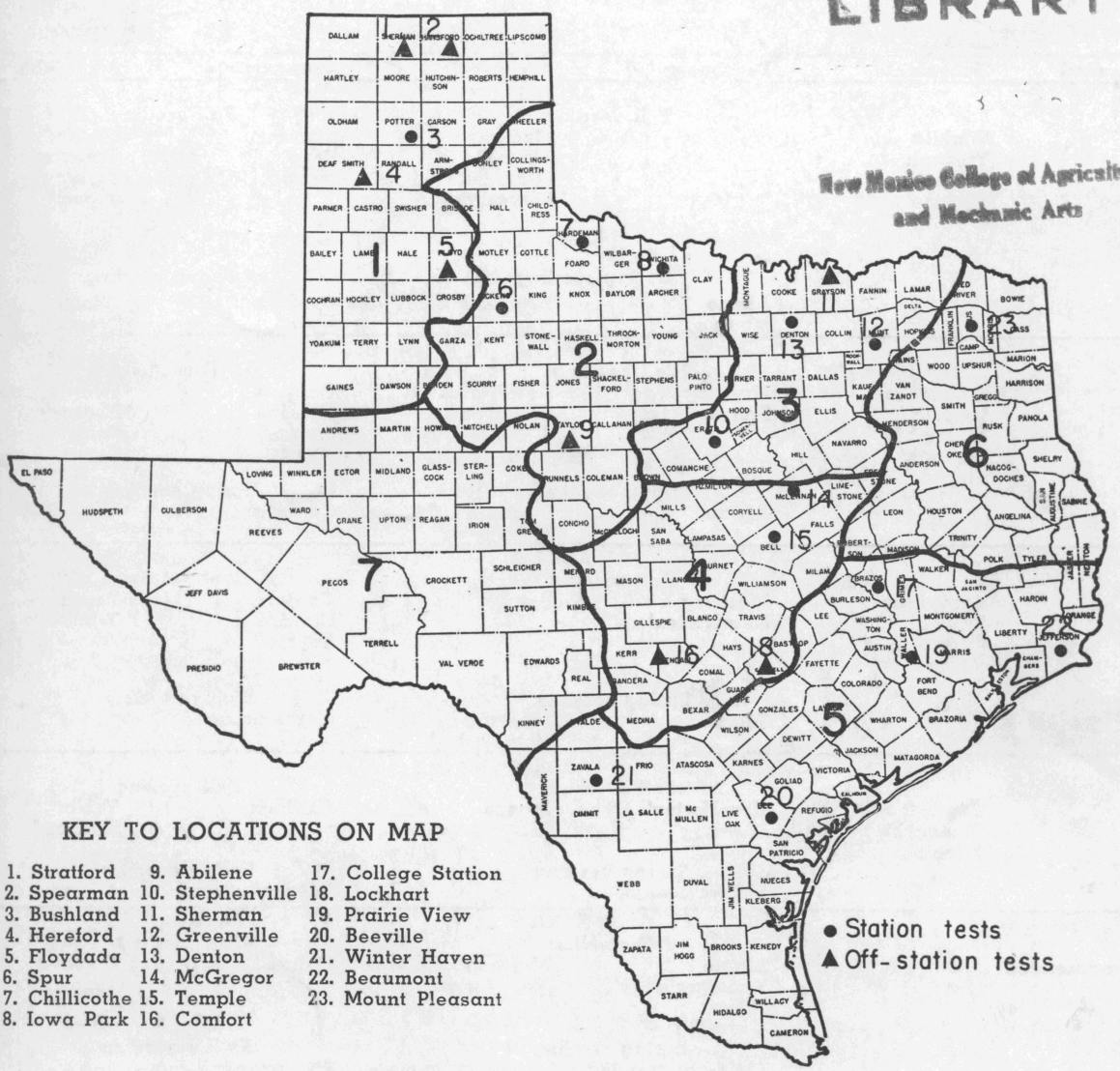
Performance of Small Grain Varieties in Texas

1949 - 57



KEY TO LOCATIONS ON MAP

1. Stratford
2. Spearman
3. Bushland
4. Hereford
5. Floydada
6. Spur
7. Chillicothe
8. Iowa Park
9. Abilene
10. Stephenville
11. Sherman
12. Greenville
13. Denton
14. McGregor
15. Temple
16. Comfort
17. College Station
18. Lockhart
19. Prairie View
20. Beeville
21. Winter Haven
22. Beaumont
23. Mount Pleasant

● Station tests
▲ Off-station tests

Figure 1. Small grains growing areas and test locations.

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TEXAS AGRICULTURAL EXPERIMENT STATION

R. D. LEWIS, DIRECTOR, COLLEGE STATION, TEXAS,

IN COOPERATION WITH THE U. S. DEPARTMENT OF AGRICULTURE

DIGEST

Small grains are used extensively as grain and forage crops in Texas. The combined acreage of wheat, oats and barley generally exceeds 6,000,000. It is estimated that more than 1,000,000 acres are sown exclusively for forage purposes. Small grains are grown from the 50-inch rainfall belt along the Gulf Coast to the 15-inch rainfall area of Northwest Texas. Many types are needed for this wide range of growing conditions.

Small grain tests were conducted at 23 locations in the State during 1949-57. This bulletin reports the results with commercial varieties tested during this period. Many experimental strains also were tested. The State has been divided into seven areas for testing purposes. Comparable yields and agronomic data for each area are given.

On the basis of results obtained in these tests, the following varietal recommendations are made by growing areas:

WHEAT		OATS		BARLEY	
Recommended	Acceptable	Recommended	Acceptable	Recommended	Acceptable
		AREA 1			
		Fall seeding[1]		Fall seeding[1]	
Concho	Wichita		Mustang	Kearney	Pueblo
Crockett	Triumph		Wintok	Reno	Cordova[3]
Westar	Bison		Cimarron	Ward	Harbine[3]
Comanche	Apache		Bronco		Rogers[3]
Ponca[2]					
Cheyenne					
		Spring seeding		Spring seeding	
		Alamo	New Nortex[4]	Cordova	Wintex
		Mustang			Texan
		AREA 2			
		Fall seeding		Fall seeding	
Crockett	Comanche	Mustang	New Nortex[4]	Cordova	Wintex
Concho	Wichita	Bronco	Cimarron	Harbine	Kearney
Ponca	Triumph			Rogers	Reno
Westar	Quanah[5]			Ward	Texan
		Spring seeding		Spring seeding	
		Alamo	Mustang	Cordova	
			New Nortex[4]		
		AREA 3			
		Fall seeding		Fall seeding	
Quanah	Comanche	Mustang	Bronco	Cordova	Texan
Ponca	Triumph	New Nortex[4]		Harbine	Wintex
Crockett	Knox			Rogers	
Concho	Frisco				
		Spring seeding		Spring seeding	
		Alamo	Mustang	Not recommended	
			New Nortex[4]		
		AREA 4			
		Fall seeding		Fall seeding	
Quanah	Crockett	New Nortex[4]	Bronco	Cordova	Texan
	Comanche	Mustang	Victorgrain		Harbine[6]
	Triumph				
		Spring seeding		Spring seeding	
		Not recommended		Not recommended	
		AREA 5			
		Fall seeding		Fall seeding	
None recommended		Alamo	Mustang	Goliad	Cordova
		Victorgrain	New Nortex[4]		Texan
		Alber			
		Camellia			
		Spring seeding		Spring seeding	
		Not recommended		Not recommended	
		AREA 6			
		Fall seeding			
Quanah	Knox	New Nortex[4]	Bronco	Cordova	Texan
Ponca	Frisco	Mustang	Arkwin	Harbine	
				Rogers	
		Spring seeding		Spring seeding	
		Alamo	Mustang	Not recommended	
			New Nortex[4]		
		AREA 7			
		Fall seeding		Fall seeding	
None recommended		Bronco	New Nortex[4]	Cordova	Texan

[1]Fall seeding hazardous.
[2]Only under irrigation.
[3]Less winter-hardy than other varieties listed.
[4]Representative of Red Rustproof types, other strains acceptable also.
[5]Southern half of area.
[6]Edwards Plateau area only.

Performance of Small Grain Varieties in Texas, 1949 - 57

I. M. Atkins, J. H. Gardenhire, D. E. Weibel, K. B. Porter and K. A. Lahr*

SMALL GRAINS OCCUPY a unique place in Texas agriculture because they are suited to so many uses and are grown from the 50-inch rainfall belt and mild climate of Southeast Texas to the 15-inch railfall belt of Northwest Texas where winter temperatures often are very severe. In South Texas, tender semi-winter types or even spring types can be grown from fall seeding, whereas in Northwest Texas only very cold-resistant, true winter-types are satisfactory.

Wheat is a major cash crop on the High Plains, but all three small grains are used as combination grain and forage crops over much of the State.

In East and South Texas, a considerable portion of the small grain acreage is used exclusively for forage purposes. Large acreages are sown in the fall for livestock pasture and are grazed continuously, or as weather permits, until the crop is killed out in the spring and livestock can be transferred to permanent pastures. Some acreages, particularly of oats, are used for hay, grass silage or as soiling crops.

The average annual seeded acreage devoted to wheat during the 10-year period 1947-56 was 3,634,000, that to oats 1,130,900 and that to barley 120,200, for a total of 4,885,100 acres. Official agricultural statistics do not record the acreage of small grains seeded for winter pasture. As this was estimated in 1957 as exceeding 1,200,000 acres, the total area seeded to small grains probably exceeds 6,000,000 acres. This is exceeded only by cotton and, in recent years, by grain sorghum.

GROWING AREAS AND TEST LOCATIONS

State-wide small grain tests are designed to provide information on the best varieties for growing in the several areas, and they provide a means for final testing of experimental strains before they are named as new varieties and distributed to growers. Yields of these experimental strains are not included in this report. Only yields of commercial varieties are included.

Because of the wide diversity of climate under which the crops are grown and tests conducted, the State is divided into seven areas. In most areas, there are three test locations. Only limited tests have been conducted in Northeast Texas and none in Southwest Texas which is devoted largely to cattle and sheep ranches. Most areas tend to follow a named soil type, but others include several types. The growing areas and experimental test locations are shown in Figure 1 on the cover.

CONTENTS

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CLIMATIC CONDITIONS AND SOIL TYPES

Information on climatic conditions prevailing normally and during the test period at each of the test locations is given in Table 1. Severe drouth prevailed over much of the State during the period. This caused the loss of many tests and increased the variability of yields in many others.

FIELD DESIGN OF TESTS

Most yield tests were conducted in nursery size plots arranged in randomized blocks of four replications. These nursery plots were four rows by 10 feet in length, from which the center rows were harvested. At Amarillo, larger plots of eight rows 9 feet long or five rows 25 feet long were used in some instances. Under some conditions, as many as eight replications were used.

All varieties were not grown in all seasons nor at all locations even in a testing area. To be able to compare directly varieties at a single location or in an area, it was necessary to compute comparable yields and agronomic data. These comparable yield data are based on a set of standards made up of varieties grown at all locations or during all years and computing a correction factor for each year and location. By this means, a comparable figure can be computed for any variety, regardless of the number of observations. Detailed annual data on yield and agronomic characters by stations are omitted and only comparable data by areas are given. Detailed data may be obtained from annual summaries or by contacting the local station.

EXPERIMENTAL DATA

Data and discussion thereof are presented by crop sections and within this by growing areas. Tests have been conducted for periods of 1 to 8 years, hence, the data presented represent performance of varieties in a few to as many as 20 tests. For this reason, they are considered accurate and indicate what may be expected of varieties when grown on farms. Data on agronomic characters also usually represent averages of many tests.

Recommendations at the end of each section are based on average yield in the area, but also take into consideration agronomic characteristics which are important for that area. These include such things as disease or insect resistance; winter-hardiness and tolerance to sudden temperature changes; the characteristics of the variety for forage purposes and, in the case of wheat, milling and baking quality. Growers should consider all these characteristics in choosing a variety. To select a variety which is not winter-hardy for growing in Northwest Texas is to gamble with losing the crop from this hazard. Likewise, for South Texas, a variety susceptible to rust or which produced little forage is undesirable.

TABLE 1. AVERAGE TEMPERATURE, RAINFALL, LENGTH OF GROWING SEASON AND SOIL TYPE AT TEST LOCATIONS[1]

Location	Elevation feet	Number years of record	Rainfall			Temperature			Length of growing season	Average date		Soil type
			Long time av.		Average 1949-56	Average annual	Average maximum	Average minimum		First killing frost	Last killing frost	
			Annual	Growing season[2]								
Area 1												
Stratford	3699	30	17.5	9.9	14.4	55.4	71.0	40.2	177	Oct. 16	Apr. 22	
Spearman	3100	45	21.3	16.7	19.7	57.0	70.7	42.1	185	Oct. 22	Apr. 20	
Bushland	3590	18	17.7	12.7	17.0	57.7	72.9	42.2	193	Oct. 27	Apr. 16	Pullman silty clay loam
Hereford	3806	26	19.6	14.1	15.5	57.5	72.6	42.4	187	Oct. 22	Apr. 18	
Plainview	3250	30	21.3	12.6	15.8	59.8	73.7	45.7	206	Nov. 2	Apr. 10	
Area 2												
Spur	2274	46	20.4	13.6	18.2	62.2	77.3	47.0	216	Nov. 4	Apr. 3	Abilene clay loam
Chillicothe	1406	51	24.3	17.2	23.5	63.4	76.6	50.3	231	Nov. 10	Mar. 24	Abilene clay loam
Iowa Park	978	31	29.0		28.5	65.0	78.2	51.9	221	Nov. 4	Apr. 1	Miller sandy loam
Abilene	1759	71	22.6	19.4	18.9	64.1	76.1	52.1	241	Nov. 19	Mar. 23	
Area 3												
Stephenville	1283	15	26.9	23.8	25.2	65.2	77.1	53.3	239	Nov. 13	Mar. 21	Denton clay
Greenville	550	36	40.0	32.9	37.3	64.1	75.1	53.2	235	Nov. 11	Mar. 15	Hunt clay
Denton	621	44	32.0	24.6	27.2	65.7	77.3	54.2	233	Nov. 12	Mar. 22	San Saba clay
Area 4												
McGregor	713	34	31.6	25.6	23.3				254	Nov. 24	Mar. 24	San Saba clay
Temple	675	44	33.7	27.3	27.2	67.4	79.3	55.4	251	Nov. 24	Mar. 18	Houston Black clay
Comfort	1412	71	30.5	26.5	25.6	64.5	78.2	50.7	216	Nov. 1	Mar. 30	
Area 5												
College Station	314	50	38.9	30.0	33.7	68.4	79.5	57.2	263	Nov. 25	Mar. 6	Lufkin fine sandy loam
Lockhart	518	60	31.6	27.9	24.6	68.5	79.1	57.8	268	Dec. 1	Mar. 4	Houston Black clay
Prairie View	251	42	40.5	25.1	32.8	68.0	90.0	45.0	275	Nov. 28	Feb. 18	Hockley fine sandy loam
Beeville	225	53	29.4	22.9	16.7	70.7	82.5	61.2	291	Dec. 6	Feb. 20	Clareville clay
Winter Haven	596	36	23.2			74.0	84.7	63.2	330	Dec. 20	Jan. 25	Willacy sandy loam
Beaumont	18	43	54.2	39.4	49.9	68.6	80.3	57.4	271	Nov. 25	Feb. 27	Beaumont clay

[1]No tests were conducted in areas 6 and 7.
[2]September 1 to June 1.

TABLE 2. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN BARLEY VARIETIES GROWN AT STATIONS IN AREA 1, 1949-57

Variety	Yield of grain, bushels per acre				Rank[3]	Number of tests[3]	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Survival, percent	Estimate of forage value[2]
	Amarillo dryland[1]	Amarillo irrigated	Floydada irrigated	For area irrigated								
Cordova	29.3	32.0	22.9	28.1	10	7	46.1	5-10	6-13	26.2	61.0	135
Harbine	26.6	26.7	22.7	25.0	11	7	46.5	5-11	6-13	24.4	62.0	125
Texan	26.6	37.4		32.9	3	2	44.9	5-11	6-16	26.6	50.4	
Tenkow	26.3	38.4		33.9	1	2	45.2	5-15	6-15	27.8	60.6	130
Wintex	23.2	37.1	20.9	30.2	5	7	45.6	5-15	6-16	27.2	52.3	135
Rogers	22.9	41.7	26.2	31.2	4	6	47.9	5-13	6-16	25.5	67.6	125
Mo-B-400	22.8	22.5		23.0	12	2	44.9	5-7	6-14	25.9	90.1	
Kearney	22.4	39.2	15.3	29.0	7	7	46.4	5-14	6-17	29.5	95.2	85
Pueblo	20.6	37.1	19.6	29.6	6	7	45.9	5-11	6-14	26.2	77.9	105
Tennessee Winter	20.5	28.8	15.0	22.9	13	7	45.2	5-10	6-14	27.0	68.3	100
Dicktoo	19.7	38.6	14.7	28.3	8	7	45.7	5-13	6-16	29.2	81.3	85
Ward	19.5	34.5	19.3	28.0	9	7	45.8	5-9	6-14	29.0	83.3	90
Reno	16.8	38.0		33.5	2	2	46.0	5-9	6-14	26.1	92.1	
Mo. E. Beardless	16.7	13.9	15.8	14.7	14	7	41.4	5-7	6-12	26.6	69.2	115

[1]Similar dryland tests were destroyed by drouth in 1950, 1951, 1953, 1955 and 1956.
[2]Visual estimate of forage value—Tennessee Winter 100 percent.
[3]Under irrigation.

Barley

The Texas acreage devoted to barley is small compared with that of wheat or oats. The average seeded acreage during 1945-54 was 185,000. An average of 129,000 acres were harvested for grain during this period, producing an average of 1,906,000 bushels. However, this does not include the acreage sown exclusively for winter pasture for livestock. No official figures on this are available, but based on estimates made for each county by county agricultural agents, it probably exceeds 75,000 acres. The acreage is widely distributed throughout the State and that in area 1 varies greatly from season to season, depending on spring moisture conditions. The distribution of barley in Texas is shown in Figure 2.

Three types of barley are grown in Texas. In area 1, true winter-type varieties are the safest for fall seeding, since other types may be winterkilled. These are obligate winters in growth habit and often will not head from spring seeding. Intermediate winter-types, such as Cordova and Wintex, will head from fall or spring seeding and are adapted over a wide area throughout areas 2, 3 and 4 and southward into area 5. This type also is used to some extent for spring seeding in area 1. In area 5, the crop is used primarily for winter pasture for livestock and even true spring-type varieties may be fall-sown.

Most of the barley grown in Texas is used to produce winter pasture for livestock and to harvest a grain crop if conditions warrant. A large acreage is sown exclusively for winter pasture. Barley is a valuable crop for winter pasture since it grows rapidly in the fall, producing forage in only a few weeks. While less palatable than oats, it produces a high protein forage which is satisfactory for livestock. A small percentage of the crop is grown for grain alone.

Yield tests are summarized by areas. All are fall-sown, since it is estimated that more than 90 percent of the commercial crop is fall-sown.

Area 1

Barley tests were conducted at Amarillo on dryland since 1949 and under irrigation since 1953. Owing to severe drouth, the tests at Amarillo were lost in 1955 and 1956, and the tests of 1950 and 1951 were destroyed by greenbugs and drouth. Tests at Floydada were grown under irrigation in 1955, 1956 and 1957. Comparable yield and agronomic data are summarized in Table 2 with grain yields divided into dryland and irrigated tests.

In dryland tests, Cordova, Harbine and Texan produced the highest average yields for this period of testing. These strains are less hardy than Kearney, Ward and Reno, hence are somewhat more hazardous to grow. In irrigated tests at both locations, Tenkow, Reno, Texan and Rogers produced the highest comparable yields.

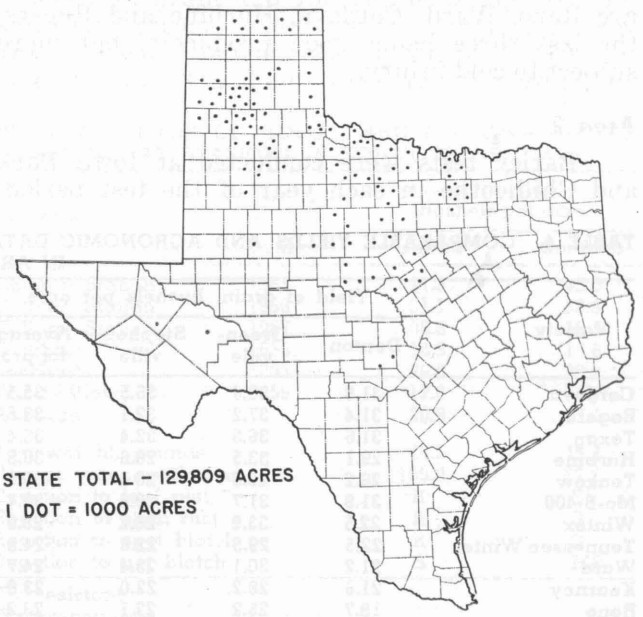

Figure 2. Distribution of barley in Texas in 1954.

TABLE 3. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN BARLEY VARIETIES GROWN AT STATIONS IN AREA 2, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Estimate of forage value[3]
	Abilene[1]	Iowa Park[2]	Chillicothe	Spur	Average for area						
Harbine	31.9	50.4	26.7	12.8	23.1	13	45.8	4-13	5-19	18.9	102
Rogers	25.9	56.5	25.7	12.7	21.9	8	46.3	4-16	5-20	20.7	106
Cordova	27.1	40.7	25.0	10.7	21.1	14	43.8	4-10	5-21	18.6	112
Texan		37.5	24.9	8.5	20.4	8	42.4	4-8	5-22	19.2	117
Tenkow		43.6	22.8	6.9	18.4	8	42.9	4-17	5-23	19.2	121
Ward	18.6	43.8	23.3	6.3	18.1	14	44.4	4-19	5-23	19.5	99
Wintex	19.9	42.2	19.5	8.5	16.4	14	42.8	4-17	5-24	18.4	100
Pueblo	17.8	40.8	22.0	4.9	16.1	10	43.8	4-17	5-24	19.4	100
Reno		43.5	20.5	4.8	16.1	8	42.6	4-19	5-24	18.2	100
Tennessee Winter	20.0	37.2	18.1	6.7	15.0	14	42.0	4-15	5-20	18.5	103
Mo. E. Beardless	20.2	28.3	17.3	8.0	14.8	14	39.5	4-10	5-18	20.1	109
Kearney	16.8	45.5	19.3	4.2	14.7	12	45.6	4-19	5-25	19.7	96
Dicktoo	15.1	41.6	19.5	4.6	14.5	10	45.6	4-20	5-27	19.1	90

[1]One year only.
[2]Irrigated test, not included in area yield averages.
[3]Visual estimate of forage value—Wintex 100 percent.

Kearney and Reno were the most winter-hardy. The intermediate winter-types are considerably less cold tolerant and were completely killed in 1950. The intermediate winter-types produce the best yields when not damaged by cold weather and also produce more forage, as indicated by the percentage rating of 135 for Cordova as compared with 85 for Kearney.

There were no great differences in agronomic characters under these conditions. Rogers, Harbine and Kearney produced the highest test weight grain; Harbine and Rogers were the shortest in plant height, while Missouri Early Beardless and Missouri B-400 were the earliest in maturity.

Laboratory tests and field observations have shown that Kearney has greater field tolerance to the greenbug than any other commercial variety. It also is the most winter-hardy. Therefore, it is recommended as the safest variety for fall seeding. Other varieties recommended or acceptable are Reno, Ward, Cordova, Harbine and Rogers, the last three being good producers, but more subject to cold injury.

Area 2

Barley tests were conducted at Iowa Park and Chillicothe in each year of the test period. Since the test at Iowa Park is irrigated and yields much higher than the others, the data from this station are reported separately. Comparable agronomic data include all stations. Tests have been sown at Abilene since 1953, but the severe drouth in that area destroyed all except the 1957 test. Yields at Spur were extremely low because of drouth. Comparable yields and agronomic data are summarized in Table 3 for each station and for the area.

Harbine produced the highest average yields, both under irrigation at Iowa Park and in dryland tests at other stations. Rogers ranked second, Cordova third and Texan fourth. For some unknown reason, the relative yields of Cordova have been unusually low at Iowa Park. The true winter-type barley varieties have been less productive at this lower elevation.

Rogers, Harbine and Kearney produced the highest test weight grain, and Missouri Early Beardless the lowest. Texan and Missouri Early Beardless are the earliest in maturity, while Rogers and Missouri Early Beardless are the tallest. Tenkow, Texan and Cordova were rated as the best forage producers.

Yield data at all stations in this area indicate that the intermediate winter-types, such as Harbine, Rogers and Cordova, are the most pro-

TABLE 4. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN BARLEY VARIETIES GROWN AT STATIONS IN AREA 3, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Percent leaf rust
	Denton	Greenville	Stephenville	Average for area						
Cordova	31.9	38.4	36.5	35.5	25	44.8	4-17	5-22	22.5	33
Rogers	31.4	37.2	32.1	33.5	11	46.5	4-25	5-23	25.1	
Texan	31.6	36.5	32.4	33.4	25	44.8	4-16	5-22	23.1	25
Harbine	29.1	33.5	28.6	30.5	20	44.4	4-22	5-23	23.5	23
Tenkow	26.2	40.0	26.4	30.5	17	41.4	4-22	5-23	23.5	24
Mo-B-400	31.9	31.7	28.6	30.4	7	43.5	4-16	5-21	24.6	
Wintex	22.5	33.9	28.2	28.0	25	44.3	4-22	5-24	21.9	27
Tennessee Winter	22.5	29.5	22.6	24.8	25	42.9	4-20	5-22	22.2	38
Ward	21.2	30.1	23.4	24.7	25	43.6	4-23	5-23	23.7	48
Kearney	21.6	28.2	22.0	23.8	16	43.6	4-22	5-23	23.9	39
Reno	19.7	28.2	22.1	23.2	16	43.7	4-24	5-24	22.6	43
Mo. E. Beardless	20.0	22.3	19.2	20.4	25	40.0	4-16	5-19	24.3	28

TABLE 5. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN BARLEY GROWN AT STATIONS IN AREA 4, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Estimate of forage value[2]
	Temple	Comfort	McGregor	Average for area[1]						
Cordova	33.7	37.4	34.2	34.9	18	42.3	4-10	5-16	23.8	107
Texan	30.0	35.9	29.8	31.6	18	41.9	4-8	5-17	25.2	100
Harbine	25.5	38.6	26.5	29.3	16	42.6	4-17	5-19	24.4	94
Wintex	27.3	33.3		28.7	4	39.9	4-17	5-18	24.8	101
Tennessee Winter	20.2	33.2	25.3	25.1	17	40.5	4-13	5-17	24.7	92
Tunis	17.0	33.2		24.8	3	39.9	4-6	5-15	21.3	
Mo. E. Beardless	22.4	31.0	21.5	24.5	17	37.9	4-9	5-15	27.9	90
Calhoun 4	21.2			23.6	2	37.8	4-19	5-18	17.0	105
Calhoun 3	20.3			23.6	3	38.4	4-19	5-18	20.0	92
Goliad	17.9	32.7	19.6	22.5	18	41.9	4-2	5-17	25.6	119
Kearney	14.0	21.6	24.8	19.7	9	40.6	4-13	5-21	26.0	86

[1]Tests sown at Comfort in 1954, 1955 and 1956 were destroyed by drouth.
[2]Visual estimate of forage value—Texan 100 percent.

ductive. While the true winter-type varieties, such as Kearney, Reno and Ward, are more cold resistant, they yield less and produce less winter pasture.

Area 3

Barley yield tests were conducted throughout the test period at Denton, Greenville and Stephenville. Barley is well adapted to this growing area since it fits well into rotations with other crops and is useful as a feed and winter pasture crop. Late spring freezes or winterkilling occasionally damage the crop, but this does not occur often enough to justify growing the more hardy winter-type varieties. The intermediate winter-type varieties are well adapted in this area. Diseases, especially mildew, are of some importance, although often the crop escapes injury because of its early maturity.

Comparable yields and agronomic data are given in Table 4. Cordova has been outstanding in this area and is grown extensively. Its average yield of 35.5 bushels, or 1,704 pounds of grain per acre, compares favorably with corn and grain sorghum and, in addition, it is valuable for winter pasture. Rogers, tested less extensively in 11 tests, ranks second, Texan third and Harbine fourth.

The highest test weight grain was produced by Rogers, Cordova and Texan. Texan, Missouri Early Beardless and Cordova were the earliest in maturity, while Rogers, Ward and Reno were the latest. Cordova, Tennessee Winter and Reno were the shortest varieties, while Rogers was the tallest. No winterkilling occurred during this testing period.

Based on results of these tests, only the intermediate winter-type varieties should be grown in this area. Cordova, Rogers, Texan and Harbine are recommended. Wintex was grown extensively for a time, but mildew has damaged this variety in recent years.

Area 4

Barley yield trials were conducted at McGregor and Temple on the Grand and Blackland Prairies and at Comfort on the Edwards Plateau. The elevation at this latter location is approximately 1,800 feet, as compared with approximately 600 feet at the other locations. Tests were conducted at Temple and Comfort throughout the period, but were not initiated at McGregor until 1953. Tests at Comfort were lost because of drouth in 1951, 1954, 1955 and 1956. Comparable yields and agronomic data for the area are given in Table 5.

Results obtained at Temple and McGregor are in good agreement and prove that Cordova is outstanding for central Blackland and Grand Prairie soils. At the higher elevation at Comfort, Harbine ranked first in yield, but it did poorly at the other locations. This variety requires some cold weather to head normally and may not encounter it except on the Edwards Plateau. The true winter-type variety, Kearney, ranks last, while the spring-type variety, Goliad, is too early and susceptible to cold injury to be satisfactory.

The intermediate winter-type varieties are superior in grain and forage yields and are the only ones recommended for this area. Diseases are of greater importance in this area than in areas 1, 2 and 3, and only those varieties resistant

TABLE 6. YIELDS OF GOLIAD AND CORDOVA BARLEY GROWN AT STATIONS IN SOUTH TEXAS, 1955-57

Location	Year	Grain yield, bushels per acre	
		Goliad	Cordova
College Station	1955	21.8	35.0
College Station	1956	31.1	38.6
College Station	1957	39.5	39.5
Lockhart	1955	14.9	14.6
Lockhart	1957	26.8	20.2
Prairie View	1956	12.6	14.7
Average		20.9	17.4
Test weight, pounds		45.5	45.2
Forage value, estimate		100.0	92.5
Reaction to leaf rust		R[1]	S[2]
Reaction to stem rust		R	S
Reaction to spot blotch		R	S
Reaction to net blotch		S	MR[3]

[1]R=resistant.
[2]S=susceptible.
[3]MR=moderately resistant.

TABLE 7. COMPARABLE YIELDS OF FALL-SOWN BARLEY GROWN IN REPLICATED NURSERY TESTS AT DENTON AND COLLEGE STATION, 1949-57

Variety	Yields of grain, bushels per acre			
	Denton		College Station	
	Comparable average	Number of tests	Comparable average	Number of tests
Cordova	33.6	7	31.0	5
Rogers	33.3	4		
Mo-B-400	33.3	5		
Kenbar	32.7	5	32.3	4
Texan	32.6	7	34.3	5
Harbine	30.5	7	24.8	5
Kentucky 1	28.4	3	18.5	4
Colonial 2	28.4	4	26.3	4
Piedmont	27.8	6	16.3	2
Fayette	26.8	6	17.1	5
Pueblo	26.8	2		
Wong	25.7	5	34.8	7
Hudson	25.6	2	10.9	4
Jackson 1	25.4	3	23.9	4
Calhoun	24.5	3	33.3	3
Davie	24.5	4	24.7	3
Ward	24.2	7		
Omugi	24.1	3		
Kearney	23.7	5		
Tenkow	23.6	7		
Tennessee Winter	23.5	7		
Dicktoo	23.0	4		
Wintex	22.7	7		
Reno	22.0	7		
Mo. E. Beardless	20.8	7		
Sunrise			30.9	4
Goliad			29.6	6

to mildew should be grown. Cordova, Harbine and Texan are resistant to present prevalent races of mildew.

Area 5

Barley is grown in this area principally as a winter pasture crop for livestock. Only one variety, Goliad, is grown for forage and grain. Small acreages of Cordova and Texan are grown for forage. Goliad is a true spring-type, but, because of the mild climate, is seldom injured even from fall-seeding. Diseases are major factors in the use of the crop and usually prevent varieties other than Goliad from maturing a crop of grain. The major diseases are mildew, spot blotch, net blotch and leaf rust. Occasionally stem rust may damage the crop and increasing amounts of virus diseases, such as yellow dwarf, have been observed in recent years.

Because the commercial varieties grown in other parts of Texas are not adapted to this area, tests have been limited to Goliad and Cordova in comparison with new experimental strains. Since these strains are not available commercially, only two varieties are reported. During recent dry seasons, diseases have not been as important as may be expected and Cordova has out-yielded Goliad in many instances.

Goliad is the only variety recommended for this area, although Cordova may be used for forage if desired.

Area 6

No yield trials were conducted in this area since little barley is grown commercially. Recent expansion of dairying and livestock production has caused greater interest in the small grains for supplementary grazing. Based on tests in area 3, Cordova, Rogers, Texan and Harbine are suggested as the best now available.

Area 7

This area is devoted largely to livestock production, although there has been an increase in the acreage of irrigated farms. No yield trials were conducted, but, based on adjoining areas, Cordova, Texan, Rogers and Harbine are suggested.

TABLE 8. COMPARABLE YIELDS OF SPRING-SOWN BARLEY GROWN AT DENTON AND AMARILLO, 1949-57

Variety	Yields of grain, bushels per acre			
	Amarillo		Denton	
	Comparable average	Number of tests	Comparable average	Number of tests
Arivat	40.9	2	13.8	5
Harlan	37.8	2	14.2	5
Gem	36.9	4	17.6	5
Custer	36.4	4	18.5	5
Otis	36.2	2	14.8	5
Cordova	34.5	2	17.3	5
Munsing	34.4	2		
Vaughn	33.7	4		
Flynn	33.5	5	11.6	5
Atlas	31.9	5	16.3	5
Beecher	31.1	5		
Plains	29.6	1		
Sportan	27.9	2		
Stavropol	27.3	5		
Feebar	26.2	4		
Mariout	25.8	5		
Texan	25.7	5	16.5	5
Wintex	25.2	5	10.8	5
Tregal	25.1	2		
Montcalm			12.0	5
Titan			14.7	5
Kindred			12.6	5

Nursery Tests

In addition to the intra-state variety tests, replicated nursery tests of many new experimental strains and commercial varieties are made at the main breeding stations. Although tested at only one location in the area, data on these strains are given in Table 7.

A large group of varieties was tested at the Denton station. Yields in this nursery were similar to those in the intra-state test. Cordova and Rogers led in yield. Kenbar did well in these tests and may be found of value with further testing.

At College Station, tests in most years consisted of only one or two replications and, therefore, yields are higher than may be expected under commercial conditions. Texan, Kenbar and Cordova also did well here.

Spring-sown Tests

Tests from spring-seeding were conducted at Amarillo and Denton. Data on comparable yields are given in Table 8.

Tests at Amarillo indicate the true spring-type varieties may be superior to the intermediate winter-types. Arivat and Harlan averaged 40.9 and 37.8 bushels, respectively, compared with 34.5 for Cordova. However, seed of these varieties normally are not available and further tests are needed to prove their superiority over Cordova for spring-seeding.

Tests at Denton show that spring-seeding of barley normally is not profitable. If spring-seeding is necessary because of winter injury or delay in seeding, then Cordova or Texan are equal to any spring-type variety.

Oats

Oats are one of the most widely grown crops in Texas, being used as a feed, grain and pasture crop in most areas. Only in the more concentrated areas of production in North Central Texas, and less often in other areas, does it become an important cash crop. The average annual acreage devoted to grain and forage during the 10-year period, 1947-57, was 1,130,900. This produced an average of 24,097,400 bushels. A large acreage, which does not show in official statistics of the harvested acreage, also is sown for winter pasture and the entire crop is grazed off. In 1957, this was unofficially estimated at almost 1,000,000 acres. Parts of this acreage are used as hay, silage or soiling crops.

Owing to the wide range in climatic conditions, a number of varieties and types are used in Texas. In the Panhandle and Rolling Plains areas of West Texas, true cold resistance is needed and survival data usually reflect this characteristic. Fall-seeding is hazardous in area 1 and it not recommended unless the grower wishes to take this calculated risk. In North Central Texas, winter-hardiness is just as important as in the other two areas, but survival and yields often do not reflect true hardiness because the crop may grow rapidly during periods of warm weather and then be damaged by sudden drops in temperature. Damage to the crop by cold temperatures occurs approximately 1 year in 4, and may range from minor leaf injury to widespread killing of the crop. Farther south in Central and South Texas, injury from cold occurs only occasionally and more erect growing types may be fall-sown.

Comparable yield and agronomic data are summarized by areas. All varieties were not grown at all stations nor in all seasons. Most data reported were from fall-seeding, but a small uniform spring-sown test was grown in recent years at the more northern stations.

Area 1

Usually only about 2 percent of the State oat acreage is grown in this area. Occasionally, when spring weather conditions are favorable, large acreages may be seeded. Fall-seeding is hazardous and winterkilling occurs often. The Amarillo yield tests were killed by low temperatures in 1949, 1950 and 1951. Differential winterkilling occurred in some other seasons. All tests except 1954 were given supplemental irrigation water.

Comparable yields and agronomic data for oat variety tests grown at Amarillo and Floydada are given in Table 9.

As an average of eight tests, Mustang produced the highest average yield, 40.8 bushels per acre. Frazier, Wintok and Cimarron ranked next. Alamo, New Nortex and Ferguson 922 were damaged by low temperatures. Fulwin, although among the most winter-hardy, did not yield well.

Cimarron, Wintok and Frazier had the highest test weight. These varieties also were the earliest maturing. Fultex and Cimarron were the shortest varieties and Bronco the tallest. Bronco, Wintok and Fulwin were the most winter-hardy, with Mustang and Cimarron only slightly less hardy. Fultex was slightly more hardy than the Red Rustproof strains.

Recognizing that fall seeding is hazardous, varieties best adapted for fall seeding in this area are Mustang, Cimarron, Wintok and Bronco because of their cold resistance.

Area 2

Oats are grown extensively in this area, both as a cash crop and a combined winter pasture and grain crop. Considerable acreages are used primarily for winter pasture and, unless conditions are very favorable for grain production, are pastured to maturity.

Yield tests were conducted at Iowa Park, Chillicothe and Spur throughout the period, but were seeded at Abilene only since 1953. Since

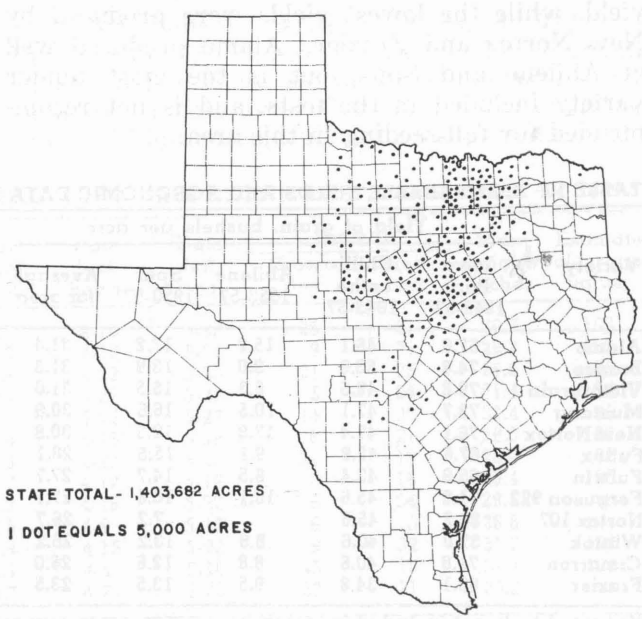

Figure 3. Distribution of oats in Texas in 1954.

TABLE 9. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 1, 1949-57

Variety	Yield of grain, bushels per acre			Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Percent winter survival
	Amarillo 1949-57	Floydada 1955-57	Average for area						
Mustang	43.2	34.5	40.8	11	31.3	5-15	6-23	23.6	87
Frazier	42.6	29.7	38.9	11	33.0	5-10	6-21	23.0	55
Wintok	41.8	28.8	38.2	11	34.1	5-12	6-21	25.0	93
Cimarron	45.6	24.6	37.8	7	34.5	5-7	6-18	21.6	86
Fultex	40.7	29.5	37.6	11	32.1	5-13	6-21	20.4	68
Bronco	35.2	33.9	35.0	11	31.4	5-21	6-25	27.0	99
New Nortex	34.6	32.5	34.0	11	32.2	5-11	6-21	23.8	53
Ferguson 922	34.3		32.2	3	32.8	5-16	6-21	26.8	58
Fulwin	31.7	27.7	30.6	11	32.1	5-15	6-22	28.6	92
Alamo	30.0	33.3	29.7	10	32.4	5-17	6-23	24.7	59

severe drouth prevailed much of the past 8 years, failures and low yields were common. The tests at Iowa Park were irrigated as necessary to maintain normal growth and yields are, therefore, much higher than at any other locations. Comparable yields and agronomic data for the area are given in Table 10.

Eighteen comparisons are available for varieties grown in all dryland tests at all stations. Many varieties were grown in fewer tests. Agronomic data, in most instances, are based on fewer observations than yield data, since complete notes were impossible to take under some conditions. Alamo, Bronco, Victorgrain, Mustang and New Nortex led in comparable yield. Alamo produced high yields because there was no winterkilling and diseases were important in 1957. Victorgrain was not tested adequately, but appears satisfactory. Frazier, Cimarron and Wintok produced the lowest comparable yields.

Under irrigation at Iowa Park, the highest comparable yields were produced by Nortex 107, Mustang, New Nortex and Bronco. Victorgrain yielded well, but was under test only 2 years. At Spur, Victorgrain, Alamo and Mustang led in yield, while the lowest yields were produced by New Nortex and Frazier. Alamo produced well at Abilene and Spur, but is the most tender variety included in the tests, and is not recommended for fall-seeding in this area.

Comparable data for the area show that Wintok, Victorgrain, Alamo and Frazier had the highest test weight, while the Red Rustproof strains were 2 to 3 pounds lighter. Frazier and Cimarron were the earliest varieties, followed by Victorgrain and Alamo. Bronco was the latest in maturity. Fultex, Cimarron and Alamo were the shortest, while Fulwin and Bronco were the tallest.

Winter-hardiness is an important characteristic in this area. Survival usually is a fairly true measure of cold resistance, since the plants usually remain in a hardened condition in contrast with the greater fluctuation in conditions found in area 3. Differential winterkilling was experienced in 9 station years out of 23. The greatest contrast was in 1951 when New Nortex and others of this hardiness class were almost destroyed at Iowa Park, yielding less than 5 bushels per acre, while Mustang and Bronco produced 44.1 and 59.7 bushels per acre, respectively. Average survival data ranged from 80 percent for Fulwin, 74 percent for Bronco and 74 percent for Mustang, down to 38 percent for Alamo.

No wide differences in forage ratings were obtained for this area, although Frazier, Victorgrain and Alamo were rated slightly above New Nortex and Bronco below New Nortex. Varieties recommended are Mustang, Bronco and New Nortex.

TABLE 10. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 2, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Estimate of forage value[2]	Percent winter survival
	Iowa Park 1949-57[1]	Chillicothe 1945-57	Abilene 1953-57	Spur 1950-57	Average for area							
Alamo	67.6	46.1	15.2	17.2	31.4	13	32.4	4-15	5-23	22.3	108	38
Bronco	74.8	50.6	9.0	13.9	31.3	15	31.3	4-24	5-30	27.0	98	74
Victorgrain	79.8	48.5	6.3	18.5	31.0	5	32.6	4-13	5-21	24.7	109	
Mustang	78.7	47.1	10.5	16.6	30.9	18	31.0	4-18	5-25	23.8	103	71
New Nortex	76.1	47.4	17.8	12.3	30.8	18	30.1	4-17	5-24	23.0	100	53
Fultex	67.6	42.9	9.1	15.5	28.1	18	31.7	4-15	5-21	20.6	100	44
Fulwin	65.9	43.4	6.5	14.7	27.7	18	31.4	4-20	5-27	29.2	107	80
Ferguson 922	71.8	45.6	10.1	10.6	27.1	9	29.1	4-17	5-23	22.4	100	49
Nortex 107	82.2	45.6		7.2	26.7	5	28.9	4-19	5-27	20.3	104	51
Wintok	37.0	40.6	8.9	13.2	26.2	17	32.9	4-18	5-22	23.9	107	68
Cimarron	71.8	40.6	8.8	12.6	26.0	9	31.9	4-9	5-17	22.2	106	75
Frazier	63.1	34.8	9.5	13.5	23.5	18	32.4	4-9	5-19	24.9	112	43

[1]Irrigated tests not included in averages.
[2]Visual estimate of forage value—New Nortex 100 percent.

TABLE 11. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 3, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches	Percent winter survival
	Denton 1950-56	Greenville 1949-57	Stephenville 1949-57	Average for area					Crown rust	Stem rust		
Mustang	52.2	67.0	54.6	58.3	23	30.3	4-17	5-23	4	8	25.6	96
Nortex 107	53.2	63.2	53.0	56.6	9	29.5	4-23	5-27	12	7	27.4	82
New Nortex	52.1	61.5	52.0	55.3	23	29.5	4-23	5-27	9	11	27.3	81
Victorgrain	44.6	58.3	54.0	52.8	14	31.8	4-18	5-21	18	13	24.4	76
Bronco	48.0	57.9	48.6	51.6	18	30.2	4-24	5-26	11	8	28.0	93
Ferguson 922	46.8	59.7	44.7	51.0	15	29.1	4-24	5-28	8	7	27.0	73
Alamo	46.4	47.7	49.7	48.2	17	31.5	4-18	5-24	16	1	24.3	46
Cimarron	46.4	51.0	51.7	44.4	9	30.5	4-16	5-20		1	24.6	
Fulwin	46.5	43.9	41.6	43.7	23	29.2	4-22	5-23	71	9	29.4	100
Fultex	37.7	43.9	46.4	42.2	15	31.3	4-17	5-20	13	11	22.7	70
Frazier	38.0	43.3	38.7	40.1	23	31.5	4-13	5-20	37	8	25.2	71

Area 3

Oats are grown extensively in this area as a cash crop and as a source of winter pasture for livestock. When oats are pastured, the livestock usually are taken off about March 1 and the crop is allowed to produce grain. More than one-third of the State acreage is seeded in this area.

Yield tests were conducted at Denton, Greenville and Stephenville. The data for each of the three stations are given and they also are combined into comparable yields and agronomic data for the area in Table 11. A total of 23 comparisons are available for stations grown the full period.

For the area, Mustang led in comparable yield of grain, averaging 3.0 bushels more than New Nortex, the other important commercial variety. Mustang also led in yield at Greenville and Stephenville, but was second at Denton. Frazier, Fultex and Fulwin were the lowest producers.

Victorgrain, Alamo and Frazier produced the highest test weights and the Red Rustproof strains the lowest. Frazier, Cimarron, Alamo and Victorgrain were 6 to 10 days earlier in heading than the Red Rustproof strains, but ripened only about a week earlier. Bronco also is a late-maturing variety. Bronco was the tallest variety and Fultex the shortest.

Winter-hardiness is a major consideration in this area, and differences in resistance to cold were observed in 4 seasons. Fulwin, Mustang and Bronco were damaged very little, while Alamo was damaged severely 2 seasons. In 1954, even the Red Rustproof strains were severely damaged in commercial fields, while Mustang survived to a full stand. Recommended varieties are Mustang, New Nortex and Bronco.

Area 4

Approximately one-third of the State oat acreage is grown in this area. Most of this acreage is grown as a combination winter pasture and feed crop. Considerable acreages are sown exclusively for winter pasture, while a smaller proportion is grown exclusively as a cash grain crop.

Tests were conducted at Temple and Comfort since 1949 and at McGregor since 1953. Severe drouth caused the loss of the tests at Comfort in 1954, 1955 and 1956, and influenced the yields materially at other locations. Comparable data for yield and agronomic characters for the area are given in Table 12. Varieties are arranged in order of average yield.

New Nortex, Alamo, Ferguson 922 and Bronco were the highest in grain yields, Mustang ranked sixth. These are the principal commercial varieties of this area. Fulwin and Frazier, because of high susceptibility to rust, produced the

TABLE 12. COMPARABLE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 4, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches	Estimate of forage value[1]
	Comfort 1949-57	Temple 1949-57	McGregor 1953-57	Average for area					Crown rust	Stem rust		
New Nortex	47.8	53.1	55.6	52.1	20	26.7	4-20	5-22	25	21	28.7	100
Alamo	55.1	48.2	47.9	52.1	17	31.6	4-12	5-21	9	Tr	29.7	138
Ferguson 922	52.9	52.0	50.5	51.6	7	26.1	4-22	5-23	21	25	29.2	105
Bronco	54.2	49.3	52.1	51.3	16	29.7	4-22	5-26	5	34	31.4	94
Camellia	46.5			51.2	5	27.7	4-22	5-23	14	32	31.4	95
Mustang	52.6	49.3	50.3	50.5	20	29.4	4-16	5-19	6	21	29.3	102
Nortex 107	51.3	56.3	49.9	49.9	6	27.5	4-21	5-23	26	19	28.0	104
Victorgrain	54.8	47.5	47.9	48.9	15	31.7	4-12	5-18	8	16	29.4	120
Ranger	47.8	44.8	56.2	48.5	20	28.7	4-19	5-22	6	34	29.5	98
Fulgrain	53.6	46.2	47.9	48.3	13	32.5	4-9	5-13	6	16	26.8	134
Alber	53.2	44.0	46.9	47.6	19	27.4	4-15	5-23	9	32	31.7	123
Frazier	44.7	45.9	40.6	44.2	20	31.1	4-4	5-10	45	13	31.1	131
Fulwin	31.7	27.3	43.5	33.3	16	25.7	4-21	5-21	53	21	33.2	94

[1]Visual estimate of forage value—New Nortex 100 percent.

TABLE 13. COMPARABLE YIELDS FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 5, 1950-57

Variety	Yield of grain, bushels per acre							Number of tests
	Winter Haven 1952	Beeville 1952	College Station 1950-57	Prairie View 1952-56	Lockhart 1952-57	Beaumont 1955-56	Comparable average for area	
Alamo	51.6	31.2	67.5	44.1	31.5	51.4	52.1	17
Victorgrain			61.3	44.7	30.8	55.6	49.4	11
Mustang	42.2	33.2	63.9	41.1	28.9	51.4	49.1	17
Fulgrain	47.2	30.7	56.1	48.9	30.4	56.9	49.3	15
Alber	26.2	29.0	60.2	37.3	37.1	54.2	47.6	17
Floriland			49.1	38.4	34.9	61.6	45.5	9
Bronco	35.6	30.0	55.5	40.5	27.3	49.5	45.0	12
Ranger	25.6	27.3	57.8	35.1	29.2	53.5	44.6	17
New Nortex	22.8	23.1	58.5	31.3	32.3	51.1	44.0	17
Camellia	28.0	26.4	55.6	32.1	27.2	38.9	41.2	17
Frazier	31.2	22.8	48.2	31.7	34.7	43.2	39.8	17
Seminole			41.0	52.6		37.5	39.6	7
Fultex	36.3	30.1	42.9	40.2	34.7		38.2	9
Southland			48.2	51.6	26.4	10.1	37.5	7
Sunland			44.3	36.5	30.6	42.6	37.4	6

lowest average yields. The rank of varieties varies greatly by location. At McGregor, Ranger and New Nortex ranked first and second, followed by Bronco, Ferguson and Mustang. At Comfort, Alamo, Bronco, Alber and Mustang were the leading varieties, while at Temple, Nortex 107 was first although it was tested only a short time. New Nortex, Ferguson, Bronco and Mustang were next in yield.

The summary of agronomic data for the area shows that Frazier, Fulgrain, Alamo and Victorgrain are the earliest and Bronco the latest-maturing variety. Alamo, Fulgrain, Victorgrain, Ranger, Mustang, Bronco and Alber showed high resistance to leaf rust during this period, but only Alamo was resistant to stem rust. Bronco and Camellia were the tallest varieties and Fulgrain the shortest. The visual estimate of forage value ranked Alamo, Fulgrain and Alber as the most productive. Fulgrain, Alamo, Victorgrain and Frazier were superior in test weight.

Varieties recommended for grain production in this area include Mustang, New Nortex, Bronco and Alamo. Other Red Rustproof strains, such as Nortex 107 and Ferguson 922, also are satisfactory.

Area 5

Oats are grown in this area primarily for winter pasture for livestock. When conditions are favorable, the crop may be harvested for hay, silage or grain. Winters are mild except for short cold periods which may damage the crop. Humidity is high, showers are frequent and conditions generally are favorable for the spread of plant diseases. Only in recent years have any varieties had sufficient disease resistance to produce a grain crop.

Tests were conducted at six locations. At Winter Haven, tests were discontinued after 1952. Although tests were seeded each year at Beeville and Lockhart, only the 1952 test was harvested at Beeville and only the 1952, 1956 and 1957 tests at Lockhart were harvested. Drouth destroyed all others. Tests were harvested at Prairie View in 1952, 1955 and 1956. The 1951 test at College Station was destroyed by a storm.

Yields are summarized into comparable data for each location and for the area. Varieties in Table 13 are arranged in order of average comparable yield. Alamo ranked first in yield, averaging 52.1 bushels per acre. Victorgrain, Mustang and Fulgrain were next. Alamo ranked

TABLE 14. COMPARABLE AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT STATIONS IN AREA 5, 1950-57

Variety	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches	Estimate of forage value[1]
				Crown rust	Stem rust		
Alamo	35.3	3-24	4-26	11	1	30.9	111
Mustang	31.9	4-1	5-3	12	22	31.6	99
Victorgrain	33.2	3-27	5-1	10	36	33.2	103
Fulgrain	35.5	3-20	4-20	6	28	31.4	121
Alber	29.0	3-26	4-30	4	27	32.7	115
Ranger	30.7	4-2	5-3	5	29	32.7	100
Floriland	32.8	3-18	4-22	2	46	35.6	108
Bronco	29.2	4-11	5-4	19	22	32.2	87
New Nortex	29.5	4-4	5-4	25	27	30.1	96
Camellia	29.8	4-2	5-4	12	28	33.7	104
Seminole	31.8	3-13	4-19	11	34	33.5	109
Frazier	33.5	3-16	4-18	53	24	32.1	106
Fultex	33.5	3-23	4-24	3	24	30.7	105
Sunland	32.1	3-16	4-22	9	31	34.1	108
Southland	31.9	3-25	4-23	13	34	33.5	110

[1]Visual estimate of forage value—Ranger 100 percent.

first at all stations except Beaumont and Lockhart where Floriland ranked first.

Agronomic data for the area are summarized in Table 14. Alamo and Fulgrain were superior in test weight. Seminole, Frazier and Sunland were the earliest-maturing varieties and Bronco the latest. All varieties except Frazier and New Nortex had considerable resistance to crown rust races present during this period, but only Alamo was resistant to stem rust. Alamo, Fultex and Fulgrain were the shortest varieties, while Sunland and Floriland were tallest. Judging the forage value with Ranger as the standard, it was estimated that Fulgrain, Alber, Alamo and Southland were best in this respect, with Bronco rated as least productive.

Varieties recommended for this area are Alamo, Camellia, Mustang, Victorgrain and Alber. Seed of neither Fulgrain nor Ranger are available commercially. The Red Rustproof strains, such as New Nortex and Nortex 107, may be used for pasture, but usually will not produce grain. The Florida varieties are so extremely susceptible to stem rust that their use is not advisable.

Area 6

Most of the oats grown in this area are sown for forage purposes. Forage tests were conducted, but only limited observations on yield of oats were made. Based on these observations and performance in adjoining areas, New Nortex, Mustang and Bronco are suggested as the best available.

Area 7

No oat yield tests were conducted in this area. Most of the area is devoted to ranching, but, with increased irrigation facilities available, an increase in the use of small grain for winter pasture may be expected. For fall seeding in the area, Mustang, Bronco and New Nortex are suggested as the best available.

Nursery Tests

In addition to the intra-state tests, a larger group of experimental strains and commerical varieties were grown at the main breeding stations at College Station and Denton. Data on yields at these two stations are given in Table 15.

The rank of varieties was similar to that in the intra-state tests of the Denton area with Bronco, Mustang and New Nortex ranked in that order. Several new varieties such as Midsouth, have not yet been tested adequately. At College Station, Alamo, Victorgrain and Mustang were the leading varieties in grain yield.

TABLE 15. COMPARABLE YIELDS OF FALL-SOWN OATS GROWN AT DENTON AND COLLEGE STATION, 1947-56

Variety	Denton		College Station		
	Bushels per acre	Number years tested	Bushels per acre	Number years tested	Rank in yield
Bronco	51.8	6	50.5	6	13
Mustang	51.4	8	65.5	8	3
New Nortex	50.3	8	56.6	7	4
Nortex 107	49.1	7	52.8	5	12
Ferguson 922	48.8	8			
DeSoto	47.4	8	55.4	6	6
Cimarron	47.0	2			
Fulwin	45.5	8			
Victorgrain	44.3	8	66.4	8	2
Arkwin	44.2	5	42.4	1	17
Midsouth	40.1	2			
Alamo	40.1	7	66.8	8	1
Taggert	39.3	4	15.3	2	18
Fultex	38.5	8	53.5	7	8
Frazier	38.1	8	43.8	6	16
Delair	35.3	8	46.1	5	15
Southland	34.7	5	52.9	6	10
Sunland	34.3	2	53.3	4	9
Floriland	24.4	3	54.3	4	7
Seminole	14.1	2	46.4	3	14
Camellia			52.7	7	11
Alber			56.0	7	5

Spring-sown Tests

Most of the oats are fall-sown, but, in seasons of favorable spring rainfall, considerable acreages may be spring-sown in the Texas Panhandle where fall-seeding is hazardous. Also, when the fall-sown crop is damaged or destroyed by low temperatures, the crop may be reseeded. This may occur principally in areas 2 and 3. With the recent distribution of the more hardy varieties, Mustang and Bronco, the percentage of spring-seeded oats has decreased.

Diseases, particularly the rusts and Helminthosporium blight, are more important in spring-sown than in fall-sown oats because of their later maturity. Hot weather during the fruiting period also may be a factor in yield. The earlier-maturing varieties generally give the best yields in spring-sown tests.

A small intra-state test of spring-sown oats was conducted at the more northern stations since 1952. Comparable data for each station and for all stations are given in Table 16. Alamo, because of rust resistance and early maturity, produced the highest average yields for the State and

TABLE 16. COMPARABLE YIELDS FOR SPRING-SOWN OATS GROWN AT TEXAS STATIONS, 1952-57

Variety	Yield of grain, bushels per acre									Number of tests
	Amarillo 1952-57	Chillicothe 1952-57	Iowa Park 1952-57	Denton 1952-57	Greenville 1952-56	Temple 1953-56	McGregor 1953	Comfort 1953	State average	
Alamo	34.6	30.3	47.0	44.4	68.3	36.3	63.6	33.1	43.7	31
Frazier	27.8	29.2	44.6	41.7	60.1	29.7	44.8	38.0	39.2	31
Mustang	30.5	27.7	41.0	42.5	57.7	31.4	62.3	25.1	38.9	31
Fulgrain	36.9	29.7	41.7	40.5	57.7	29.5	61.8	25.7	38.8	20
Fultex	31.7	26.6	39.3	42.0	57.7	27.7	60.3	21.5	37.0	24
Bronco	24.9	18.5	33.6	37.4					29.9	6
New Nortex	28.1	17.0	30.5	37.2	36.3	26.0	45.1	6.1	29.1	31

TABLE 17. COMPARABLE YIELDS OF SPRING-SOWN OATS GROWN IN NURSERY PLOTS AT DENTON AND AMARILLO, 1949-57

Variety	Yields of grain, bushels per acre				
	Denton		Amarillo		
	Comparable average	Number tests	Comparable average	Number tests	Rank
Alamo	50.4	9	41.1	4	1
Mustang	50.4	9	37.8	3	3
Clintland	49.7	4			
Missouri 0-200	48.5	6	26.9	2	13
Bronco	48.2	8	36.2	2	5
Victorgrain	47.8	7			
Cimarron	47.6	3			
Missouri 0-205	46.9	2			
Andrew	46.9	8	27.7	2	12
Fultex	45.4	9	36.5	5	4
New Nortex	45.2	9	35.2	5	6
Frazier	44.3	9	33.7	4	8
Nortex 107	44.2	9			
Ferguson 922	43.5	9			
Cherokee	39.9	8	29.3	4	11
Nemaha	39.0	8	31.2	4	10
Fulwin	38.3	9			
Clinton	36.7	6	24.6	3	14
Shelby	34.2	2	23.8	2	15
Neosho			39.0	5	2
Osage			34.9	2	7
Bonda			31.4	2	9

at most stations. Mustang yielded well, but both of these varieties are very susceptible to blight and may be damaged some seasons. New Nortex, because of its late maturity and susceptibility to the rusts, produced the lowest average yields at most stations.

A larger group of experimental strains and commercial varieties are grown from spring-seeding at the Amarillo and Denton stations. Data from the replicated nursery tests are given in Table 17. Alamo and Mustang were among the leading varieties in yield at both locations, and, for practical purposes, are considered equal to any of the true spring-type varieties from the spring-sown area for spring-seeding in Texas.

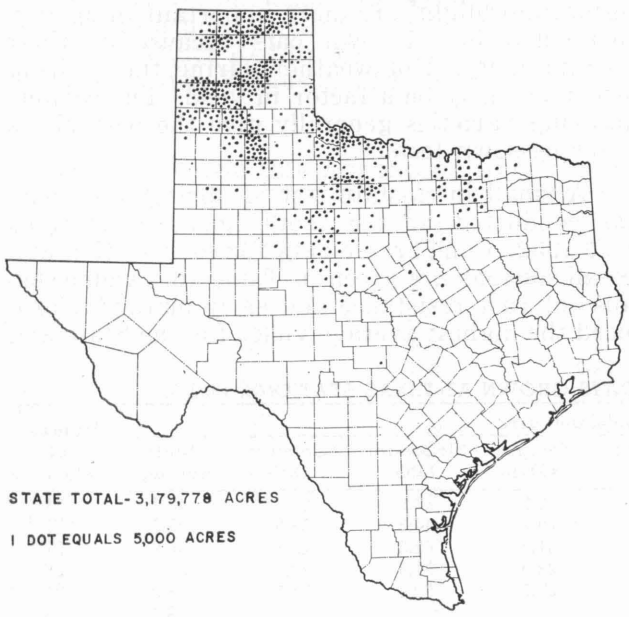

Figure 4. Distribution of wheat in Texas in 1954.

Wheat

Before 1950, wheat ranked second only to cotton as a cash crop in Texas. Owing to severe drouth conditions since 1950, the harvested acreage has declined rapidly so that wheat now ranks below both cotton and grain sorghum. Part of this decrease was due to acreage restrictions. The 10-year annual average harvested acreage was 3,634,000, which produced an average of 44,417,000 bushels annually. The maximum acreage and production was in 1947, when 7,310,000 acres produced 124,270,000 bushels. The lowest harvested acreage in recent years was in 1955, when only 1,508,000 were harvested, and this produced only 14,326,000 bushels. The distribution of wheat in Texas in 1954 is shown in Figure 4.

The acreage devoted to wheat is principally in the northwestern part of the State, with approximately 64 percent in area 1, 24 percent in area 2 and the remaining 12 percent scattered throughout Central and South Texas with most of it in the Dallas-Fort Worth-Sherman triangle.

A wide range of types is grown. More than 95 percent of the acreage is sown to hard red winter varieties, but, in the North Central area, part of the acreage is sown to varieties of soft red winter wheat. The former is utilized for bakery flour and the latter is used for the manufacture of family flours. A small acreage of durum wheat is scattered from near Waco southward onto the Edwards Plateau. Traditionally, durum has been grown because of its rust resistance. For the same reason, there also is a small acreage of emmer, locally called "speltz," on the Edwards Plateau. Damage by diseases makes wheat growing in South Texas impractical except for livestock pasture.

Area 1

Wheat is a major cash crop in this area and, in recent years, especially under irrigation, the revenue from wheat pasture also is an important source of income. Wheat variety yield tests were conducted at the U. S. Great Plains Field Station at Bushland and at off-station locations in cooperation with farm cooperators. Part was under dryland conditions and part under irrigation. Where irrigation was used, it was for crop insurance rather than to produce maximum yields. Tests at Bushland were sown on dryland and under irrigation.

Table 18 gives yield results obtained in dryland tests and Table 19 results from irrigated tests. Comparable agronomic data for all tests are included with Table 18. Varieties are listed in order of comparable yield for the area. The order at a given station may vary from this listing.

TABLE 18. COMPARABLE YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN IN DRYLAND TESTS AT STATIONS IN AREA 1, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests	Test weight, pounds[1]	Date first head[1]	Date full ripe[1]	Plant height, inches[1]	Winter survival, percent[1]
	Amarillo 1949-57	Dumas 1949-52	Spearman 1954	Stratford 1955	Average for area						
Concho	19.2	17.9	19.4	6.0	17.0	11	57.7	5-14	6-21	25.7	86
Apache	18.3	17.7	23.4	5.9	16.8	8	59.8	5-10	6-19	24.4	91
Pawnee	18.7				16.5	7	57.7	5-14	6-22	24.5	86
RedChief	19.1	16.8	13.5	6.6	16.5	13	59.6	5-16	6-23	28.9	90
Crockett	19.0	17.6	16.3	5.6	16.4	13	58.9	5-12	6-20	25.8	90
Kiowa	17.7	15.2	24.7	5.5	15.9	11	58.3	5-13	6-21	26.0	88
Westar	17.4	17.3	20.0	5.1	15.6	13	57.1	5-15	6-22	26.9	85
Bison	17.2				15.3	4	58.0	5-14	6-21	26.6	91
Comanche	16.8	18.0	18.6	5.9	15.2	13	57.1	5-15	6-22	26.1	84
Early Blackhull	16.5	17.4	17.7	6.2	14.9	13	59.4	5-7	6-18	25.3	85
Wichita	16.3	16.8	16.0	7.1	14.8	13	58.8	5-9	6-18	24.7	93
Kharkof (Turkey)	15.7	14.7	24.3	5.6	14.5	13	56.8	5-21	6-25	28.3	89
Blackhull	16.3				14.4	6	58.0	5-18	6-22	27.8	92
Triumph	16.2	16.4	15.8		14.2	11	58.9	5-7	6-16	23.2	88
Ponca	16.7	14.2	15.5	4.3	14.2	9	57.3	5-15	6-21	25.9	87
Tenmarq	15.8	13.1	20.8	6.3	14.1	13	55.8	5-18	6-24	27.0	83
Quanah	15.7	13.3			13.4	9	56.6	5-17	6-23	25.7	52

[1]Average of both dryland and irrigated tests.

Concho produced outstanding yields in this area, leading in both dryland and irrigated tests. Apache ranked second in both tests, but was tested less extensively. In the dryland tests, Pawnee, RedChief and Crockett ranked next, while, under irrigation, Crockett, Ponca and Kiowa were next.

RedChief, Early Blackhull, Apache, Crockett and Wichita excelled in test weight, with Kharkof, Tenmarq and Quanah ranking lowest. Early Blackhull and Triumph were the earliest in maturity, while Kharkof and Tenmarq were the latest. Under these conditions, both very early and very late-maturing varieties yielded less as a group than midseason varieties. RedChief and Tenmarq were the tallest and Triumph the shortest in height. Quanah was the only variety injured by low temperatures in these tests.

Quality is an important consideration in the choice of a wheat variety since the attractiveness and final market value are determined by the value for commercial bread baking purposes. Varieties differ widely in quality characteristics and are grouped as strong gluten, mellow gluten and weak gluten wheats. Fortunately, some of the best quality varieties also have good production records. On the basis of yield and quality, Concho, Crockett, Westar and Comanche are recommended. Ponca and Cheyenne are recommended under irrigation, but not on dryland.

Many additional varieties are grown at the main breeding stations at Amarillo, Chillicothe and Denton. Results from these tests are shown later in the nursery section and in Table 24.

Area 2

Wheat yield tests were conducted at Iowa Park, Chillicothe and Spur. Tests were started in 1953 at Abilene in cooperation with Abilene Christian College. The tests at Iowa Park were grown under irrigation. Since severe drouth prevailed during most of this period, only limited

TABLE 19. COMPARABLE YIELD DATA FOR WHEAT VARIETIES GROWN UNDER IRRIGATION AT STATIONS IN AREA 1, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests
	Amarillo 1949-56	Dumas 1955	Hereford 1951	Floydada 1952-57	Average for area	
Concho	28.2	21.2	12.0	26.4	27.8	16
Apache	26.3	25.5		24.0	26.4	11
Crockett	25.4	22.3	11.4	23.3	25.4	16
Ponca	26.4	20.4		22.5	25.3	14
Kiowa	25.9			22.2	25.0	13
Comanche	25.4	22.6	11.5	21.5	24.8	16
RedChief	23.6	25.7	12.0	22.9	24.5	16
Westar	23.9	17.8	12.5	23.9	24.4	16
Bison	25.7			20.5	24.0	8
Blackhull	23.8				23.8	7
Triumph	24.5		7.5	21.4	23.7	11
Pawnee	23.5		7.4		23.7	8
Kharkof (Turkey)	23.9	18.2	11.4	22.8	23.3	16
Tenmarq	22.9	17.9	11.1	21.8	23.0	16
Wichita	23.0	20.4	8.3	21.2	22.9	16
Early Blackhull	21.2	17.2	10.9	21.6	22.4	16
Quanah	20.8		9.8	16.4	21.6	8

TABLE 20. COMPARABLE YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT STATIONS IN AREA 2, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests	Test weight, pounds	Date first head	Date full ripe	Plant height, inches	Percent leaf rust	Forage esti-mate[2]
	Iowa Park 1949-57[1]	Chilli-cothe 1949-57	Abilene 1953-57	Spur 1949-57	Average for area							
Crockett	33.5	25.6	6.8	12.3	18.7	17	61.0	4-21	5-26	24.5	11	112
Ponca	31.4	24.1	7.1	13.1	18.2	15	60.6	4-23	5-27	24.7	20	100
Concho	33.6	23.8	8.6	13.1	18.1	12	61.1	4-24	5-28	25.3	25	103
Apache	29.9	23.6	6.4	12.3	17.6	9	60.3	4-22	5-26	24.8	52	85
Kiowa	30.7	22.9	6.0	12.3	17.2	13	60.5	4-22	5-27	23.9	53	97
Kanred		22.8		12.1	17.1	11	59.5	4-27	6-2	25.9	31	98
Westar	31.4	24.5	5.1	9.7	17.0	15	60.1	4-24	5-29	26.8	24	90
BlueJacket	28.7	22.4	4.9	12.9	17.0	6	61.7	4-26	5-29	29.2	60	107
Comanche	30.6	22.0	5.3	12.1	16.5	17	59.8	4-23	5-28	25.4	37	100
Wichita	30.1	22.2	7.8	10.7	16.4	17	60.9	4-17	5-24	24.5	61	103
RedChief	29.1	21.3	4.3	11.7	15.9	17	61.7	4-25	5-30	26.1	59	101
Tenmarq	30.5	21.4	7.3	10.4	15.8	17	59.6	4-24	5-29	25.9	52	91
Quanah	30.2	21.9	4.1	10.1	15.7	9	60.1	4-21	5-27	24.8	Tr	120
Early Blackhull	29.4	20.9	6.0	10.9	15.6	17	60.8	4-15	5-22	25.4	50	108
Kharkof	29.3	20.8	3.2	11.6	15.5	17	59.1	4-28	6-1	26.8	44	95
Blackhull		20.9		10.9	15.4	11	60.1	4-24	6-1	26.1	47	104
Triumph	27.0	19.4	6.9	9.9	14.6	16	60.7	4-15	5-21	24.6	63	103

[1]Irrigated test, not included in averages for area.
[2]Visual estimate of forage value—Comanche 100 percent.

results were obtained at Spur and Abilene. Conditions were more favorable at Chillicothe.

Comparable yield and agronomic data are summarized for the area in Table 20. Data on agronomic characters are summarized for all four locations, but yield data include only the three dryland tests.

Crockett, Ponca and Concho produced the highest average yields, 18.7, 18.2 and 18.1 bushels, respectively, in dryland tests, while under irrigation at Iowa Park, Concho averaged 33.6 bushels and Crockett 33.5 bushels. Apache, Kiowa and Westar also produced high yields in this area. The early-maturing varieties, such as Triumph and Early Blackhull, did not yield as well as mid-season varieties. Likewise, the Blackhull group of varieties, although high in test weight, did not produce yields equal to the better quality varieties.

Concho, Crockett, Ponca and Westar were among the highest in test weight, being exceeded only by RedChief and BlueJacket. Early Blackhull

TABLE 21. COMPARABLE YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT SUBSTATIONS IN AREA 3, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches
	Denton	Green-ville	Stephen-ville	Average for area					Leaf rust	Stem rust	
HARD RED WINTER WHEAT VARIETIES											
Crockett	25.1	28.7	22.2	24.8	23	59.9	4-26	5-28	6	2	32.3
Concho	26.0	27.9	19.8	23.8	18	59.2	4-28	5-29	10	15	30.1
Ponca	24.0	26.7	20.5	23.2	19	58.3	4-28	5-29	19	12	30.8
Quanah	22.1	26.1	21.2	23.0	23	59.1	4-26	5-29	5	2	30.0
Blackhull	23.8		15.1	22.0	7	60.4	5-2	6-1	50	10	33.3
Early Blackhull	23.5	25.6	17.7	21.9	23	60.1	4-21	5-25	51	6	31.9
Westar			19.5	21.6	3	58.4	4-28	5-31	20	17	32.0
Comanche	23.2	24.0	19.3	21.4	23	57.9	4-27	5-30	37	9	31.0
Triumph	23.8	23.9	17.6	21.3	23	59.1	4-21	5-25	59	6	29.0
Kiowa	23.8	19.7	12.3	21.1	6	59.0	4-27	5-28	66	7	30.6
Wichita	24.7	21.8	17.4	20.6	14	59.8	4-24	5-25	61	6	30.4
Kanred	21.7			20.4	4	57.4	5-3	6-2	45	7	30.5
Tenmarq	22.7	22.5	17.8	20.3	23	58.0	4-30	5-31	60	13	32.1
Kharkof	21.6		16.1	19.9	8	58.2	5-1	6-2	53	9	30.3
RedChief	21.4		14.3	19.5	9	60.2	4-30	6-1	55	20	32.6
SOFT RED WINTER WHEAT VARIETIES											
Knox	25.0	29.4	17.9	23.5	11	57.4	4-18	5-21	4	5	30.5
Vermillion	20.9	27.3	18.9	22.0	5	56.0	4-18	5-22	5	11	31.5
Frisco	20.9	25.7	19.5	21.8	19	57.7	4-24	5-27	2	5	33.0
Austin	25.6	23.3	15.3	20.4	6	56.0	4-25	5-27	43	Tr	33.1
Red May	19.9	25.5	15.6	19.9	19	56.9	4-27	5-28	20	18	33.3
Denton	20.5	23.8	13.7	19.3	21	56.9	5-1	6-1	14	26	39.1
Mediterranean 81	19.7	20.0		18.4	4	58.5					
Thorne	20.5	22.1		15.7	4	55.6	5-1	5-30	68	36	30.9
Blackhawk	15.5	11.7	14.4	14.0	3	55.9	5-3	6-2	5	25	40.7
Vigo	15.4	14.5	10.6	12.8	9	56.2	5-2	5-29	25	33	35.5

TABLE 22. COMPARABLE YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT SUBSTATIONS IN AREA 4, 1949-57

Variety	Yield of grain, bushels per acre				Number of tests	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches	Forage estimate[1]
	McGregor	Temple	Comfort	Average for area					Leaf rust	Stem rust		
HARD RED WINTER WHEAT VARIETIES												
Quanah	19.7	20.6	22.8	21.0	19	58.1	4-19	5-27	3	3	30.8	99
Crockett	21.5	19.2	17.4	19.4	19	58.5	5-21	5-27	17	2	30.0	84
Early Blackhull	19.7	17.0	18.4	18.1	19	59.9	4-17	5-24	49	Tr	31.5	89
Comanche	18.5	17.9	17.1	17.6	8	56.2	4-25	5-28	45	6	29.4	81
Tenmarq	16.4	14.4	14.1	14.9	19	56.2	4-26	5-31	53	15	31.3	87
Triumph		9.7	10.9	13.7	3	58.3	4-19	5-27	70		28.1	84
Wichita		9.8	10.4	10.3	4	60.3	4-22	5-22	60	4	30.5	72
SOFT RED WINTER WHEAT VARIETIES												
Frisco	18.3	24.3	26.0	23.6	14	57.0	4-18	5-25	12	4	30.6	91
Vermillion	23.0	19.9		21.9	4	56.6	4-10	5-24	Tr	Tr	31.3	102
Knox	21.0	19.8	12.3	19.6	9	57.6	4-10	5-20	19	Tr	31.0	92
Coker 47-27	14.9	18.8	27.5	19.1	11	56.4	4-12	5-19	26	9	34.4	157
Atlas 66	18.2	16.5		18.8	9	51.8	4-14	5-23	12	4	32.5	118
Austin	19.1	15.9	21.3	18.2	19	55.1	4-20	5-27	53	2	31.8	100
Denton	16.0	15.4	17.5	16.1	18	56.6	4-28	5-31	40	21	32.1	92
Red May	15.4	16.7	16.1	14.8	10	55.7	4-22	5-25	50	37	28.1	92
Vigo		11.0	9.9	14.2	3	50.9	5-3	6-1	82	69	30.3	102
DURUM VARIETIES												
Stewart	18.2	19.9	24.7	20.7	19	59.6	4-14	5-23	10	6	38.5	121
Nugget	17.3	19.0	25.5	19.7	15	58.7	4-5	5-19	6	4	33.1	115
Sentry	20.4	17.2		18.5	6	60.4	4-7	5-21	Tr	Tr	31.0	113
Langdon	22.0	19.7		15.9	5	58.0	4-19	5-23			33.1	
Ramsey	13.8	16.9		14.3	5	59.5	4-21	6-2			35.1	

[1]Visual estimate of forage value—Austin 100 percent.

and Triumph were the earliest in maturity, followed by Wichita about 2 days later and then by Crockett. Blackhull and Kharkof were the latest maturing. The varieties did not differ greatly in height, although Kiowa, Crockett and Wichita were the shortest, while RedChief and BlueJacket were somewhat taller than other varieties.

Leaf rust notes were obtained during 5 seasons. Quanah was the most resistant to this disease. Crockett, Ponca and Concho were moderately resistant and all others highly susceptible. Quanah and Crockett showed the most spring forage growth. Apache, Westar and Tenmarq showed the least growth.

Based on these tests, and considering also milling and baking characteristics, Crockett, Concho, Ponca, Westar and Comanche are recommended for this growing area.

Area 3

Wheat yield tests in this area were conducted each year at Greenville, Stephenville and Denton. Only about 8 percent of the State acreage is grown in this area, but wheat is important as a cash crop in certain local communities, such as near Sherman, and it offers diversification in all parts of the area. This is the only part of the State where the soft winter wheats are grown. Their production centers around Sherman, where one mill produces annually more than 1,000,000 hundredweights of family flour.

Comparable yields and agronomic data are summarized for the area in Table 21. Varieties are listed in the order of comparable yield for the area and are grouped into hard red winter and soft red winter classes.

TABLE 23. COMPARABLE YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT SUBSTATIONS IN AREA 5, 1949-57

Variety	Yield of grain, bushels per acre					Number of tests	Test weight, pounds	Date first head	Date full ripe	Percent		Plant height, inches	Forage estimate[3]
	Lockhart 1955-57	Prairie View 1953-56	Beeville 1952-57	College Station[1] 1949-57	Average for area[2]					Leaf rust	Stem rust		
Supremo	17.0	12.5	10.7	29.0	20.3	15	58.8	3-25	4-30	6	15	33	118
Lee	17.0	14.2	11.3	27.3	19.9	13	60.3	3-23	5-3	10	24	30	128
Coker 47-27	13.4	16.5	7.0	27.3	18.1	8	59.0	3-25	5-1	14	20	34	129
Seabreeze	12.1	15.4	9.9	23.7	17.0	13	57.0	2-25	4-15	21	7	31	118
Atlas 66	14.1	8.0	6.4	25.5	16.7	9	57.3	3-28	5-3	6	16	33	124
Quanah	13.4	13.9	6.7	23.8	16.5	15	58.0	4-7	5-9	8	10	34	86
Bowie	15.4	5.6	7.6	23.2	15.9	12	57.3	3-27	5-4	4	59	31	116
Selkirk	13.7	17.4	6.9	21.0	15.9	7	57.3	3-20	4-27	12	1	31	120
Austin	10.2	9.9	2.7	19.0	12.2	15	53.8	4-4	5-7	40	13	31	100

[1]Tests at College Station were irrigated as necessary to produce normal growth during 1954-56.
[2]Similar tests were lost from drouth or severe storms at College Station in 1951, at Beeville in 1955 and 1956, at Prairie View in 1954 and 1955 and at Lockhart in 1954 and 1956.
[3]Visual estimate of forage value—Austin 100 percent.

Crockett, Concho, Ponca and Quanah were the leading varieties in average yield for this growing area. Average yields of the best soft wheat varieties, Vermillion, Knox and Frisco, were approximately the same as the best hard winter wheats.

Blackhull, Early Blackhull and RedChief produced grain of highest test weight, although the test weights of Crockett, Quanah and Concho also were good. The soft wheats usually averaged less in test weight. Knox and Vermillion, a sister strain, were the earliest maturing and were injured by late freezes in some seasons. Early Blackhull and Triumph were the earliest hard wheats, followed by Wichita, Crockett and Quanah. There are no great differences in height among the hard wheats, but among the soft wheat varieties, Knox and Vermillion are short, while Denton and Blackhawk are very tall.

Leaf rust and stem rust reaction are important considerations in this area. Knox and Frisco have considerable resistance and also may escape damage because of earliness. Crockett, Quanah, Ponca and Concho showed good resistance during the period of testing, while most others are very susceptible to both rusts. Late maturity increases the opportunity for damage by diseases.

Varieties recommended for this area are Crockett, Concho, Ponca and Quanah. The first two produced the best yields in recent dry seasons, but the last two are better adapted to wet seasons. Where there is a local market for soft wheat, Knox and Frisco may be grown.

Area 4

Wheat yield tests were conducted at Temple, McGregor and Comfort in this growing area. Comfort is on the Edwards Plateau at an elevation of 1,800 feet, the growing season is shorter than other stations and late spring frosts are a hazard. Average rainfall in Area 4 is more than 30 inches per year and plant diseases are a major problem.

Although wheat is a minor crop in this area, small acreages of hard winter, soft winter and durums are grown. All three types were tested. Comparable yields and agronomic data are given by market classes in Table 22.

Quanah and Crockett gave the best average yields in 16 comparisons of hard winter wheats. The soft wheat varieties, Frisco, Vermillion and Knox, produced good yields in recent dry seasons, but are very susceptible to some races of stem rust. There is no local market for soft winter wheat. The yield of durum varieties was not as good as Quanah or Crockett. There is no local market for durum wheat other than as feed wheat.

Diseases are major factors in this area, as evident when varieties such as Quanah and Crockett are compared with Comanche, Wichita and Triumph. Leaf rust alone may completely destroy such varieties if conditions are favorable for the disease.

Quanah and Crockett are the only varieties recommended for this area.

Area 5

Wheat grown in area 5 is used principally for winter pasture. Only 0.1 percent of the State

TABLE 24. COMPARABLE YIELDS OF COMMERCIAL VARIETIES OF WHEAT TESTED IN REPLICATED NURSERY PLOTS AT AMARILLO, CHILLICOTHE AND DENTON, 1949-56

Variety	Amarillo					Chillicothe			Denton		
	Dryland tests		Irrigated tests								
	Comparable yields	Number tests	Comparable yields	Number tests	Rank in yield	Comparable yields	Number tests	Rank in yield	Comparable yield	Number tests	Rank in yield
Concho	20.4	7	28.2	7	1	25.0	8	2	24.8	6	1
Kanking	20.3	2	23.5	3	14	22.0	4	14	24.7	4	2
RedChief	20.1	7	23.6	7	13	20.5	8	20	21.2	6	18
RedJacket	20.0	3	22.5	2	20	23.7	3	8	17.2	2	21
Crockett	19.9	7	25.4	7	6	25.5	8	1	24.2	6	3
Pawnee	19.8	6	23.5	6	15	24.4	8	4	21.2	6	17
Stafford	19.5	5	19.2	3	25	21.4	2	16	12.2	1	23
KanQueen	19.5	2	21.6	1	22	22.0	2	13	22.0	1	15
NewChief	19.4	3	22.8	2	19	19.7	3	23	16.2	2	22
Apache	19.4	5	26.3	6	3	23.9	5	7	22.6	4	10
BlueJacket	18.9	7	23.6	6	12	23.0	6	9	21.5	4	16
Kiowa	18.8	7	25.9	7	4	22.7	8	10	23.3	6	8
Westar	18.8	7	23.9	7	9	24.7	8	3	24.1	6	5
Comanche	17.8	7	25.4	7	7	21.3	8	17	22.4	6	12
Bison	17.8	3	25.7	4	5	22.4	5	11	22.3	3	13
Blackhull	17.7	7	23.8	6	11	20.1	8	21	24.1	6	4
Ponca	17.7	5	26.4	7	2	24.3	8	5	23.9	6	6
Wichita	17.3	7	22.8	7	18	22.2	8	12	22.9	6	9
Triumph	17.3	7	24.5	7	8	19.4	8	24	23.4	6	7
Early Blackhull	17.2	7	21.2	7	23	19.9		22	22.4	6	11
Tenmarq	17.1	7	22.9	7	17	21.0	8	18	22.1	6	14
Kharkof	17.0	7	23.9	7	10	21.5	8	15	20.3	6	20
Turkey	16.9	6	21.8	6	21	19.2	8	25			
Quanah	16.8	6	20.8	5	24	21.0	6	19	21.1	6	19
Kanred	16.6	5	23.0	6	16	24.1	7	6			

acreage is grown in this area. Few commercial varieties are adapted and only a few were tested. Yields were low except at College Station, where the tests were irrigated since 1953. Diseases are major hazards of production and discourage any expansion of the crop with present varieties.

Since winters usually are mild, spring types were included among the hard and soft winter varieties tested. Tests were conducted at Lockhart and Prairie View since 1953, while tests were seeded at Beeville and College Station each year. There were frequent failures because of drouth, diseases or severe wind storms.

Comparable yield and agronomic data are given by location and for the area in Table 23.

The highest yield in 12 station tests in the area was produced by Supremo. This variety was released in Mexico but not in Texas and it is not available commercially. Lee, a hard red spring wheat variety, produced the highest yield of the commercial varieties tested. Coker 47-27, Seabreeze, Atlas 66 and Quanah ranked next. These varieties have considerable resistance to leaf rust and are moderately resistant or tolerant to other leaf diseases.

Test weight of grain produced in this area was generally below standard, and in some seasons was very low. Lee and Coker 47-27 produced the highest test weight. Forage estimates, based on visual evaluations of the amount of growth present, indicate that Quanah and Austin, which approach true winter wheats, are the poorest in this area. Lee, a spring type, and the intermediate winter types, such as Coker 47-27, Atlas 66 and Supremo, produce more forage.

Nursery Tests

Many additional varieties were grown at the main breeding stations at Amarillo, Chillicothe and Denton. Data on the performance of these varieties in dryland and irrigated tests at Amarillo and in dryland tests at Chillicothe and Denton are given in Table 24. These tests were grown in replicated nursery tests of four replications, while the intra-state tests were grown in eight replications. Varieties are arranged in order of yield in dryland tests at Amarillo. The rank of each variety in the other tests and number of years tested are given.

At Amarillo, Concho ranked first in both dryland and irrigated tests. Kanking RedChief and RedJacket ranked next in dryland tests, but dropped to 14th, 13th and 20th in irrigated tests. As in the intra-state tests. Ponca produced excellent yields under irrigation, but ranked 17th in dryland tests. Crockett ranked 5th in dryland tests and 7th under irrigation.

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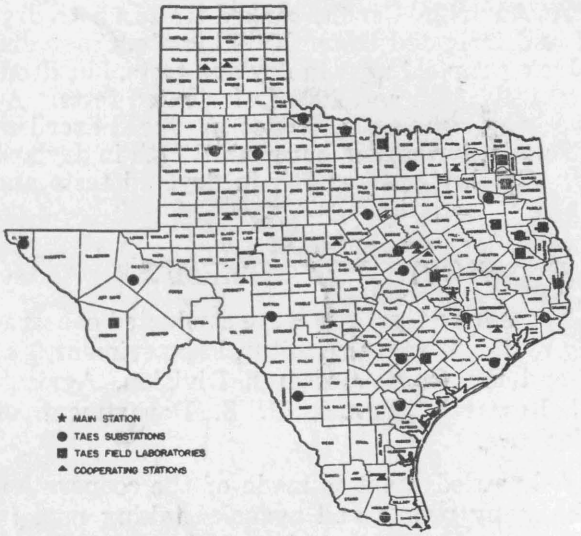

Location of field research units of the Texas Agricultural Experiment Station and cooperating agencies

State-wide Research

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