60	40.30	20.37	52	241	Mar. 19	Nov. 15
Area 3								
Hallettsville	Lufkin fine sandy loam	54	35.10	16.33	52	260	Mar. 4	Nov. 19
Lockhart	Houston Black clay	60	31.95	14.69	52	268	Mar. 3	Nov. 26
Brenham	Houston Black clay	60	39.90	17.35	54	260	Mar. 2	Nov. 17
Holland	Austin clay	60	34.43	16.34	53	257	Mar. 10	Nov. 22
Temple	Austin clay and Houston Black clay	40	34.48	15.86	37	250	Mar. 16	Nov. 21
Area 4								
Waxahachie	Lewisville clay	49	35.05	17.44	46	232	Mar. 25	Nov. 12
Garland	Houston Black clay	50	36.16	18.39	57	250	Mar. 18	Nov. 23
Denton	Denton and San Saba clays	40	32.76	16.01	37	243	Mar. 15	Nov. 13
Greenville	Hunt clay	25	40.18	19.81	42	234	Mar. 23	Nov. 12
Area 5								
Beeville	Clareville clay loam	49	30.23	14.20	45	294	Feb. 16	Dec. 7
San Antonio	Frio clay loam	50	27.18	12.86	62	279	Feb. 24	Nov. 30
Stephenville	Windthorst and Stephenville fine sandy loam	49	30.80	15.28	42	236	Mar. 23	Nov. 14

[1] March through July.

Table 4. Performance data on yield and other characters, 1951-53

Entries	Acre yield, bu.	Root lodging, %	Stalk breakage, %	Unsound ears, %	Worm damage, score[1]	Shelling %	Days to silk	Ears per plant
Texas 28	44.5	14.9	8.9	7.8	2.6	80.5	83.4	1.1
Texas 26	43.3	14.0	10.1	7.0	2.7	80.2	83.1	1.1
Texas 30	43.0	10.6	8.3	6.7	2.2	80.3	83.9	1.0
Texas 15W	40.9	9.1	6.0	8.1	2.7	79.3	84.5	1.1
Texas 24	40.7	9.8	8.2	7.4	2.4	80.5	84.0	1.1
Watson 124	39.5	9.3	8.5	8.0	2.6	79.9	83.6	1.0
Keystone 222	39.4	9.5	17.7	8.6	3.0	80.5	84.1	1.1
United U72	39.3	12.4	11.6	7.6	2.6	81.6	83.3	1.0
TRF 3	39.1	10.4	8.8	7.4	2.6	77.5	81.5	1.0
Texas 11W	38.2	14.6	10.5	7.6	2.3	78.5	85.5	1.0
Funk G711	37.8	9.9	17.7	8.6	2.7	79.2	84.9	1.0
Surcropper	33.1	15.3	13.1	10.9	2.6	77.5	84.3	.9
Ferguson's Yellow Dent	28.4	16.8	14.7	14.2	2.7	78.0	85.3	.8
Number of tests included	56	46	44	52	53	20	22	49

[1]Refers to the relative degree of damage to the ears; 1 indicates practically no damage, while 2, 3, 4 and 5 represent successively greater degrees of damage.

led other hybrids in resistance to stalk breakage. Texas 24, Texas 30 and Watson 124 were the yellow hybrids most resistant to stalk breakage. Funk G711 and Keystone 222 were especially susceptible to stalk breakage.

Growers who plan to harvest their fields with mechanical pickers should be especially interested in the amount of stalk breakage that occurs, since ears on broken stalks frequently are missed by a mechanical harvester. Resistance to root lodging is not quite as important from this standpoint, since mechanical harvesters usually recover a high percentage of root-lodged plants.

Texas 30 had the lowest percentage of unsound ears, followed by Texas 26. Texas 30 had the lowest worm damage score of the yellow hybrids, followed by Texas 24. Texas 11W was superior to other white hybrids in this respect.

In locations where earworms, rots and weevil damage are known to cause losses, Texas 30 and 24 should produce higher quality corn than the other yellow hybrids. Both are low in earworm damage and percentage of unsound ears. These two hybrids have a better shuck cover than the other yellow hybrids, and both show considerable resistance to root lodging and stalk breakage. Therefore, they can remain longer in the field with less damage than the other yellow hybrids.

United U72 had the highest shelling percentage of any hybrid studied, and TRF 3 and Surcropper had the lowest shelling percentages. TRF 3 was the earliest hybrid tested, and Texas 11W was the latest. The number of days from planting until 50 percent of the plants are in silk was used as a measure of maturity. All hybrids included in the 3-year test had an average of 1.0 to 1.1 ears per plant, whereas the two open-pollinated varieties included in all tests had an average of 0.8 and 0.9 ear per plant.

Yields of the performance tests at the various locations are presented by test areas on the front cover. A brief discussion of the climate, soils and recommended cultural practices is given for each area. More specific recommendations for the various cultural practices are given in Table 1. Detailed annual results for each location are not included. The 3-year average for each location is shown, except at locations where only 2-years data are available. The average acre yields for the different areas ranged from 25 to 49 bushels. The average yield for all entries at all locations was almost 40 bushels per acre, Table 4.

Only those hybrids and varieties are reported on which data are available for the entire 3-year period included in this report. It was necessary to make exceptions in the case of Texas 26 and Funk G715, since they were not tested in 1951. However, comparable averages are reported for these two hybrids so that they can be compared with other entries in the tests.

Area 1—Southeastern

This area is made up of that part of South Texas east of the 40-inch rainfall line. Corn production is concentrated in the bottoms of the Trinity River and other streams, and on the well-drained sandy soils of the Coastal Prairie.

Although this area has early, warm spring weather, most corn is planted in March and April because of heavy early rain. Poor stands and reduced yields often occur as a result of too much moisture early in the season. The soils used for corn production benefit from both soil-improving crops and the use of inorganic fertilizers. Winter legumes, such as vetch and Austrian Winter peas, and summer legumes such as cowpeas, can be used successfully. A complete fertilizer is recommended at or before planting, and additional nitrogen should be used as a side-dressing early in the growing season.

The average yield of 48.4 bushels per acre for this area shows that it probably suffered less from summer drouth during 1951-53 than other areas.

Texas 28, 30, 24 and 26 had the highest average yields for this area, Table 5. Texas 15W was the highest yielding white hybrid. The test at College Station had the highest 3-year average

Table 5. Corn performance test, area 1, 1951-53

Entries	Bushels of shelled corn per acre					
	Angleton	Cleveland[1]	Prairie View	College Station	Kirbyville	Area average
Texas 28	45.6	65.0	60.0	70.5	37.7	55.1
Texas 30	40.6	66.8	62.0	70.0	37.6	54.6
Texas 24	41.6	70.4	57.6	70.1	36.4	54.2
Texas 26	42.8	69.5	56.0	70.5	36.8	54.0
Texas 15W	44.0	67.2	59.4	67.2	34.8	53.6
Watson 124	39.9	71.0	55.7	65.7	33.0	51.8
Texas 11W	41.9	62.4	52.2	64.6	36.4	50.7
Texas 20	38.4	64.0	57.3	64.3	33.9	50.7
Funk G711	37.2	63.6	56.4	63.7	34.7	50.2
Funk G715	33.7	65.4	56.0	60.8	36.9	49.5
Keystone 222	37.1	58.2	57.5	64.1	31.5	49.1
United U72	37.3	61.8	53.5	61.6	31.8	48.3
TRF 3	42.5	59.4	49.4	58.5	31.7	47.5
Surcropper	34.3	52.4	46.3	57.5	26.4	42.7
Ferguson's Yellow Dent	28.5	53.3	47.9	45.9	28.2	39.9
Tuxpan	29.4	48.8	38.0	39.0	27.4	35.6
Yellow Tuxpan	26.6	46.6	38.2	40.0	25.5	34.6
Average yield	37.4	61.0	53.0	63.2	32.5	48.4
Least sig. dif. 19:1	7.3	11.5	5.8	7.3	ns[2]	4.0

[1] Two-year average.
[2] No significant difference among entries.

Table 6. Corn performance test, area 2, 1951-53.

Entries	Bushels of shelled corn per acre				
	Nacogdoches	Tyler	Mt. Pleasant	Clarksville[1]	Area average
Texas 28	37.9	33.9	41.2	52.0	40.3
Texas 30	34.0	30.7	41.6	50.2	38.1
Texas 15W	33.3	25.4	43.2	53.6	37.5
TRF 3	32.1	31.8	40.8	48.8	37.4
Texas 26	34.2	33.8	34.6	48.3	36.7
Texas 24	31.5	27.0	40.8	49.2	36.0
Keystone 222	30.0	30.7	41.6	44.0	35.9
United U72	31.1	29.2	37.8	44.3	34.8
Texas 11W	30.3	25.2	41.4	45.0	34.6
Texas 20	31.3	28.5	36.9	44.0	34.4
Funk G711	30.6	29.4	40.2	39.0	34.4
Funk G715	29.8	25.2	37.8	48.2	34.1
Watson 124	32.4	26.2	36.2	44.0	33.9
Surcropper	28.6	20.4	33.5	39.4	29.6
Ferguson's Yellow Dent	24.0	18.7	33.4	32.0	26.6
Average yield	31.4	27.7	38.7	45.4	35.0
Least sig. dif. 19:1	5.6	4.7	ns[2]	ns[2]	3.5

[1] Two-year average.
[2] No significant difference among entries.

in this area. This test was conducted in the Brazos River Valley on soil that is in good physical condition and highly fertile. The high average yield shown for Cleveland is somewhat misleading since this test was lost in 1953, the most unfavorable season during the 3-year period. Consequently, the average yields shown for this location are probably high in comparison with locations involving all 3 years. Kirbyville had the lowest average yield of any location. The tests are conducted on a sandy soil and, as in most of that area, crops usually suffer from lack of soil moisture in midsummer.

Considering both yield and other characteristics, Texas 30, 28 and 24 are the recommended yellow hybrids for this area, and Texas 15W is the recommended white hybrid.

Area 2—Northeastern

This area, which is that part of North Texas east of the 40-inch rainfall line, usually has the most favorable climate for corn production in Texas. Most of the corn is grown on the better-drained bottomland and the moderately sandy uplands. These soils respond well to soil-building crops and commercial fertilizers. The use of both winter and summer legumes in a cropping system will benefit corn production. Vetch and Austrian Winter peas are used most commonly as winter legumes, while lespedeza and cowpeas are the summer legumes most frequently planted. A complete fertilizer should be used at or before corn planting and additional nitrogen should be added as a side-dressing early in the growing season.

Most of the corn in this area is planted in March. However, when spring rains are excessive, much of the corn is planted as late as May and June. Two of the 3 years covered in this report, 1952 and 1953, were very unfavorable for good corn production. Excessive spring rains followed by hot, dry summers caused severe reduction in corn yields over most of the area.

Texas 28, 30 and 26 were the highest yielding yellow hybrids in this area, Table 6. Texas 15W had the highest average yield of the white hybrids followed closely by TRF 3. Clarksville had the highest average yield of any location, but it is based on only 2 years' results, as the 1952 test was worthless because of unfavorable weather conditions. The other three locations had a low average yield for the 3-year period, indicating that growing conditions were less favorable in area 2 than in area 1. Tests were conducted at one other location in this area, but growing conditions were such that the information was unreliable.

Texas 28, 30, 24 and 26 are recommended as yellow hybrids for this area. Texas 15W and TRF 3 are recommended as white hybrids.

Area 3—South-central

This area, which is that part of South Texas receiving 30 to 40 inches of rainfall annually, is important in Texas corn production. Corn is grown on a wide variety of soils, but mostly on blackland and bottomland. These "heavy" soils are very responsive to soil-building crops and water conservation practices. The use of legumes in the cropping system such as the sweetclovers, will greatly benefit corn production. Commercial fertilizers are beneficial but are not so important as in areas of higher rainfall. In many instances, the addition of commercial fertilizer, especially phosphorus, to the soil-building legume is more beneficial than the addition of fertilizer to the corn crop.

Early warm temperatures in this area accompanied by favorable planting moisture, permits early planting of corn. As a result the corn often escapes the summer drouth, or is far enough along in its development that reduction in yield by drouths is not so serious as in other parts of the State.

The high average yield, as shown in Table 7, indicates that growing conditions were favorable throughout most of this area for the 3-year period.

The average at Hallettsville is based on only 2 years' results since testing at that location was not started until 1952. The high average yield at Lockhart is due to some extent to one or two supplemental irrigations in 1952 and 1953.

Table 7. Corn performance test, area 3, 1951-53

Entries	Bushels of shelled corn per acre					
	Hallettsville[1]	Lockhart	Brenham	Holland	Temple	Area average
Texas 26	51.3	75.3	66.6	38.2	45.7	55.7
Texas 28	49.6	72.9	64.5	35.6	46.7	54.2
Texas 30	49.2	78.1	62.7	34.5	44.6	54.1
Texas 15W	46.6	73.2	59.2	33.2	43.1	51.4
Texas 24	50.4	69.9	56.9	33.5	42.5	50.7
Keystone 222	50.6	70.8	58.0	33.5	40.8	50.7
Texas 8	45.5	67.8	55.1	34.7	46.1	50.2
Texas 18	46.6	70.0	59.3	32.6	39.3	49.8
United U72	44.8	67.1	55.2	34.3	43.7	49.3
Watson 124	44.5	68.7	57.4	32.1	40.5	48.9
Texas 11W	45.8	69.6	57.0	28.2	39.1	48.1
TRF 3	47.8	60.9	50.0	33.3	44.9	47.3
Funk G711	48.9	65.5	53.3	28.0	40.8	47.2
Surcropper	38.4	57.7	43.0	29.5	38.5	41.6
Ferguson's Yellow Dent	33.2	53.2	41.9	22.2	26.0	35.4
Average yield	46.2	68.0	56.0	32.2	41.5	49.0
Least sig. dif. 19:1	5.2	7.6	7.2	3.1	5.3	2.9

[1] Two-year average.

Table 8. Corn performance test, area 4, 1951-53

Entries	Bushels of shelled corn per acre				
	Waxahachie[1]	Garland	Denton	Greenville[1]	Area average
Texas 28	26.6	34.7	25.4	38.4	31.1
Texas 26	24.8	33.0	23.8	32.8	28.6
Texas 30	24.7	31.1	21.4	38.8	28.4
TRF 3	25.4	31.5	21.8	33.9	27.9
Texas 8	22.8	30.8	22.4	33.0	27.2
Texas 24	20.6	29.4	22.4	33.0	26.3
United U72	21.9	30.3	22.6	29.9	26.2
Keystone 222	20.8	27.5	20.6	37.3	26.0
Watson 124	21.8	27.3	21.3	34.4	25.8
Texas 18	20.4	27.7	20.1	31.2	24.7
Texas 15W	15.8	27.5	16.6	36.1	23.6
Funk G711	16.6	24.9	18.0	35.2	23.2
Texas 11W	19.6	23.5	17.5	29.0	22.0
Surcropper	16.6	24.6	14.5	27.4	20.5
Ferguson's Yellow Dent	9.8	16.0	8.5	18.6	13.0
Average yield	20.5	28.0	19.8	32.6	25.0
Least sig. dif. 19:1	7.1	5.3	10.1	9.2	2.8

[1] Two-year average.

Texas 26, 28 and 30 were the highest yielding yellow hybrids. Texas 15W had the highest yield of the white hybrids. These four hybrids are recommended to growers in this area.

Area 4—North-central

This is the major corn-growing area of the State and is that part of North Texas receiving 30 to 40 inches of rainfall annually. Most of the corn is grown on heavy blackland and clay bottomland. Shortage of moisture during the summer is the limiting factor on corn production. Practices to conserve and store moisture are very important. The use of deep-rooted legumes in a cropping system is especially beneficial to corn production. Commercial fertilizers are needed on some soils of the area to produce good corn yields; however, as in area 3, the greatest benefit from commercial fertilizer often comes from its use on soil-building crops.

This area experienced the most unfavorable weather for corn production in 1952 and 1953 of recent years. Adverse planting weather followed by hot, dry summers caused reduction in yields, and complete loss of the crop occurred in many locations. The low average yield for the area, and the low yield at each location shown in Table 8, reflects the adverse conditions of this area.

Tests were conducted at one other location in this area but no results were obtained because of adverse weather conditions.

Texas 28, 26 and 30 were the highest yielding yellow hybrids, and TRF 3 had the highest average yield of the white hybrids. These four hybrids are recommended for this area. In addition, Texas 15W is recommended for the better corn-growing soils, since it has produced good yields in better seasons and under more favorable conditions than those encountered during the 3-year period reported.

Area 5—Western

Only a small part of the State's corn crop is produced in this area of less than 30 inches of annual rainfall. Limited rainfall during the growing season and its poor distribution make corn production hazardous. Corn should not be grown in this area except on soils in good physical condition with a good soil-water relationship.

Green manure crops turned under ahead of corn are not successful in this area because of a scarcity of moisture for the growth and decomposition of the legume crop. However, legumes such as the sweetclovers, are beneficial in a cropping system to improve the moisture intake and moisture-holding capacity of the soil. Since moisture limits corn production in this area, commercial fertilizers are not so important as they are in other areas of the State.

Texas 26, 28 and United U72 had the highest average yield of the yellow hybrids and Texas 15W was the highest yielding white hybrid in this area, Table 9. These hybrids, along with Texas 30 and TRF 3, are recommended for this area.

The data for this area are inadequate and, consequently, the results are not as reliable as those for the other areas. Tests at Lampasas and Chillicothe were lost during the test period covered in this report. The test at Stephenville was lost in 1953 and testing was not started at San Antonio until 1952. Therefore, of the five test locations in Area 5, only one location, Beeville, has 3 complete years of data available. These crop failures reflect the hazards of corn production in this area of limited rainfall.

DESCRIPTION OF RECOMMENDED HYBRIDS

Considering both yield and other desirable characters, three yellow hybrids and one white hybrid developed by the Texas Station and one white hybrid developed by the Texas Research Foundation are recommended for corn production in Texas. A brief description of these five hybrids, with their areas of recommendation, follows:

Texas 26—A yellow hybrid produced by combining 325 x 203 as the seed parent, with 127C x 132A as the pollinator parent. This hybrid is slightly earlier than Texas 28 and 30. It produces medium-size ears with yellow dent-type grains that are rather large and deep yellow. This

Table 9. Corn performance test, area 5, 1951-53

Entries	Bushels of shelled corn per acre			
	Beeville	San Antonio[1]	Stephenville[1]	Area average
Texas 26	19.3	41.2	41.1	31.8
Texas 28	19.0	45.6	31.8	30.3
United U72	17.6	41.6	28.2	27.5
Texas 30	20.5	36.4	28.4	27.3
Texas 8	18.7	42.1	24.9	27.2
Texas 15W	19.6	37.7	25.8	26.6
Watson 124	17.9	37.0	27.6	26.1
TRF 3	17.6	33.6	30.0	25.7
Texas 24	18.6	36.1	25.0	25.4
Texas 11W	15.4	33.8	30.6	25.0
Texas 18	18.7	30.5	24.3	23.7
Keystone 222	18.6	32.5	22.4	23.6
Funk G711	16.5	29.4	24.6	22.5
Surcropper	15.4	33.8	20.4	22.1
Ferguson's Yellow Dent	11.8	18.2	21.8	16.5
Average yield	17.7	35.3	27.1	25.4
Least sig. dif. 19:1	3.0	12.1	9.7	4.7

[1] Two-year average.

hybrid has a wide range of adaptation and produces two good ears under favorable conditions. It is somewhat susceptible to earworms and ear rots and shows a moderate degree of root lodging. It is recommended primarily for areas 3, 4 and 5.

Texas 28—A yellow hybrid usually produced by combining 127C x 132A as the seed parent, with 325 x 303 as the pollinator parent. However, the reciprocal of this cross is sometimes used. Texas 28 is slightly later than Texas 26. It also produces larger ears than Texas 26 and has the same tendency to make two ears under favorable conditions. The grains produced are rather large and possess a good yellow color. This hybrid is somewhat resistant to earworms and ear rots and the ears ordinarily suffer only moderate damage. Although susceptible to root lodging, it is fairly resistant to stalk breakage. It has a very wide range of adaptation and is recommended for all areas of the State.

Texas 30—A yellow hybrid produced by combining 173D x 203 as the seed parent, with 325 x 303 as the pollinator parent. Texas 30 is similar to Texas 28 in maturity. It produces large ears with large, yellow dent-type grain. Although primarily a one-ear hybrid, it may produce two ears under optimum conditions. This hybrid is the most resistant of the yellow hybrids to earworms and ear rots. It is also resistant to root lodging and stalk breakage. Texas 30 can be grown successfully in all areas of the State. It does not yield as well as Texas 26 and 28 in areas of low rainfall.

Texas 15W—A white hybrid produced by combining K64 x R11 as the seed parent, with 61M x Mo22 as the pollinator parent. This hybrid is slightly later than the recommended yellow hybrids. It usually produces one ear per plant but may produce two under favorable conditions. The ears are small, with small dent-type grain. Texas 15W is slightly susceptible to earworm and ear rots, but it is not objectionable in either of these characteristics. This hybrid is superior to all other recommended hybrids in resistance to root lodging and stalk breakage. Texas 15W performs especially well under favorable moisture conditions and is recommended for areas 1, 2 and 3.

TRF 3—A white hybrid developed by the Texas Research Foundation and produced by combining 4413-C# x 4417-C# as the seed parent, with K55 x K64 as the pollinator parent. TRF 3 is distinctly earlier than any of the other recommended hybrids. It characteristically produces one large ear with fairly large Surcropper-type grain. This hybrid is slightly susceptible to earworms and ear-rot organisms and to root lodging and stalk breakage, but it is not especially objectionable in any of these characteristics. Because of its earliness, TRF 3 may be expected to outyield Texas 15W under low-yield, drouthy conditions. It is recommended primarily for areas 4 and 5.

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