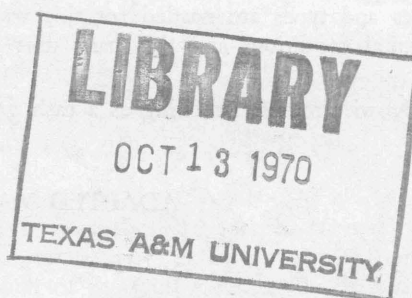


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*Performance  
of Small Grains  
and Flax Varieties  
in Texas*

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## Summary

Small grains are used extensively for grain and supplemental winter pasture in Texas. The combined acreage of wheat, oats, barley and rye was 6,749,600 acres in 1968. Only 4,255,900 acres were harvested for grain. Of the 2,493,700 acres not harvested, the majority was grazed to maturity as the value for forage uses often exceeds that for grain. Considerable acreages are abandoned each year because of drouth or winter killing. Small acreages are used for hay, grass silage or green manure. Small grains are grown from the 50-inch rainfall belt of south-east Texas to the 15-inch rainfall belt of northwest Texas. Many varieties and types are needed for this wide range of the environmental conditions and the many uses made of the crop.

Flax is grown from fall seeding as a cash grain crop

in South-central Texas. The first commercial fields of flax were grown in 1938, and the acreage increased to 329,000 acres in 1949. During recent years the acreage has ranged from 15,000 in 1957 to 169,000 in 1963.

Performance trials of small grains and flax were conducted at from 10 to 14 locations each year during 1959-68. These trials serve as a means of determining the range of adaptation of commercial varieties and new experimental strains developed in the breeding program. For testing and easy reference, the state was divided into five research areas. Annual production, means and comparable averages for grain yield and certain agronomic characteristics for commercial varieties tested in various areas are given in tables which follow. A list of three to five best adapted varieties is given for each area. In some cases other varieties may be equally good in certain areas.

### ADAPTED VARIETIES FOR GROWING AREAS

Area	I	II	III	IV	V
Extension districts	1, 2	3, 6, 7	4, 5	8, 9, 11	10, 12
<b>Oats</b>					
FALL SEEDING	Cimarron Wintok Bronco	Cimarron Norwin Nora Ora Alamo-X	New Nortex Ora Moregrain Alamo-X Nora	New Nortex Coronado Cortez Ora Moregrain	Florida 500 Suregrain Coronado Cortez Houston
SPRING SEEDING	Coronado Cortez Norwin Cimarron	Cimarron Coronado Cortez	Coronado Cortez Suregrain Ora	None recommended	
<b>Barley</b>					
FALL SEEDING	Will Harrison Rogers Chase Kearney	Rogers Cordova Will Era Zora	Era Cordova Zora Rogers Will	Cordova Zora Rogers Era	Goliad Florida 102
SPRING SEEDING	Cordova Rogers Zora	Cordova Rogers Era Zora	Cordova Era	None recommended	
<b>Wheat</b>					
FALL SEEDING	Tascosa Caprock Sturdy Caddo Scout 66	Caddo Scout 66 Sturdy Caprock Improved Triumph	Sturdy Caprock Caddo Knox 62 Riley 67 Arthur	Caddo Sturdy Caprock Knox 62 Riley 67 Arthur	Milam Penjamo 62 Chris Polk
SPRING SEEDING		Not recommended			
<b>Flax</b>					
FALL SEEDING				Dillman Mac Caldwell	Dillman Mac B5128

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# *Performance of Small Grains and Flax Varieties in Texas*

I. M. ATKINS\*

**S**SMALL GRAINS OCCUPY A UNIQUE PLACE among Texas crops because they are adapted to many uses and can be grown with some degree of success from the 50-inch rainfall belt of the Gulf Coast to the 15-inch rainfall belt of Northwest Texas. Spring-type varieties can be fall-sown in South Texas, while only very cold-tolerant varieties are adapted to fall seeding in Northwest Texas.

Wheat is one of the important cash grain crops of the High and Rolling Plains and to a lesser extent of parts of the eastern half of the State. However, the forage value of wheat, as winter pasture for livestock, has increased greatly in recent years. Revenue from grazing small grains, in terms of grazing fees, beef production or milk production, is often equal to that received from the grain crop.

Oats and barley are usually seeded in the fall, although small acreages may be spring-sown when the fall-sown crop has been winter-killed or when favorable spring moisture is available. The fall-sown crop is used as a combination winter forage and grain crop. When a grain crop is to be harvested, livestock are removed from the fields in February or March. As with wheat, large acreages are grazed to maturity. They are seeded exclusively for pasture with no intent to harvest a grain crop. Smaller acreages are seeded for hay, grass silage, green-chop feeding or as a green manure crop.

Rye is seeded for winter pasture, as a green manure crop and for wind and water erosion control in sandy areas. Only a small part of the rye crop is harvested for grain production. Flax is grown only in South Texas where it is fall-sown as a cash grain crop. In some seasons, a very limited amount of the straw has been sold for the fiber.

The seeded and harvested acreages of small grains and flax are given in Table 1. The differences between that seeded and harvested may be due to the acreage grazed to maturity and that lost because of drouth, winterkilling, diseases, storm damage or other hazards.

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TABLE 1. TEXAS 10-YEAR AVERAGE ACREAGES AND PRODUCTION OF SMALL GRAINS AND FLAX, 1959-68<sup>1</sup>

Crop	10-year average, 1959-68				
	Seeded acres	Harvested acres	Percent harvested	Production, bushels	Yield per acre, bushels
Wheat	4,313,100	3,278,700	76.0	65,904,300	20.1
Oats	1,896,700	730,600	38.5	18,720,500	25.6
Barley	367,700	219,900	59.8	4,810,700	21.9
Rye	172,100	26,700	15.5	392,400	14.7
Flax	109,700	82,300	75.0	778,100	9.5

<sup>1</sup>Data furnished by the Texas Crop and Livestock Reporting Service, U.S. Department of Agriculture, Austin, Texas.

### RESEARCH AREAS AND TEST LOCATIONS

Small grains and flax performance trials are designed for two purposes: (1) To provide information on which to base varietal recommendations to growers and (2) to provide adequate tests of new experimental strains developed in the breeding programs. Data on performance of commercial varieties are given in tables in the appropriate sections. Data on experimental strains, for which no commercial seed is available, are reported in mimeographed form to research workers, Texas Agricultural Experiment Station, Soil and Crop Sciences Department Technical Report 25, 1968.

Because of the wide diversity of climatic conditions in the state, five experimental or research testing areas were established for reporting and easy reference, Figure 1. These represent general climatic and soil-type areas, and each includes certain Texas Extension Districts. There

are some instances where the types of farming areas do not exactly coincide with research or extension boundaries so these line limitations should be taken only as guidelines.

Area I (Extension Districts 1 and 2) is the High Plains or Panhandle with elevation of 3000 to 4000 feet and average rainfall of approximately 18 inches. Winter temperatures are severe, and only hardy varieties can be fall-sown successfully. Area II (Districts 3, 6 and 7) is the Rolling Plains, Trans-Pecos and northern Edwards Plateau land-use areas. Rainfall ranges from 30 inches in the east to as low as 5 inches in the Trans-Pecos. Irrigation water is only available in certain small areas, and the quantity frequently is limited. The elevation varies greatly, but most small grains are grown at elevations of 900 to 1750 feet. Winter temperatures are moderately severe, but usually small grains remain dormant and are not severely damaged by low temperatures. Area III (Districts 4 and 5) is the northern part of the Blacklands, Cross Timbers and East Texas Timberlands land-use areas. The elevation ranges from 400 to 1500 feet with precipitation from 30 to 45 inches. Winter temperatures are moderate but subject to rapid change. A period of warm weather may cause small grains to initiate active growth and lose hardiness. Cold fronts may then lower the temperature rapidly and seriously damage the crop. Soft red winter wheat is the major type grown in this area; oats also are grown extensively. Area IV (Districts 8, 9 and 11) is the central part of the Blackland, Prairies, Cross Timbers and the Southeast Texas Timberlands. Average precipitation ranges from 30 inches on the western edge to near 55 inches on the upper Gulf Coast. Winter temperatures are moderate, and winterkilling of grain occurs only occasionally. Area V (Districts 10 and 12) is the southern part of the Blacklands and Prairies, plus the Coastal Bend and Rio Grande Plain land-use areas. Precipitation is very poorly distributed and ranges from 15 to 25 inches. Irrigation water is available along some streams. The acreage of wheat and other small grains used exclusively for grazing has recently increased. Practically all the Texas flax crop is grown in this area.

### PERFORMANCE TRIALS

All performance trials were conducted in nursery size plots arranged in randomized blocks of three or four replications. These nursery plots were four 12-inch rows wide by 10 to 12 feet long. The two center rows were harvested to determine yields. Larger drill plots were often grown for demonstration to provide seed or to provide for grain samples for quality tests of wheat varieties.

The varieties included in trials were changed frequently as new ones became available and older ones became obsolete. A set of standard check varieties was maintained throughout the period of testing, but the standard varieties vary with research areas. In order to compare directly the varieties grown at a single location for 1 or several years with check and other varieties grown the full period of years, comparable averages were calculated. These comparable averages of grain yields and agronomic data were based on a selected set of check varieties grown the

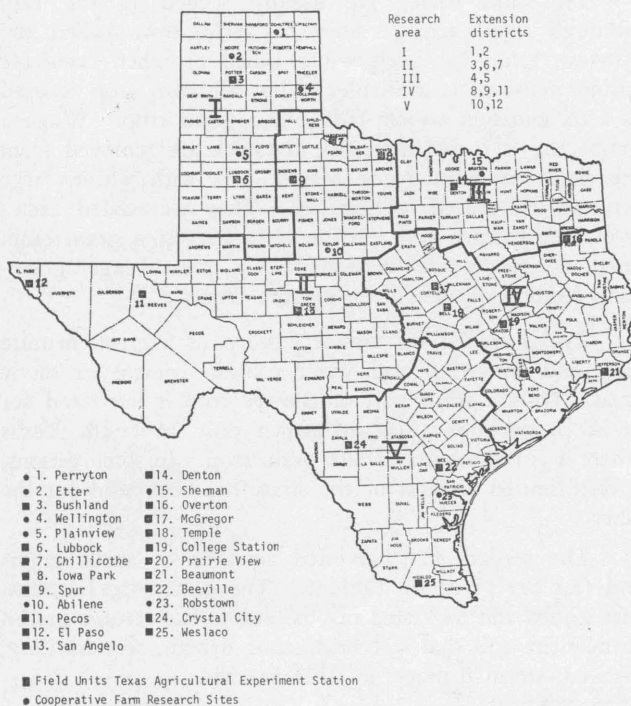


Figure 1. Small grains and flax research areas and testing stations.

full period of years. The data for a variety grown a shorter period is adjusted on the basis of its performance in relation to the check varieties for the years when both were grown. Actual yields and averages for shorter periods are also given. Varieties tested for short periods may not be accurately evaluated.

Recommendations are based on performance in grain production, but performance may be altered by such characteristics as cold tolerance, disease reaction or insect resistance, adaptation for winter grazing or quality of the wheat grain for milling purposes. Growers should consider all these characteristics in selecting a variety to grow.

A brief description of the growing seasons for the period of testing herein reported is given:

1959: A favorable fall season; extremely dry winter and spring season; heavy abandonment in western part of the state because of drouth; little winterkilling.

1960: A favorable fall season; cool, cloudy, damp winter with above normal December rain and snow; January and February temperatures 4 to 10 degrees below normal, but little loss from winterkilling.

1961: Fall and winter very favorable; heavy snows from Denton westward in January; December and January temperatures much below normal, but little winterkilling; very dry spring with little disease losses.

1962: A favorable fall season; temperatures below normal in fall followed by very severe January temperatures after a period of warm weather; serious low temperature damage to stands and forage production of all small grains; estimated loss 14 percent of oat crop; forage of oats lost throughout State; total loss of grain and forage estimated at \$14 million; spring season dry and unfavorable for recovery; approximately 90 percent of the flax crop destroyed.

1963: Favorable fall season; early establishment and abundant forage produced over entire state; severe winterkilling in January, estimated at 45 percent of the oats, 30 percent of the barley, 17 percent of the wheat and 30 percent of the flax; dry spring season unfavorable for recovery.

1964: Fall season unfavorable; no rain until November, dry winter over much of the state; much abandonment of acreages; little winterkilling; some stem rust damage to wheat; damage to barley by *Helminthosporium* species.

1965: Favorable fall; mild winter, no winter killing; late, cold spring; very wet May and June; moderate damage by leaf rust on oats and wheat in Central Texas; severe damage to barley by *Helminthosporium* species.

1966: Favorable fall season; High Plains area very dry throughout fall and winter; other areas had favorable seasons; flax diseases serious — rust, pasmo and boll rot.

1967: One of the driest seasons on record; abandonment heavy; lowest acreage of oats harvested since 1881; March freeze caused much sterility of wheat in some areas.

1968: Excessive rains and flooding in South Texas due to Hurricane Beulah; winter rains favorable; temperatures uniform; little or no winterkilling; leaf rust of wheat important in Central Texas and Rolling Plains.

Data on performance of varieties are arranged by crops. The average grain yields are reported for the 5-year period 1959-63. Annual yields are given for the period 1964-68 and actual and comparable averages for the 10-year period 1959-68.

## WHEAT

The 10-year seeded average of wheat, 4,313,000 acres, ranks third among cultivated crops in Texas. The seeded acreage has been under government control for many years. However, much of the wheat is grown in areas of limited rainfall, so the seeded acreage fluctuates greatly, depending upon moisture conditions at seeding time. The largest acreages and production in Texas were in 1947 when 7,587,000 acres were seeded; 7,130,000 acres were harvested, and 116,960,000 bushels of grain were produced. The lowest seeded acreage since 1925 was in 1955 when 1,508,000 acres were seeded, and production was 14,326,000 bushels.

Wheat acreage is widely distributed in Texas, Figure 2. Approximately 53 percent was grown in Research Area I and 32 percent in Research Area II in 1968. Due to the release of Milam and other adapted varieties, the acreage in Research Area V has increased from only a few thousand acres in 1950 to more than 160,000 acres in 1968. The wheat acreages by extension districts and research areas are given in Table 2.

Nearly all Texas wheat is fall-sown. However, in favorable spring seasons or in irrigated areas, a small acreage of true spring-type varieties may be spring-sown in Northwest Texas. Spring-type varieties may be fall-sown

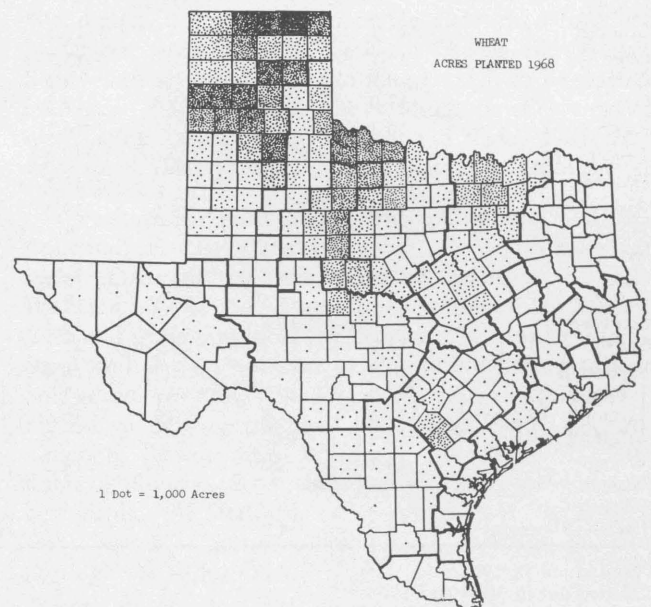


Figure 2. Distribution of 1968 Texas wheat acreage.

TABLE 2. ACREAGES AND PRODUCTION OF WHEAT BY EXTENSION DISTRICTS AND RESEARCH TESTING AREAS, 1968<sup>1</sup>

Extension district	Research testing area	Land use area	Average seeded	Average harvested	Percent of each district of state		Production, bushels	Percent seeded acreage harvested for grain
					Seeded	Harvested		
1	I	Northern High Plains	2,139,650	1,660,690	43.6	43.3	38,997,395	77.8
2	I	Southern High Plains	520,950	368,000	10.6	9.6	9,052,500	70.6
3	II	Northern Low Rolling Plains	1,101,300	956,230	22.4	25.0	20,882,300	86.8
6	II	Trans-Pecos	33,550	24,340	0.7	0.6	863,900	72.5
7	II	Southern Low Rolling Plains and upper Edwards Plateau	319,350	261,200	6.5	6.8	4,259,600	81.7
4	III	North Central Blacklands, Prairies and Cross Timbers	401,200	328,100	8.2	8.6	6,080,000	81.8
5	III	Northeast Timberlands	16,000	7,850	0.3	0.2	11,675	49.1
8	IV	Central Blacklands, Prairies and Cross Timbers	192,800	126,900	3.9	3.3	2,127,000	65.8
9	IV	Central East Timberlands	1,800	0				0
11	IV	Southeast Texas and upper Coast	21,270	2,290	0.4	0.1	37,500	10.8
10	V	South Central Blacklands Prairies and Coastal Bend	124,640	69,500	2.5	1.8	1,216,100	55.8
12	V	Rio Grande Plain, South Texas	36,490	19,900	0.7	0.5	487,800	54.5

<sup>1</sup>Texas Small Grain Statistics, Bulletin No. 50, May, 1969, USDA, Statistical Reporting Service, Austin, Texas, 1968.

TABLE 3. GRAIN YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN WITHOUT IRRIGATION AT BUSHLAND, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre							Comparable average <sup>3</sup>			
	1963-68 <sup>2</sup>			1958-68				Date first head	Plant height, inches	Test weight, pounds	Percent survival 1966
	1964	1966	1968	Average for years grown	Average for years grown	Number years grown	Comparable average <sup>3</sup>				
Comanche <sup>4</sup>	14.6	10.6	22.4	15.9	18.5	7	18.5	5-11	23.1	58.3	81
Early Blackhull <sup>4</sup>	12.0	15.1	22.0	16.4	20.0	7	20.0	5-4	25.1	59.0	77
Kharkof <sup>4</sup>	16.8	10.6	21.2	16.2	18.5	7	18.5	5-16	24.0	57.9	80
Average	14.5	12.1	21.9		19.0	7	19.0	5-10	24.1	58.4	
Agent					10.2	1	10.1	5-2	23.4	54.2	
Aztec					21.2	3	19.0	5-13	24.8	60.4	
Bison	16.5	8.8		12.7	19.1	6	19.6	5-10	24.4	58.6	79
Caddo	15.2	14.6	23.7	17.8	20.5	7	20.5	5-7	24.6	60.0	77
Caprock		11.3	24.0	17.7	17.7	2	19.7		22.1	60.3	79
Concho					22.8	3	20.7	5-9	23.0	58.2	
Crockett	15.4		23.5	19.5	19.9	6	18.8	5-8	24.1	58.5	
Gage	13.7			13.7	15.3	3	19.2	5-10	24.9	55.9	
Gaines	8.5	9.7		9.1	9.1	2	14.8	5-15	20.1	57.3	79
Guide	17.0	16.7	23.8	19.2	19.2	3	22.0	5-6	23.1	57.0	77
Kaw	16.2			16.2	19.9	4	20.8	5-7	24.0	60.7	
Lancer	14.4			14.4	14.4	1	18.9		21.8	59.8	
Ottawa	15.3	10.8		13.1	14.8	4	19.4	5-10	23.3	57.2	
Parker	13.8		24.5	19.2	19.4	3	19.9		22.8	57.7	
Ponca					26.6	3	21.4	5-11	23.9	56.9	
Red Chief					23.7	3	18.5	5-12	26.2	61.1	
Scout	16.8	14.0	23.3	18.0	17.2	4	21.0	5-7	24.2	56.8	77
Scout 66		13.6	22.3	18.0	18.0	2	20.0	5-6	22.4	57.7	76
Shawnee		10.8	21.6	16.2	16.2	2	18.2			58.0	84
Sturdy	12.5	11.3	22.2	15.3	15.3	3	18.2	5-6	22.1	55.8	77
Tascosa	12.8	14.7	21.7	16.4	20.9	7	20.9	5-8	23.1	59.8	80
Triumph	17.8	10.1	19.9	15.9	17.2	6	18.5	5-5	25.0	58.1	77
Triumph, Improved	15.3	14.3	20.9	16.8	17.9	6	19.2	5-4	23.7	57.7	75
Triumph '64	16.4	13.9	22.7	17.7	17.7	3	20.5	5-3	24.6	57.5	76
Warrior	14.2			14.2	12.3	2	18.1	5-11	23.1	57.7	
Westar					25.3	3	20.1	5-11	24.5	57.8	
Wichita					21.2	4	19.0	5-6	24.6	59.3	
LSD — 5 percent	3.6	4.2	6.1								

<sup>1</sup>Hailed out in 1961.

<sup>2</sup>Hailed out in 1963 and 1965.

<sup>3</sup>Calculated comparable yields based on years grown.

<sup>4</sup>Check varieties used for calculating comparable needs.

TABLE 4. ANNUAL, AVERAGE AND COMPARABLE GRAIN YIELDS OF WINTER WHEAT VARIETIES GROWN WITHOUT IRRIGATION AT WELLINGTON, 1959-68<sup>1</sup>

Variety	Yield of grain, bushels per acre										
	1959-63		1964-68				1959-68				
	Average for years grown	Number years grown	1964	1965	1966	1967	Average for years grown	Number years grown	Average for years grown	Number years grown	Comparable average <sup>2</sup>
Early Blackhull <sup>3</sup>	22.0	5	11.7	14.6	10.9	15.2	13.1	4	18.1	9	18.1
Comanche <sup>3</sup>	26.0	5	9.8	17.0	13.4	15.0	13.8	4	20.6	9	20.6
Kharkof <sup>3</sup>	26.8	5	6.1	13.5	11.3	15.0	11.5	4	20.0	9	20.0
Average	25.0	5	9.2	15.0	11.9	15.1	12.8	4	19.6	9	19.6
Bison	30.5	5	12.3		13.0	12.7	12.7	3	23.8	8	23.2
Caddo	24.9	5	11.4	14.5	13.1	13.8	13.2	4	19.7	9	19.7
Caprock					10.6	11.4	11.0	2	11.0	2	17.1
Crockett	27.2	5	14.1				14.1	1	25.0	6	22.3
Concho	36.2	3		15.1	14.6	14.8	14.8	3	25.5	6	22.4
Gage	15.6	2	11.1				11.1	1	14.1	3	20.4
Gaines	13.6	1			13.1		13.1	1	13.4	2	19.7
Kaw	25.9	5	11.5	14.3			12.9	2	22.2	7	20.4
Lancer			15.8	16.1			16.0	2	16.0	2	23.4
Ottawa	24.4	3	8.7				8.7	1	20.5	4	21.5
Red Chief	31.9	3							31.9	3	20.1
Rodco	24.0	3							24.0	3	21.1
Scout			12.7	13.1	14.2	15.5	13.9	4	13.9	4	20.6
Sturdy	13.3		9.1	12.7	9.1	10.4	10.3	4	13.7	5	17.3
Tascosa	27.4	5	15.7	12.6	13.0	11.0	13.1	4	21.0	9	21.0
Triumph	24.3	5	15.3				15.3	1	22.5	5	19.9
Triumph, Improved	25.4	4	13.4	17.4	12.8	14.9	14.6	4	20.0	8	20.5
Triumph '64					13.2	12.6	12.9	2	12.9	2	18.9
Warrior	16.0	2	13.5	15.6			14.6	2	15.3	4	21.1
Wichita	30.6	3							30.6	3	18.8
LSD — 5 percent				2.8	2.1						

<sup>1</sup>No data for 1968.

<sup>2</sup>Calculated yield based on years grown.

<sup>3</sup>Check varieties used for calculating comparable yields.

in South Texas where winters are mild. Some spring varieties have no critical photoperiodic requirement to initiate heading. These varieties, called day-length neutral varieties, will initiate heading when favorable temperatures are reached. Such varieties may head in mid-winter in South Texas if planted too early. Other varieties are sensitive to day length and will not head until days become longer in the spring. Thus, photoperiodic response is an important factor to consider in choosing a variety for planting and the proper time to plant.

True winter-type varieties vary greatly in cold tolerance even though most have narrow leaves and prostrate growing seedlings. Most require a period of vernalization (slow growth under cool temperatures) to head normally. A few varieties are somewhat intermediate in growth habit, but they are not comparable to intermediate-winter type barleys because they do require some vernalization. These produce erect growing seedlings with broad leaves. Additional characteristics of varieties are available in Texas Agricultural Experiment Station Bulletin 1095, "Wheat Production in Texas."

RESEARCH AREA I: The High Plains is the major wheat grain growing area with almost 44 percent of the State's acreage in Extension District I alone. About half of this is irrigated<sup>1</sup>. Only cold tolerant winter-type varieties

should be fall-sown. Drouth is a major hazard where irrigation is not available, and when drouth is combined with low temperature injury, major losses may occur. Hail also is an important hazard of production.

Performance trials have been conducted without irrigation at Bushland and Wellington, Tables 3 and 4. At Wellington, the highest comparable yields were produced by Lancer, Bison, Concho, Crockett, Ottawa and Warrior. Some of these were not grown long enough to be properly evaluated. At Bushland, the leading varieties in yield were Guide, Ponca, Scout, Tascosa, and Kaw. Differences were small among these leading varieties at both locations.

Performance trials under irrigation were conducted at Bushland, Hartley, Etter, Stratford, Perryton and Plainview. Data for the full period are available only from Bushland, Table 5. The highest comparable yields at Bushland were produced by Shawnee, Caprock, Tascosa, Scout and Parker. Several of these have been tested for only short periods. At Etter, (3 years) Table 6, the highest yields were produced by Concho, Scout, Improved Triumph, Tascosa and Warrior. At Hartley in 1968, Table 6, Concho, Scout, Sturdy and Parker produced the best yields. At Stratford, (4 years) Table 7, Scout, Warrior, Tascosa, Concho and Improved Triumph produced the highest yields.

At Perryton, (4 years) Table 8, the best comparable yields were produced by Scout, Kaw, Gage, Lancer and

<sup>1</sup>High Plains Irrigation Survey 1968. Texas Agricultural Extension Service — mimeographed. Compiled by Leon New, area irrigation specialist.

TABLE 5. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF IRRIGATED WINTER WHEAT AT BUSHLAND, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre								
	1964	1966	1967	1968	1963-68 <sup>2</sup>		1958-68		
					Average for years grown	Number years grown	Average for years grown	Number years grown	Comparable yields <sup>3</sup>
Comanche <sup>4</sup>	57.9	50.3	56.0	60.6	56.2	4	51.5	8	51.5
Early Blackhull <sup>4</sup>	50.7	37.8	49.0	58.1	48.9	4	46.6	8	46.6
Kharkof <sup>4</sup>	59.0	38.4	40.7	46.4	46.1	4	43.0	8	43.0
Average	55.9	42.2	48.6	55.0	50.4	4	47.1	8	47.1
Agent							26.1	1	34.2
Aztec							44.3	4	47.6
Bison	62.3	57.8	52.1		57.4	3	51.9	7	53.0
Caddo	51.9	54.3	54.0	62.4	55.7	4	62.2	8	54.5
Caprock	65.2	59.2	71.7	70.6	66.7	4	66.7	4	63.3
Concho							49.2	4	52.5
Crockett				63.1	60.4	2	48.1	6	47.5
Gage	57.7				57.6	1	50.0	3	46.1
Gaines	67.7	31.8			49.8	2	49.8	2	47.8
Guide	58.6	51.7	53.8	65.6	57.4	4	57.4	4	54.8
Kaw	54.4		53.7		54.1	2	53.5	5	51.7
Lancer	65.6				65.6	1	65.6	1	56.8
Ottawa	57.6				57.6	1	52.0	3	48.0
Parker	62.0			62.7	62.4	2	67.3	3	58.1
Pawnee							44.4	2	43.0
Ponca							48.8	3	50.6
Red Chief							44.0	3	45.8
Scout	69.8	57.7	55.4	68.7	62.9	4	59.4	5	58.4
Scout 66		56.0	62.4	60.0	59.5	3	59.5	3	58.0
Shawnee		55.0	70.6	69.3	65.0	3	65.0	3	63.4
Sturdy	61.4	47.9	62.6	65.8	59.4	4	59.4	4	56.1
Tascosa	73.4	68.3	63.6	65.9	67.8	4	59.8	8	59.8
Triumph	51.8	46.8	53.2	53.0	51.2	4	52.0	7	50.3
Triumph, Improved	62.4	48.9	55.8	57.0	56.0	4	55.9	7	54.2
Triumph '64	55.7	45.9	53.1	56.7	52.9	4	52.9	4	49.5
Trader			52.1		52.1	1	52.1	1	50.6
Trapper			58.8		58.8	1	58.8	1	57.3
Warrior	65.3				65.3	1	55.6	2	55.2
Westar							46.0	3	47.8
Wichita		33.2	47.0		40.1	2	37.4	6	40.2
LSD — 5 percent	8.2	10.4	7.8	12.9					

<sup>1</sup>Destroyed by hail in 1961.<sup>2</sup>Destroyed by hail in 1963 and 1965.<sup>3</sup>Calculated comparable data based on years grown.<sup>4</sup>Check varieties used to calculate comparable yields.

TABLE 6. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF IRRIGATED WINTER WHEAT VARIETIES GROWN AT ETTER AND HARTLEY, 1965-68

Variety	Etter, yield per acre, bushels							Hartley, 1968	
	1965	1966	1967	Average		Comparable <sup>1</sup>		Grain yield, bushels per acre	Test weight, pounds
				For years grown	Com-parable <sup>1</sup>	Test weight, pounds	Plant height, inches		
Early Blackhull <sup>2</sup>	68.2	48.7	37.7	51.5	51.5	60.7	33.0		
Comanche <sup>2</sup>	68.9	42.9	43.6	51.8	51.8	59.1	38.0		
Kharkof <sup>2</sup>	61.4	35.5	33.6	43.5	43.5	57.5	38.3		
Average	66.2	42.4	38.3		48.9	59.1	36.4		
Bison		50.2	44.3	47.3	55.8	60.5	34.6		
Caddo	65.7	48.7	42.8	52.4	52.4	62.0	32.7	33.4	63.3
Concho			54.5	54.5	65.1	57.9	35.7	44.6	62.2
Caprock	58.8	59.2	38.1	52.0	52.0	59.0	27.0		
Gaines		47.2		47.1	53.7	53.6	23.4		
Lancer	64.6			64.6	47.3	60.9	37.7		
Parker								36.1	63.3
Scout	81.3	49.1	50.2	60.2	60.2	60.7	36.6	39.4	62.0
Sturdy	76.1	47.7	35.0	52.9	52.9	59.1	28.3	38.4	60.8
Tascosa	81.8	42.1	47.5	57.1	57.1	63.2	33.3	35.9	63.6
Triumph, Improved	78.1	57.5	35.9	57.2	57.2	60.7	30.3	28.1	62.3
Triumph 64		51.2	40.5	45.9	54.4	61.1	32.1		
Warrior	74.2			74.2	56.9	59.2	36.7		
LSD — 5 percent		8.3	14.2						

<sup>1</sup>Calculated comparable average based on years grown.<sup>2</sup>Check varieties used for computing comparable data.



TABLE 7. ANNUAL, AVERAGE AND COMPARABLE GRAIN YIELDS OF IRRIGATED WINTER WHEAT GROWN AT STRATFORD, 1958-68

Variety	Yield of grain, bushels per acre										
	1958-62		1963	1964	1965	1966	1963-66		1958-66		
	Average for years grown	Number years grown					Average for years grown	Number years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>
Early Blackhull <sup>2</sup>	38.0	4	30.5	60.2	41.5	32.8	41.3	4	39.6	8	39.6
Comanche <sup>2</sup>	35.8	4	31.3	53.5	36.7	32.5	38.5	4	37.4	8	37.4
Kharkof <sup>2</sup>	36.5	4	31.8	42.0	36.6	30.4	35.2	4	35.9	8	35.9
Average	36.8	4	31.2	51.9	38.3	31.9	38.3	4	37.6	8	37.6
Aztec	35.4	3							35.4	3	37.2
Bison	41.0	4	40.0	57.0		31.3	42.8	3	41.7	7	41.8
Caddo	37.8	3	29.8	66.4	39.9		31.8	4	43.1	7	40.7
Caprock							32.6	1	32.6	1	38.3
Concho	42.7	3							42.7	3	44.5
Crockett	37.9	4	34.9	34.4			34.7	2	36.8	6	36.0
Gage	44.0	1	34.6	52.3			43.5	2	43.6	3	40.0
Gaines			16.4			34.4	25.4	2	25.4	2	31.5
Kaw	35.2	3	34.9	48.8	47.6		43.8	3	40.3	5	40.2
Lancer				48.6	40.1		44.4	2	44.4	2	36.9
Ottawa	42.3	1	33.6	51.4			42.5	2	42.4	3	38.8
Ponca	40.1	2							40.1	2	37.4
Red Chief	34.5	3							34.5	3	36.3
Scout				70.8	44.9	41.5	52.4	3	52.4	3	49.3
Sturdy			23.0	58.8	46.4	32.6	41.5	4	41.5	4	40.7
Tascosa	44.7	4	31.1	63.4	42.8		44.7	4	44.7	8	44.7
Triumph	37.8	2	24.8	65.3			45.1	2	41.4	4	41.5
Triumph, Improved	36.9	2	34.5	69.3	42.8	37.7	46.1	4	43.0	6	43.8
Triumph, Super	32.7	2							32.7	2	36.5
Triumph 64						26.2	26.2	1	26.2	1	31.9
Warrior	51.2	1	40.5	58.2	45.0		47.9	3	48.7	4	45.9
Wichita	36.4	3							36.4	3	38.1
LSD—5 percent			6.3	9.0	8.1	5.3					

<sup>1</sup>Calculated comparable average based on years grown.

<sup>2</sup>Check varieties used to calculate comparable data.

Sturdy. Concho was grown for only 1 year. At Plainview, (3 years) Table 8, Scout, Comanche, Concho, Bison and Tascosa produced the best yields.

Agronomic data at Bushland, Table 3, show Red Chief, Kaw, Aztec, Caprock, Caddo and Tascosa had the best test weight. The Triumph strains and Early Blackhull were the earliest in maturity, although Sturdy and several others were only slightly later. No lodging was recorded during the period, but Gaines, Sturdy, Caprock and Lancer were the shortest strains.

RESEARCH AREA II: Extension District 3 of this area grows approximately 22 percent of the State's acreage. In 1968, 87 percent of the planted acreage was harvested, but in seasons of drouth, which are frequent, a smaller percentage is harvested. Most of the Trans-Pecos area is devoted to ranching. Performance trials were conducted at Iowa Park until 1965, Table 9, and for the full period at Chillicothe, Table 10. The highest comparable yields at Iowa Park were produced by Gage, Kaw, Concho, Improved Triumph, Ottawa, Crockett and Tascosa.

Comparable data at Chillicothe for the full period show Scout 66, Scout, Caprock, Newest Improved Triumph and Sturdy as the five leading varieties, although differences among them are small. Several Triumph strains were tested, but as only foundation seed of Improved Triumph and Triumph 64 are now available, data for the

others are not included. The new short stature wheats, Caprock and Sturdy, have produced well at Chillicothe.

Comparable agronomic data, Table 10, show that Kaw, Ponca, Kaw 61, Aztec and Triumph (Metcalf) have the best test weight. Sturdy and Caprock are approximately as early as the Triumph strains with Guide, Caddo and Crockett emerging slightly later. Sturdy and Caprock were from 7 to 8 inches shorter than older varieties and have shown advantages in resistance to lodging.

RESEARCH AREA III: Approximately 8 percent of the State's acreage is grown in Extension District 4 and only a small acreage in District 5. The commercial acreages of this area are predominantly of the Knox or Knox 62 varieties. Caddo, Improved Triumph, Sturdy and Crockett are the other important varieties grown. Performance trials were grown at Denton throughout the period and in a few seasons at Mt. Pleasant or Overton. Data at these latter locations are extremely variable but indicate the yields that might be expected.

Performance data at Denton, Table 11, show that the soft winter wheat varieties have the best comparable yields, although the leading ones have not been tested extensively. Arthur, Benhur, Riley 67 and Stadler have the highest comparable yields. Knox and Knox 62, which were grown for longer periods, have averaged about the same yields as Caddo and Gage. The best hard winter wheats were

TABLE 8. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF IRRIGATED WINTER WHEAT VARIETIES GROWN AT PERRYTON AND PLAINVIEW, 1965-68

Variety	Perryton						Plainview						
	Yield of grain, bushels per acre				Average		Comparable <sup>1</sup>			Yield of grain, bushels			Com- parable average for years grown <sup>1</sup>
	1965	1966	1967 <sup>2</sup>	1968	For years grown	Com- parable average <sup>1</sup>	Test weight, pounds	Plant height, inches	Lodging percent	1966	1967 <sup>2</sup>	1968	
Caddo <sup>3</sup>	48.3	54.4	45.9	39.6	47.7	47.7	60.9	37.0	11	58.3	15.8	49.1	53.7
Scout <sup>3</sup>	62.7	65.5	59.0	51.3	59.8	59.8	60.6	37.3	58	60.6	39.6	64.3	62.5
Sturdy <sup>3</sup>	57.1	54.9	41.0	51.7	54.6	54.6	58.8	30.6	2	60.4	7.5	44.0	52.2
Tascosa <sup>3</sup>	50.0	55.5	66.5	47.2	50.9	50.9	59.7	37.3	21	58.2	35.2	56.2	57.2
Triumph, Improved <sup>3</sup>	51.5	59.2	40.7	26.8	45.8	45.8	59.3	34.3	45	68.8	6.4	29.4	49.1
Average	53.9	57.9		43.3		51.7				61.3		48.6	
Bison		48.7	54.6		48.7	42.5	58.4	39.5	30	65.8	37.8		59.5
Caprock	56.6	47.5			56.6	50.4			2				
Comanche	40.0	57.9	54.4		49.0	44.8	56.6	39.3	80	68.4	38.4		62.1
Concho				60.7	60.7							52.8	59.1
Early Blackhull	50.1	50.9	48.2		50.5	46.3	59.6	38.0	53	56.9	16.9		50.6
Gage				48.0	48.0	56.4							
Gaines		34.1			34.1	27.9	47.8	24.1	0	59.3			53.0
Kaw	59.2				59.2	57.0							
Kharkof	33.1	44.1	40.5		38.6	34.4	55.4	40.0	68	45.6	35.7		39.3
Lancer	57.6				57.6	55.4	62.7	41.1					
Parker				43.3	43.3	51.7							52.3
Triumph '64		49.6	41.4		49.6	43.4	57.9	35.5	12	57.6	11.3		51.4
Warrior	30.8				30.8	28.6	49.5	38.1					
LSD — 5 percent	12.4	19.8	7.4							15.3			

<sup>1</sup>Calculated comparable average based on years grown.

<sup>2</sup>Data for 1967 not included in averages because of spring freeze damage to early varieties.

<sup>3</sup>Check varieties used to calculate comparable yields.

TABLE 9. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF WINTER WHEAT AT IOWA PARK, 1956-65<sup>1</sup>

Variety	Yield of grain, bushels per acre							Average for years grown	Number years grown	Comparable yield <sup>2</sup>
	1956	1957	1959	1960	1961	1962	1963			
Comanche <sup>3</sup>	57.0	25.4	44.5	57.0	31.5	23.4	37.6	39.5	7	39.5
Crockett <sup>3</sup>	57.6	25.0	46.8	62.1	37.1	29.8	53.4	44.5	7	44.5
Early Blackhull <sup>3</sup>	60.1	26.7	47.3	58.5	30.3	29.0	41.3	41.9	7	41.9
Kharkof <sup>3</sup>	55.6	22.3	43.0	46.0	30.5	19.1	30.6	35.3	7	35.3
Tascosa <sup>3</sup>	64.2	25.4	53.5	61.8	34.1	23.0	46.0	44.0	7	44.0
Average	58.9	25.0	47.0	57.1	32.7	24.9	41.8	41.0	7	41.0
Aztec			44.1	55.8	31.8			43.9	3	39.3
Bison		22.2	45.5	64.6	37.6	24.9	45.7	40.1	6	43.1
Caddo			41.1	60.2	30.7	29.1	47.0	41.6	5	41.9
Concho	67.1	23.2	50.8	65.8	35.8			48.5	5	45.4
Gage					34.4	28.8	49.8	37.7	3	45.6
Kaw			49.2	61.5	31.6	35.8	47.7	45.2	5	45.5
Ottawa						31.2	44.0	37.6	2	45.3
Ponca	55.5	25.6	40.2	58.0	38.6			43.6	5	40.5
Red Chief	55.2	23.6	42.4	46.0	29.3			39.3	5	36.2
Rodco					32.1	24.8		31.6	3	39.6
Sturdy							41.4	41.4	1	40.7
Tenmarq	55.7	26.4	42.6					41.6	3	39.0
Triumph		25.8	42.6	57.2	31.5	31.8	38.0	37.8	6	40.8
Triumph, Improved			44.2	69.8	34.2	34.5	40.0	44.5	5	44.9
Triumph, Super					34.1	28.2		31.2	2	43.4
Warrior						20.2	41.7	30.9	2	38.7
Westar	57.2	21.9	47.4					42.2	3	39.6
Wichita	64.2	25.1	41.4	59.0				47.4	4	41.5
LSD—5 percent	8.2	3.7	8.9	10.3	4.9	5.7	7.5			

<sup>1</sup>Crops lost due to poor stand in 1958 and hail damage in 1964 and 1965.

<sup>2</sup>Calculated comparable yield based on years grown.

<sup>3</sup>Check varieties used to calculate comparable yields.

Parker, Caddo, Sturdy, Gage and Triumph 64. Parker and Agent have not been fully evaluated.

Agronomic data show Kaw, Caddo, Parker, Triumph 64 and Arthur with the best test weight. Sturdy and Caprock are equally as early as the Knox and Riley strains and average about 6 inches shorter, an advantage in resistance to lodging.

A few varieties have been tested in East Texas, Table 12, as part of a forage evaluation project.

RESEARCH AREA IV: Approximately 4 percent of the State's acreage is grown in Extension District 8 and only a small acreage in District 9. Both hard and soft winter wheat and a few durum varieties are grown commercially. The largest commercial acreages are devoted to Caddo, Quanah and Crockett. Performance trials were conducted at Temple and McGregor. Comparable data for Temple, Table 13, show Riley 67, Benhur and Sturdy as the leading varieties. Arthur has not been thoroughly tested. The durum varieties also have produced good yields, but there is no local market for them, so they must be used for feed. The best test weights were produced by Kaw, Stewart durum, Knox 62, Caddo and Arthur. Lodging is important in this area, and Sturdy and Caprock were the shortest strains and among the earliest in maturity.

At McGregor, Table 14, the highest comparable yields were produced by Gage, Knox, Wells durum and Caddo. Knox 62, Sturdy and Kaw yielded almost as

much as the leading varieties. The highest test weights were produced by Caddo, Riley, Stewart durum, Riley 67 and Knox 62. The soft wheat varieties Riley and Riley 67 and Knox and Knox 62 were the earliest in maturity but only a few days earlier than Sturdy. Leaf rust is important in this area, and the lowest infections were observed on Agent, Riley 67, the durum varieties and Quanah.

RESEARCH AREA V: The acreage of wheat has expanded in this area since the release of Milam wheat in 1960. The seeded acreage in 1968 was about 3 percent of the State's acreage, but only about half of this was harvested. Most of the acreage is grown in Extension District 10. The Mexican variety, Penjamo 62, is now being grown on a small acreage.

Spring-type varieties may be fall-sown in this area, so data for hard red winter, soft red winter, durum and hard red spring varieties were obtained. At College Station, Table 15, the highest yields for a period of years were produced by the durum varieties Lakota, Stewart, Langdon and Sentry, although the yield of Milam was not significantly less. Chris and Crim hard red spring wheats produced rather low yields because they were damaged by spring freezes in several seasons. The durum wheat varieties also produced the highest test weight grain, although that of Milam also was above standard. Leaf rust is important in this area and may be a factor in the high yields of the durum varieties.

TABLE 10. GRAIN YIELDS AND AGRONOMIC DATA FOR WINTER WHEAT VARIETIES GROWN AT CHILLICOTHE, 1959-68

Variety	Grain yield, bushels per acre														
						1964-68				1959-68			Comparable data <sup>1</sup>		
	1964	1965	1966	1967	1968	Average for years grown	Average for years grown	Number years grown	Com- parable yield <sup>1</sup>	Test weight, pounds per bushel	Date first head	Plant height, inches			
Comanche <sup>2</sup>	17.6	14.7	12.5	21.3	27.5	18.7	20.9	10	20.9	57.9	5-2	27.4			
Early Blackhull <sup>2</sup>	19.0	17.0	13.9	21.1	23.4	18.9	21.0	10	21.0	59.7	4-26	30.2			
Kharkof <sup>2</sup>	15.1	6.7	7.1	22.4	21.0	14.5	18.6	10	18.6	58.3	5-8	28.4			
Average	17.2	12.8	11.2	21.6	24.0	17.4	20.2	10	20.2	58.6					
Agent							25.0	3	23.2	56.0	5-3	30.0			
Aztec							23.3	5	20.5	60.1	5-6	28.4			
Bison				25.0	20.9	19.4	22.4	9	21.4	58.4	5-2	27.1			
Blackhull	17.3	14.2				13.7	18.4	6	17.6	59.1	5-6	28.5			
Caddo	19.5	15.1	12.4	21.4	32.9	20.2	22.3	10	22.3	59.5	4-29	28.1			
Caprock			14.5	23.4	35.0	24.3	24.3	3	25.5	57.7	4-23	21.9			
Concho							23.7	5	20.9	58.4	5-2	26.8			
Crockett	19.8	16.4	13.7	21.3	21.1	18.5	20.9	10	20.9	59.1	4-30	28.3			
Gage	19.5					19.5	23.0	5	20.6	57.6	5-3	25.2			
Gaines	17.9	7.9	10.1			12.0	14.3	4	18.7	55.9	5-13	21.8			
Guide	20.3	20.3	14.3	24.1	20.7	19.9	19.9	5	22.7	58.1	4-24	23.3			
Kaw	21.1	17.3				19.2	23.7	7	23.3	60.7	4-28	28.3			
Kaw 61		16.9	12.9	25.6	21.7	19.3	19.3	4	22.0	60.4	4-29	28.1			
Lancer	18.2	10.3				14.3	16.9	3	19.9	56.2	5-5	24.8			
Ottawa	16.2					16.2	18.3	4	19.0	57.8	5-3	27.4			
Parker		16.2			28.8	22.5	22.5	2	24.3	58.9	4-27	23.5			
Ponca							22.7	5	19.9	60.5	5-6	28.9			
Scout	19.9	21.4	15.2	29.2	33.7	23.9	24.5	8	25.6	57.7	4-29	26.6			
Scout 66		22.1	13.6	28.3	32.4	24.1	24.1	4	26.9	58.2	4-28	27.2			
Shawnee			11.4	22.0	26.9	20.1	20.1	3	21.3	59.2	5-2	26.0			
Sturdy	18.5	19.4	13.7	23.0	35.7	22.1	22.5	6	24.6	57.8	4-23	20.9			
Tascosa	18.3	15.8	14.8	21.1	29.6	19.9	22.5	10	22.5	59.8	5-1	25.3			
Triumph	21.1	18.9	14.9	28.5	23.5	21.4	23.4	10	23.4	59.2	4-24	27.5			
Triumph, Improved	22.8	20.0	15.6	28.0	23.7	22.0	24.0	10	24.0	59.0	4-23	26.4			
Triumph, Super							24.2	3	22.3	59.1	4-24	27.6			
Triumph, N. Improved	20.6	20.3	13.8			18.2	25.1	6	25.1	58.9	4-22	26.9			
Triumph, '64	20.9	21.9	12.9	27.0	27.1	22.0	22.2	6	24.3	59.5	4-23	25.8			
Triumph, (Metcalf)	22.4	20.9				21.7	17.7	3	20.7	60.0	4-27	24.1			
Triumph, (Sunbeam)	19.4	22.4	13.9			18.5	19.6	4	24.1	59.0	4-23	26.8			
Warrior	20.1	7.9				14.0	21.1	6	20.3	57.8	5-5	24.1			
Wichita				21.9		21.9	22.7	4	19.5	58.9	4-27	28.4			
LSD — 5 percent	3.5	4.1	3.5	4.3											

<sup>1</sup>Calculated comparable yield based on years grown.<sup>2</sup>Check varieties used to compute comparable yields.

TABLE 11. GRAIN YIELDS AND AGRONOMIC DATA FOR WINTER WHEAT VARIETIES GROWN AT DENTON, 1959-68

Variety	Yield of grain, bushels per acre						Comparable average						
	1964	1965	1966	1967	1968	1959-68			agronomic data <sup>1</sup>				
						1964-68 Average	Average	Number years grown	Com- parable average <sup>1</sup>	Test weight, pounds	Date first head	Plant height, inches	Leaf rust, percent
Comanche <sup>2</sup>	26.6	20.2	22.1	31.2	23.0	24.6	29.4	10	29.4	58.6	4-26	38.2	32
Early Blackhull <sup>2</sup>	29.6	27.7	28.0	33.6	22.1	28.2	31.5	10	31.5	61.4	4-17	38.4	40
Kharkof <sup>2</sup>	15.6	16.1	19.1	25.7	15.7	18.4	23.8	10	23.8	57.8	4-29	38.4	55
Average	23.9	21.3	23.1	30.2	20.3	23.8	28.3		28.3		4-24	38.4	
Agent							38.7	2	35.2	58.4	4-24	39.3	Tr
Arthur					37.7	37.7	37.7	1		61.3	4-13	35.0	Tr
Benhur			34.1	37.8	33.7	35.2	35.2	3	38.9	59.5	4-14	36.3	23
Bison			25.0	31.8		28.4	28.4	2	30.0	59.1	4-24	38.4	50
Blackhull							34.1	2	25.8	60.1	4-29	38.7	54
Blueboy				37.1	13.5	24.3	24.3	2	28.3	52.9	4-16	36.4	70
Caddo	34.1	30.8	29.5	36.8	34.1	33.1	36.1	10	36.1	62.0	4-20	37.4	9
Caprock			26.1	31.1	32.0	29.7	29.7	3	33.5	59.8	4-14	31.9	14
Concho							31.9	4	27.0	57.7	4-25	37.6	41
Crockett	36.2				13.4	24.8	34.4	7	33.0	60.9	4-23	36.5	22
Denton	15.4	23.8	19.0	27.9	22.3	21.7	25.4	10	25.4	57.7	4-29	42.0	19
Gaines			23.8			23.8	23.8	1	29.0	54.6	5-1	30.0	49
Gage	38.2	28.3	29.3	35.1		30.4	34.2	8	34.8	59.2	4-24	35.3	6
Guide		26.2	28.6	37.1	16.9	27.2	27.2	4	31.7	58.8	4-15	34.0	50
Knox	32.2	26.7				29.5	31.8	7	30.2	59.5	4-16	37.9	19
Knox 62	29.2	31.7	28.2	35.6	25.5	30.0	30.0	7	32.8	59.4	4-16	37.9	21
Kaw	31.5	26.7				29.1	35.4	7	33.8	62.1	4-20	37.4	16
Lancer	27.7	21.1				24.4	27.0	3	29.7	59.3	4-27	37.1	41
Lewis				31.2	12.5	21.9	21.9	2	24.9	54.4	4-18	36.4	50
Monon	28.1					28.1	29.6	4	28.2	58.5	4-16	35.3	17
Ottawa	33.7	17.6	18.0	23.7		23.3	27.3	6	29.3	59.1	4-25	36.8	24
Parker	26.2				35.4	30.8	30.8	2	36.9	61.8	4-19	35.2	12
Ponca							38.0	3	31.5	59.1	4-25	36.4	7
Quannah	31.3	21.5				27.3	31.3	8	30.9	59.7	4-23	38.2	7
Reed							26.6	2	25.1	57.8	4-30	42.5	24
Riley		27.2	31.7	36.3		31.7	31.7	3	35.1	58.9	4-13	38.2	25
Riley 67				35.7	38.0	36.9	36.9	2	39.9	59.4	4-15	37.8	Tr
Scout	29.4	25.4	23.8	39.3	25.1	28.6	30.6	8	32.2	59.1	4-24	37.4	39
Scout 66		30.7	21.6	36.5	23.6	28.1	28.1	4	32.6	58.8	4-22	38.7	44
Shawnee			18.0	23.7	17.8	19.3	19.3	3	23.6	59.3	4-26	38.0	48
Stadler				36.5	32.2	34.4	34.4	2	37.4	59.4	4-17	39.4	15
Sturdy	32.0	29.1	34.6	35.1	36.4	33.4	31.6	6	34.9	59.9	4-15	29.4	1
Tascosa	25.4	23.9	27.3	35.2	19.3	26.2	30.8	10	30.8	60.7	4-25	35.1	33
Triumph	29.4	22.4	25.7	35.0	18.9	26.3	30.0	10	30.0	60.8	4-18	35.2	51
Triumph, Improved	31.7	24.9	29.2	38.2	21.3	29.1	33.1	10	33.1	60.0	4-17	35.1	49
Triumph '64	33.7	30.2	25.7	35.4	26.3	30.3	30.3	5	34.8	61.6	4-16	34.8	36
Vermillion							31.5	3	26.0	59.3	4-18	40.3	4
Warrior	20.6					20.6	25.0	2	25.6	56.6	4-27	36.2	19
LSD — 5 percent	4.2	4.1	6.4	4.3	4.3								

<sup>1</sup>Calculated yield based on years grown.<sup>2</sup>Check varieties used to calculate comparable data.

TABLE 12. YIELDS OF FALL-SOWN WHEAT VARIETIES AT MT. PLEASANT AND OVERTON, 1955-68

Variety	Mt. Pleasant		Overton
	1955	1963	1968
Frisco	8.1		
Knox	7.7		
Atlas	9.7		
Quanah	2.8	16.3	17.1
Caddo		34.7	
Milam		17.1	28.1
Sturdy			26.5

Comparable yields at Beeville, Table 16, show the highest yields produced by Penjamo 62, Rio Bravo, Lerma Rojo and Nadadores. However, these were tested only 1 to 3 years. The durum varieties have yielded well. Rust is important at this location, and the durum varieties have been highly resistant. However, races which can attack most durum varieties are now present. Milam has produced as well as the spring wheat varieties and better than the winter-type varieties Quanah, Caddo and Sturdy.

### RYE

The rye acreage is rather widely distributed over Texas, Figure 3, but it is grown more extensively on the sandy-textured soils of each area. On such soils it usually produces more forage and grain than do the other small grains. It frequently is grown with vetch or winter peas as a soil building, wind and water erosion control crop and for winter pasture or other forage uses. The relatively new, erect growing forage rye varieties, such as Elbon, Bonel, Gator, etc., are now widely grown on many types of soils for winter pasture. Only 15 percent of the seeded crop is harvested for grain, Table 1.

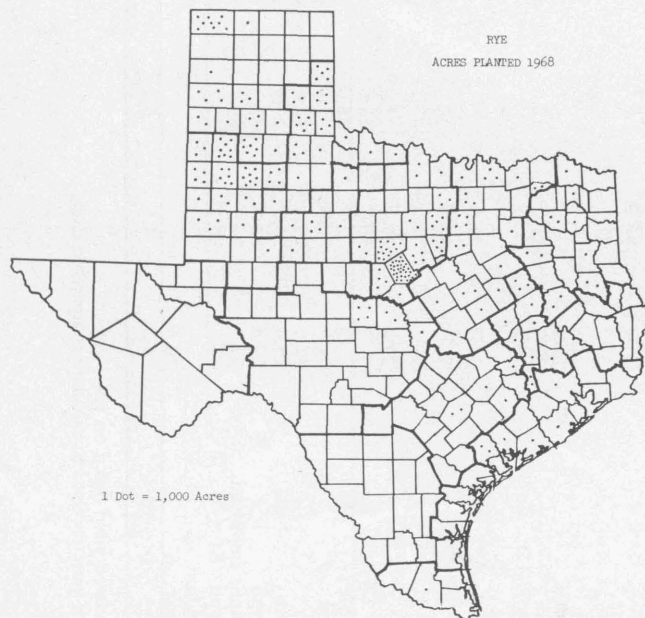


Figure 3. Distribution of 1968 Texas rye acreage.

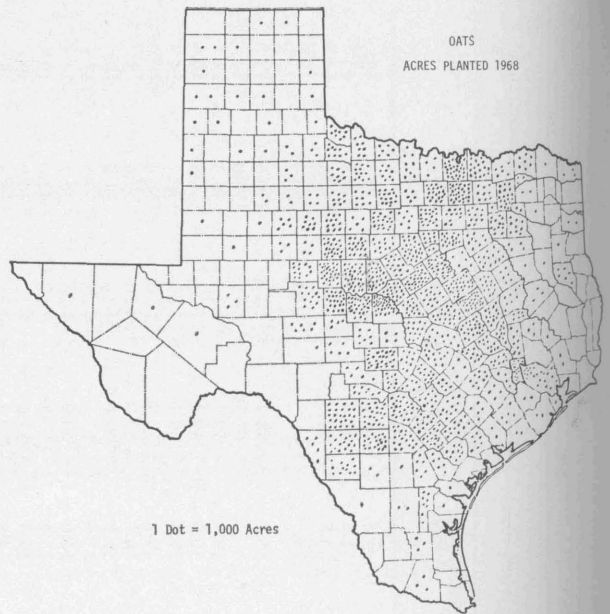


Figure 4. Distribution of 1968 Texas seeded acreage of oats.

Performance trials have been grown at Chillicothe from 1961-68 but only in occasional years at other stations. Data at Chillicothe, Table 17, shows relatively small differences in yield among the strains tested. Caddo wheat in nearby tests at Chillicothe averaged 22.2 bushels per acre for the same 8-year period.

At Denton, Table 18, the yield of Elbon rye was 37.7 bushels per acre for the 2 years 1960-61. Caddo wheat in nearby tests averaged 40.0 bushels per acre. At College Station on sandy land, Elbon rye yielded 31.3 bushels compared to 20.9 bushels for Milam wheat. In east Texas on sandy soils at Overton and Mt. Pleasant rye outyielded wheat in most seasons i.e., Elbon rye 43.2 and Milam wheat 28.1 bushels in 1968 at Overton.

### OATS

The oat acreage in Texas is widely distributed, Figure 4, and because it is used so extensively for livestock pasture, the seeded acreage fluctuates widely in accordance with the conditions for fall seeding. During the past 10 years, less than 40 percent of the seeded acreage has been harvested, Table 1. Oat acreages have declined to some extent in recent years. After the severe spring drought of 1967, only 315,000 acres were harvested from the 1,357,000 seeded. This was the lowest-harvested acreage since 1881. The greatest acreage of oats ever grown in Texas was in 1957 when 2,670,000 acres were seeded.

Most Texas oats are fall-sown, but a small acreage is spring-sown in Northwest Texas each season, and when winterkilling reduces the fall-sown crop, the spring-seeded acreage is increased. Fall-sown oats usually produce higher yields and better quality grain than spring-sown oats. The acreages of oats in 1968 by extension districts and research areas are given in Table 19. The largest acreages are

TABLE 13. GRAIN YIELDS AND AGRONOMIC DATA FOR WINTER WHEAT VARIETIES GROWN AT TEMPLE, 1959-68

Variety	Yield of grain, bushels per acre										Comparable agronomic data <sup>1</sup>			
	1964-68					1959-68					Test weight, pounds per bushel	Date first head	Plant height, inches	Visual forage estimate, percent
	1964	1965	1966	1967	1968	Average	Average	Number years grown	Comparable average <sup>1</sup>					
Denton <sup>2 3</sup>	29.6	23.8	26.6	9.7	21.5	22.2	23.2	10	23.2	56.4	4-24	40.0	92	
Early Blackhull <sup>2</sup>	32.2	29.3	21.0	19.5	22.4	24.9	25.0	10	25.0	61.8	4-16	36.2	85	
Quanah <sup>2</sup>	27.6	26.1	26.8	19.2	24.4	24.8	24.3	10	24.3	58.6	4-20	36.6	101	
Average	29.8	26.4	24.8	16.1	22.8	24.0	24.2		24.2	58.9	4-20	37.6		
Arthur <sup>3</sup>					44.2	44.2	44.2	1		60.6				
Atlas 66 <sup>3</sup>				19.6	30.9	25.3	22.5	3	27.3	56.9	4-12	33.9	107	
Austin <sup>3</sup>	29.0	26.2				27.6	25.9	7	24.6	56.5	4-19	36.4	100 <sup>3</sup>	
Benhur <sup>3</sup>				15.2	37.3	26.3	26.3	2	31.0	60.1	4-7	30.4		
Blueboy <sup>3</sup>				15.2	19.8	17.5	17.5	2	22.2	54.6	4-10	31.9	101	
Caddo	30.9	26.3	30.6	21.9	31.6	28.3	27.3	10	27.3	60.7	4-17	34.8	90	
Caprock			29.6	16.1	27.9	24.5	24.5	3	27.5	58.4	4-10	26.8		
Comanche	25.5	20.4	23.9	16.5	19.1	21.1	21.1	5	21.3	55.6	4-22	34.8	85	
Crockett				20.8	16.2	23.2	23.9	7	24.8	60.4	4-18	36.6	90	
Gage	31.8	26.4	28.7	13.9		25.2	25.2	4	25.1	58.9	4-15	33.3		
Kaw	32.2	17.2				24.7	27.9	4	24.1	61.4	4-19	33.5	88	
Knox <sup>3</sup>	33.5					33.5	27.0	5	25.8	59.9	4-12	37.5	95	
Knox 62 <sup>3</sup>	33.3			17.0	38.9	29.7	29.5	5	28.8	61.1	4-10	35.8	96	
Lakota <sup>4</sup>	31.1					31.1	26.3	5	24.0	56.5	4-12	38.4	121	
Langdon <sup>4</sup>							22.8	3	24.9	59.3	4-15	41.3	114	
Milam	29.8	21.7	36.3	21.8	28.1	27.5	24.9	10	24.9	59.7	4-12	34.2	109	
Monon <sup>3</sup>							24.8	2	21.1	60.1	4-13	34.9	93	
Riley <sup>3</sup>				15.4		15.4	15.4	1	23.5	58.6	4-8	30.9		
Riley 67 <sup>3</sup>				19.2	38.7	29.0	29.0	2	33.7	57.6	4-8	34.9	98	
Stewart <sup>4</sup>	35.1					35.1	27.2	6	26.1	61.4	4-17	43.5	112	
Sturdy	32.2	34.0	32.3	15.7	33.1	29.5	29.6	6	29.2	59.0	4-10	26.5	87	
Wells <sup>4</sup>	36.3					36.3	25.4	3	21.1	58.2	4-15	35.6	108	
LSD — 5 percent	5.8	12.5	3.2											

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties used to calculate comparable yields.<sup>3</sup>Soft red winter wheat varieties.<sup>4</sup>Durum varieties.

TABLE 14. GRAIN YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT MCGREGOR, 1959-68<sup>1</sup>

Variety	Market class	Yield of grain, bushels per acre							Comparable agronomic data <sup>2</sup>				
		1964	1966	1967	1964-68	1959-68		Comparable average <sup>2</sup>	Test weight, pounds per bushel	Date first head	Plant height, inches	Estimate of forage value	Percent leaf rust
					Actual average	Number years grown	Actual average						
Denton <sup>3</sup>	SRW <sup>4</sup>	28.8	28.6	19.0	25.5	8	25.3	25.3	58.3	4-25	37.4	81	15
Early Blackhull <sup>3</sup>	HRW <sup>5</sup>	30.8	30.8	17.3	26.3	8	26.5	26.5	60.5	4-17	35.6	80	39
Quannah <sup>3</sup>	HRW	29.9	29.0	16.6	25.2	8	27.8	27.8	59.2	4-21	35.5	94	11
Average		29.8	29.5	17.6	25.7		26.6	26.6	59.3	4-21	36.2		
Agent				20.5	20.5	1	20.5	29.4	58.0				Tr
Atlas 66	SRW			17.0	17.0	2	21.9	25.8	58.9	4-15	35.9	97	25
Austin	SRW	37.8			37.8	6	33.3	32.3	57.6	4-19	36.7	100 <sup>3</sup>	11
Caddo	HRW	41.8	41.7	17.6	33.7	8	32.6	32.6	61.9	4-19	35.1	81	11
Caprock	HRW		34.8	14.8	24.8	2	24.8	27.8	60.3				
Comanche	HRW	29.0	31.6	18.8	26.5	4	25.0	26.7	57.6	4-21	36.1	83	20
Crockett	HRW	35.5	26.3	19.4	27.1	8	28.4	28.4	60.9	4-21	35.2	79	23
Gage	HRW	39.2	41.5	19.7	33.5	3	33.5	34.4	60.3	4-20	35.3	85	31
Kaw	HRW	37.5	25.4		41.5	4	35.5	30.9	61.8	4-19	34.4	80	18
Knox	SRW	39.2			39.2	5	34.7	33.9	59.8	4-11	37.4	96	19
Knox 62	SRW	38.9		12.9	25.9	4	28.4	31.8	60.7	4-11	36.6	99	22
Lakota	Durum <sup>6</sup>					5	31.3	30.8	57.1	4-13	37.9	102	8
Langdon	Durum					3	33.4	29.9	59.4	4-14	40.2	98	7
Milam	HRS <sup>7</sup>	41.2	35.8	19.6	32.2	8	30.9	30.9	59.8	4-11	35.4	104	17
Monon	SRW					2	27.0	31.0	58.0	4-11	35.3	93	25
Riley	SRW			13.3	13.3	1	13.3	22.2	61.7	4-9			19
Riley 67	SRW			12.3	12.3	1	12.3	21.2	61.0	4-8			Tr
Stewart	Durum	39.3			39.3	6	30.1	29.1	61.4	4-17	40.3	93	2
Sturdy	HRW	46.2	32.3	15.0	31.2	4	29.5	31.2	60.1	4-13	30.8	88	21
Wells	Durum	46.2			46.2	3	31.7	33.2	59.1	4-17	36.6	103	3
LSD — 5 percent		6.4	5.3	3.8									

<sup>1</sup>Test destroyed by storms in 1965 and 1968.<sup>2</sup>Calculated data based on years grown.<sup>3</sup>Check varieties used to calculate comparable yields.<sup>4</sup>Soft red winter wheat varieties — SRW.<sup>5</sup>Hard red winter wheat varieties — HRW.<sup>6</sup>Durum varieties — Durum.<sup>7</sup>Hard red spring wheat varieties — HRS.



TABLE 15. GRAIN YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT COLLEGE STATION, 1958-68<sup>1</sup>

Variety	Market class	Yield of grain, bushels per acre											Comparable agronomic data <sup>2</sup>			
		1964	1965	1966	1967	1968	1964-68		1958-68		Comparable average <sup>2</sup>	Test weight, pounds per bushel	Date of first head	Plant height, inches	Leaf rust, percent	
							Actual average	Number years grown	Actual average	Number years grown						
Milam <sup>3</sup>	HRS <sup>4</sup>	38.3	13.0	16.9	21.0	34.4	24.7	10	27.7	27.7	61.6	4-1	35.7	20		
Seabreeze <sup>3</sup>	HRS	37.4	7.3	7.1	9.3	23.1	16.8	10	18.5	18.5	59.9	3-15	37.2	40		
Average		37.9	10.2	12.0	15.2	28.8	20.8	10	23.1	23.1	60.8					
Agent	HRW <sup>5</sup>						37.3	1	37.3	27.3	60.8	3-29	36.2	Tr		
Atlas 66	SRW <sup>6</sup>				12.0	38.2	25.1	5	29.3	23.9	58.9	4-1	39.2	10		
Austin	SRW	30.4	6.5				18.5	7	26.4	24.5	57.4	4-6	39.9	25		
Blueboy	SRW				10.0		10.0	1	10.0	17.9		4-3		74		
Bowie	HRW	39.7	12.6				26.2	5	26.0	23.8	60.2	4-3	35.9	15		
Caddo	HRW		16.2	6.6	13.0		11.9	3	11.9	22.6	60.3	4-15	40.0	5		
Chris	HRS			2.7	3.6	7.6	4.6	3	4.6	9.1	58.6	3-5	33.5	Tr		
Comanche	HRW			4.5	10.1		7.3	2	7.3	16.8	41.8	4-18		30		
Crim	HRS			8.9	5.2	13.2	9.1	3	9.1	13.5	58.3	3-13	41.5	35		
Early Blackhull	HRW			9.5	6.4		8.0	2	8.0	17.4	58.8	4-13		53		
Justin	HRS	30.5					30.5	2	22.1	20.1	56.7	3-30	38.0	34		
Lakota	Durum <sup>7</sup>	39.3					39.3	3	28.0	29.1	57.4	4-1	40.5	Tr		
Langdon	Durum							1	35.3	28.4	59.8	4-2	43.5	Tr		
Lee	HRS							5	25.8	23.5	60.4	4-1	38.4	20		
Nadadores	HRS	44.8	10.5				27.7	2	27.7	26.7	58.2	4-2	31.7	Tr		
Quanah	HRW	27.1	10.8	14.2	13.1	21.9	17.4	10	22.7	22.7	59.8	4-9	39.1	15		
Sentry	Durum							1	34.5	27.6	61.8	4-2	40.1	Tr		
Stewart	Durum							1	35.4	28.5	61.8	4-8	44.5	Tr		
Sturdy	HRW			8.6			8.6	1	8.6	19.7	54.8	4-8		Tr		
Supremo	SRW							3	29.8	20.0	59.6	3-28	44.0	20		
Wells	Durum	44.6					44.6	3	32.1	33.2	59.4	4-1	40.0	9		
LSD — 5 percent		5.5	5.0	8.4	6.4	4.5										

<sup>1</sup>No data obtained in 1959.

<sup>2</sup>Calculated data based on years grown.

<sup>3</sup>Check varieties used to calculate comparable data.

<sup>4</sup>Hard red spring wheat varieties — HRS.

<sup>5</sup>Hard red winter wheat varieties — HRW.

<sup>6</sup>Soft red winter wheat varieties — SRW.

<sup>7</sup>Durum varieties — Durum.

TABLE 16. GRAIN YIELDS AND AGRONOMIC DATA FOR WHEAT VARIETIES GROWN AT BEEVILLE, 1959-68

Variety	Market class	Yield of grain, bushels per acre									Comparable agronomic data <sup>1</sup>			
		1964-68					1959-68				Test weight, pounds per acre	Date of first heading	Plant height, inches	Leaf rust, percent
		1964	1965	1966	1967	1968	Actual average	Number years grown	Actual average	Comparable average <sup>1</sup>				
Milam <sup>2</sup>	HRS <sup>3</sup>	23.3	9.6	9.4	11.8	18.6	14.5	10	14.3	14.3	56.2	3-31	33.9	12
Seabreeze <sup>2</sup>	HRS	22.2	8.8	7.0	13.1	19.9	14.2	10	13.1	13.1	56.0	3-17	32.2	27
Average		22.8	9.2	8.2	12.5	19.3		10	13.7	13.7	56.1			
Atlas 66	SRW <sup>4</sup>				15.4	22.7	19.1	5	15.3	15.4	54.5	4-4	34.1	17
Austin	SRW	18.4	8.0				13.2	7	12.9	12.7	52.8	4-4	33.9	26
Blueboy	SRW				5.3		5.3	1	5.3	6.5		4-3	26.6	50
Bowie	SRW	21.2	6.6				13.9	4	13.4	13.5	55.9	3-30	34.4	8
Caddo	HRW <sup>5</sup>			7.8			7.8	1	7.8	13.3	58.1		28.1	13
Chris	HRS			7.2	18.8		13.0	2	13.0	16.3	59.9	3-20	30.6	5
Comanche	HRW			4.1			4.1	1	4.1	9.6				60
Crim	HRS			7.6	12.2	20.5	13.4	3	13.4	9.7	57.9	3-30	33.6	47
Justin	HRS	16.4					16.4	1	16.4	7.3	52.0	4-3	39.6	20
Lakota	Durum <sup>6</sup>	24.2					24.2	3	16.2	12.8	52.4	3-28	36.7	22
Lee	HRS							5	13.4	14.1	54.2	3-28	33.5	35
Lerma Rojo	HRS					30.1	30.1	1	30.1	24.5				
Nadadores	HRS	32.2	12.8				27.4	3	33.3	20.7	57.1	4-2	31.9	10
Penjamo 62	HRS						34.1	1	34.1	28.5				
Polk	HRS					15.6	15.6	1	15.6	10.0				
Quannah	HRW	16.0	12.3	5.9	10.4		13.6	10	12.1	12.1	56.4	4-7	34.4	16
Red River 68	HRS						15.8	1	15.8	10.2				
Rio Bravo	HRS					39.4	39.4	1	39.4	33.8				
Sturdy	HRW			8.6				1	8.6	14.1	53.1			0
Supremo	SRW							2	14.5	16.6	55.9	3-24	39.9	19
Wells	Durum							2	13.6	13.6	53.9	3-27	36.7	18
LSD — 5 percent		3.0	4.8	4.8	4.6	7.6								

<sup>1</sup>Comparable data based on years grown.<sup>2</sup>Check varieties used to compute comparable data.<sup>3</sup>Hard red spring wheat varieties — HRS.<sup>4</sup>Soft red winter wheat varieties — SRW.<sup>5</sup>Hard red winter wheat varieties — HRW.<sup>6</sup>Durum varieties — Durum.

TABLE 17. ANNUAL AND AVERAGE YIELDS OF FALL-SOWN RYE VARIETIES AT CHILLICOTHE, 1961-68

Variety	1961	1962	1963	1964	1965	1966	1967	1968	Average		Average, 1965-68	
									For years grown	Elbon for same years	Test weight	Date first head
Common	23.7	8.8	21.2	11.3	14.8	5.9	19.0	19.4	15.5	14.2	54.3	4-23
Balboa	21.7	10.3	19.2	11.1	15.7	6.4	21.8	14.6	15.1	14.2	53.8	4-17
Gator	18.3	8.9	16.6	13.1	15.5	11.1	22.9	11.7	14.8	14.2	54.3	4-18
Explorer	18.6	11.9	17.1	12.9	15.1	10.6	19.2	13.1	14.8	14.2	54.8	4-18
Elbon	19.4	10.4	14.7	12.8	13.7	10.0	21.4	11.3	14.2		54.2	4-17
Abruzzi			20.8	14.1	17.2	7.0	20.2	14.1	15.6	14.0	54.5	4-21
Emory					13.1	9.1	20.0	11.8	13.5	14.1	53.5	4-18
Weser					12.1	9.4	20.4	10.7	13.2	14.1	53.8	4-18
Bonel							20.0	9.9	15.0	16.4		

TABLE 18. GRAIN YIELDS AND AGRONOMIC DATA FOR RYE VARIETIES GROWN AT DENTON, COLLEGE STATION, MT. PLEASANT AND OVERTON, 1955-68

Variety	Denton				College Station, 1962		
	Grain yield, bushels			Test weight, pounds	Grain yield, bushels	Test weight, pounds	Percent leaf rust
	1960	1961	Average				
Gator	33.1	40.3	36.7	56.0	27.5	57.0	10
Elbon	31.0	44.4	37.7	57.0	31.3	57.0	40
Common	39.3	26.2	32.8	58.0			
Explorer		40.8		58.0	30.6	56.0	10
Balboa					4.8		80
Abruzzi					31.7	57.0	20
Wrens					27.8	57.0	10

Variety	Mt. Pleasant				Overton	
	Grain yield, bushels				1964	1968
	1955	1956	1957	1963		
Abruzzi	20.9	26.8	35.5	26.0		
Elbon					34.0	43.2
Weser				17.8		
Gator				20.7	33.8	
McNair						45.4

TABLE 19. ACREAGES AND PRODUCTION OF OATS BY EXTENSION DISTRICTS AND RESEARCH TESTING AREAS IN TEXAS, 1968<sup>1</sup>

Extension district	Research testing area	Land use area	Acreage seeded	Acreage harvested	Percent of state		Production, bushels	Percent of seeded acreage harvested for grain
					Total seeded	Total harvested		
1	I	Northern High Plains	13,510	7,590	0.83	1.30	205,000	56.2
2	I	Southern High Plains	16,720	6,590	1.03	1.13	181,420	39.4
3	II	Northern Low Rolling Plains	150,600	81,770	9.21	14.02	2,987,000	54.3
6	II	Trans-Pecos	8,350	4,230	0.51	0.73	158,300	50.7
7	II	Southern Rolling Plains and Edwards Plateau	301,280	184,070	18.50	31.50	6,440,300	61.1
4	III	North Central Blacklands, Prairies and Cross Timbers	242,950	106,580	14.91	18.28	4,060,900	43.9
5	III	Northeast Texas Timberlands	34,280	8,100	2.11	1.47	282,550	23.6
8	IV	Central Blacklands, Prairies and Cross Timbers	374,950	149,820	23.00	25.63	4,588,700	40.0
9	IV	Central East Timberlands	50,630	1,390	3.11	0.24	37,700	2.7
10	IV	Upper Coast and Southeast Texas Timberlands	86,750	2,210	5.33	0.38	48,730	2.5
11	V	South Central Blacklands, Prairies and Coastal Bend	212,500	12,150	13.05	2.08	303,400	5.7
12	V	Rio Grande Plain, South Texas	134,770	18,330	8.28	3.15	502,700	13.6

<sup>1</sup>Texas Small Grain Statistics, Bulletin No. 50, March 1969, USDA, Statistical Reporting Service, Austin, Texas.

TABLE 20. GRAIN YIELDS AND AGRONOMIC DATA FOR IRRIGATED, FALL-SOWN OAT VARIETIES GROWN AT BUSHLAND, 1956-68<sup>1</sup>

Variety	Yield of grain, bushels per acre													
						1964-68			1956-68		Comparable agronomic data <sup>2</sup>			
	1964	1965	1966	1967	1968	Average for years grown	Average for years grown	Number years grown	Com- parable <sup>2</sup> average	Test weight, pounds per bushel	Date first head	Plant height, inches	Survival, percent	Lodging, percent
Frazier <sup>3</sup>	105.7	71.8	70.7	83.2	113.5	89.0	84.2	10	84.2	34.6	5-7	31.6	60	11
Fulwin <sup>3</sup>	98.1	72.8	109.0	73.0	84.9	87.6	76.7	10	76.7	34.8	5-10	36.2	79	54
New Nortex <sup>3</sup>	97.2	98.3	132.1	67.7	118.6	102.8	81.4	10	81.4	35.0	5-13	32.4	50	32
Average	100.3	81.0	103.9	74.6	105.7	93.1	80.7	10						
Blount				93.3		93.3	93.3	1	99.4	35.4	5-14	32.7	48	
Bronco	103.1	110.2	82.0	105.1	89.4	97.9	85.9	10	85.9	33.2	5-17	35.9	64	37
Cimarron	128.0	91.3	105.6	86.1	153.0	112.8	93.4	10	93.4	36.1	5-7	30.2	78	19
Compact					87.9	87.9	87.9	1	63.0	33.1		36.1		
Dubois	130.9	86.9	106.9	84.6		102.3	102.3	4	93.1	37.1	5-13	32.6	65	7
Fultex							59.7	5	72.0	34.4	5-10	29.1	49	6
Mustang	101.2	111.4				106.3	83.3	7	89.3	32.7	5-13	32.3	45	43
Nora					178.3	178.3	178.3	1		36.2	5-6	24.1		
Norline							101.9	5	89.5	36.4	5-16	36.5	75	5
Norwin	143.8	88.9	112.7	130.1	144.9	119.2	119.2	5	108.6	35.6	5-8	29.5	72	28
Winter Excel	125.2	81.8				103.5	103.5	2	93.6	41.2	5-10	31.7	79	
Wintok	112.7	81.4	113.2	61.2		92.1	84.5	9	87.3	35.9	5-13	33.2	83	30
LSD — 5 percent		14.8	22.3	30.8	34.7									

<sup>1</sup>Crop was destroyed by hail in 1961 and 1962, by winterkilling in 1963.

<sup>2</sup>Comparable data based on years grown.

<sup>3</sup>Check varieties used in computing comparable averages.

TABLE 21. COMPARABLE GRAIN YIELDS AND AGRONOMIC DATA FOR IRRIGATED, FALL-SOWN OAT VARIETIES GROWN AT PLAINVIEW, ETTER AND FLOYDADA, 1956-68

Variety	Comparable yield of grain <sup>1</sup>			Comparable <sup>1</sup>			Plant height, inches Floydada	Winter Survival, percent 1966	Lodging, percent 1966
	Plainview	Etter	Floydada	Test weight, pounds					
	1966-67	1966-67	1956-60	Plainview	Etter	Floydada			
Bronco <sup>2</sup>	96.9	104.1	53.4	33.1	32.0	36.2	25.3	80	32
Cimarron <sup>2</sup>	119.8	106.5	48.9	34.0	34.5	35.6	21.8	78	55
Dubois	103.9	99.0		37.7	34.4			75	32
Frazier		100.4	51.8		34.7	35.5	23.5	78	70
Fulwin		84.1	50.1		31.4	36.0	29.5	81	45
Fultex			49.8			35.9	20.3		
Mustang			59.2			33.6	22.0		
New Nortex		84.6	55.7		33.0	35.6	23.5	74	45
Norline	84.4	97.0		34.2	33.9			77	12
Norwin	119.3	97.1		33.8	34.3			79	70
Wintok	109.9	78.9	52.8	35.1	33.4	36.9	24.3	83	37

<sup>1</sup>Comparable data based on years grown.

<sup>2</sup>Check varieties used to compute comparable data.

found in Extension Districts 3, 4, 7, 8 and 10. The largest acreages of varieties grown are those of Ora, Moregrain and New Nortex. These three combined equal about 67 percent of the State's acreage.

As with barley, three growth-habit types of oats can be and are grown in Texas. Although practically all varieties will head even from spring seeding and do not require a period of vernalization in order to head normally, they vary greatly in seedling growth habit and cold tolerance. More complete descriptions of varietal characteristics are found in Texas Agricultural Experiment Station Bulletin 1091, "Growing Oats in Texas."

#### Fall-Sown Performance Trials

RESEARCH AREA I: The High Plains area grows only about 2 percent of the State's oat acreage. Oats are less cold tolerant than barley or wheat and even with the hardy varieties now available, fall seeding is somewhat hazardous, especially if the crop is not irrigated.

Performance trials have been conducted at Bushland throughout the period, both from fall and spring seeding, Tables 20 and 32. Trials for shorter periods were conducted at Etter, Plainview and Floydada, Table 21. Consistent high yields have been produced by Norwin, Winter Excel, Cimarron, Dubois, Wintok and Bronco, and as these are also the most cold tolerant, they are the safest varieties to grow. New Nortex, Mustang, Frazier and others have produced good yields, but they are less hardy and may be killed some years. Agronomic data are also given in Table 20. Data from the other locations are generally in agreement with the Bushland data.

RESEARCH AREA II: Oats are grown extensively in this area. About 28 percent of the State's acreage is grown, and about half is harvested for grain. More than 18 percent of the grain harvested is grown in Extension District 3. Performance trials were conducted at Iowa Park until 1965, with supplemental irrigation when needed, Table 22. The best yields were produced by Ora, Cimarron, Norwin, Dubois and Mustang.

Trials were conducted at Chillicothe without irrigation during the full period. Yields were much lower than at Iowa Park, Table 23. The leading varieties were Norwin, Alamo-X, Cimarron, Mustang and Wintok. Damage by low temperatures occurred in 1959, 1962 and 1963. While the very hardy varieties are less likely to be damaged by low temperatures, the moderately hardy varieties such as Ora, Alamo-X, Moregrain and New Nortex are widely grown because of their forage characteristics.

RESEARCH AREA III: Extension District 4 grows about 15 percent of the State's acreage with about half harvested; but, District 5 grows only about 2 percent with most of it used exclusively for winter pasture. Extensive trials were conducted at Denton, Table 24. The best comparable yields have been produced by Ora, Nora, Bronco, Mustang and New Nortex. Victorgrain and Appler Rust-proof have produced good yields but seed is not available. A number of other varieties grown for short periods have done well. At Overton, Coronado, Cortez, Ora and Houston all produced excellent yields. Agronomic data are also given in Table 24. Cold tolerance is important, especially in District 4, and important losses from low temperature injury occurred in 1959, 1962 and 1963. However, in most seasons the varieties of moderate hardiness will survive, and these usually are preferred because of their desirable grazing characteristics. Lodging also is important in this area. The varieties Ora, Moregrain, Alamo-X, Bronco, Coronado and Cortez have much stronger straw than New Nortex. Disease resistance is important in this area in some seasons. Ora, Moregrain, Coronado and Cortez have shown greater resistance to rust than others, but there are new races of rust which will attack these varieties.

Limited trials in connection with forage clippings were conducted at Overton, Table 25. Variability was very high, so no averages are given, but data indicate yield potential in this area.

RESEARCH AREA IV: The Central Blackland, Prairie and Cross Timbers land-use areas of District 8 grow about 23

TABLE 22. GRAIN YIELDS AND AGRONOMIC DATA FOR IRRIGATED, FALL-SOWN OAT VARIETIES AT IOWA PARK, 1956-65<sup>1</sup>

Variety	Yield of grain, bushels per acre					Comparable data <sup>2</sup>						
	1960	1961	1962	1963	1965	Average for years grown	Comparable average <sup>2</sup>	Number comparisons	Test weight, pounds	Date first head	Plant height, inches	Winter survival, percent
Frazier <sup>3</sup>	99.6	63.8	14.2	71.8	52.4	70.2	70.2	9	33.2	4-14	34	35.0
Mustang <sup>3</sup>	116.5	81.3	19.3	77.9	56.0	78.0	78.0	9	30.7	4-23	34	42.0
Wintok <sup>3</sup>	106.0	45.9	42.0	63.8	70.3	67.1	67.1	9	33.3	4-23	33	91.5
Average							71.8	9	32.4	4-19		
Alamo	112.1	56.7				82.6	72.7	6	33.8	4-17	31	13.8
Alamo-X			16.4		53.7	35.1	64.4	2	32.6	4-17		48.0
Arkwin						54.7	61.7	2	34.9	4-21		
Bronco	106.0	91.8	48.2	70.4		80.5	77.7	8	30.4	4-26	34	85.0
Blount					51.1	51.1	63.3	1	32.1			
Cimarron	126.3	65.3	30.0	85.2	74.8	80.6	80.6	9	33.3	4-15	30	88.5
Dubois					67.5	67.5	79.7	1	37.1			
Fultex						83.5	72.0	3	32.1	4-20	32	
Fulwin	97.3	69.9	34.6	38.6		69.7	68.1	8	31.8	4-25	37	87.0
Moregrain	100.2	65.0	9.6	30.7	51.5	54.6	60.2	6	35.2	4-12		9.5
New Nortex	128.5	76.0		19.6	63.4	73.8	67.9	8	31.7	4-21	33	3.5
Norwin			32.4	85.5	61.4	59.8	79.6	3	35.1			
Ora					69.0	69.0	81.2	1	34.1			43.2
Suregrain	124.0	66.2	0			49.4	71.6	4	33.3	4-15		14.8
Victorgrain						85.3	77.3	4	33.0	4-19		
Winter Excel		57.6	28.2	73.3	64.6	55.9	72.8	4	35.1	4-24		46.5
LSD — 5 percent	15.7	13.9	15.5		13.6							

<sup>1</sup>No data for 1964, detailed data for 1956-59 not known.

<sup>2</sup>Comparable data based on years grown.

<sup>3</sup>Check varieties used to adjust comparable average.

TABLE 23. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OAT VARIETIES GROWN AT CHILLICOTHE, 1958-68

Variety	Yield of grain, bushels per acre										Comparable agronomic averages <sup>2</sup>						
	1964	1965	1966	1967	1968	1964-68		1958-68 <sup>1</sup>			Test weight, pounds per bushel	Date first head	Lodging percent	Plant height, inches	Percent survival		Forage estimate, percent
						Average for years grown	Average for years grown	Number years grown	Comparable averages <sup>2</sup>	1959					1963		
Frazier <sup>3</sup>	21.8	32.3	11.4	42.6	25.4	26.7	32.5	10	32.5	32.4	4-25	43.0	26.0	25	11	104	
Fulwin <sup>3</sup>	23.4	23.1	11.7	48.2	14.7	24.2	32.0	10	32.0	32.1	4-30	71.3	28.7	95	33	102	
New Nortex <sup>3</sup>	21.0	26.9	17.6	41.7	18.7	25.2	31.8	10	31.8	30.7	4-29	39.0	24.1	20	2	100	
Average	22.1	27.4	13.6	44.2	19.6	25.4	32.1	10	32.1	31.7	4-28	51.1	26.3			102	
Alamo								4	42.8	32.6	4-27	41.8	22.4	50		110	
Alamo-X	20.0	28.9	22.1	49.6	27.9	29.7	35.4	8	38.8	31.8	4-28	19.4	24.4		21	117	
Arkwin							45.5	2	31.9	32.6	5-2	31.8	23.0	15		85	
Blount	29.1	34.9	20.4	40.0		31.1	31.1	4	36.4	32.2	4-29	19.4	25.9				
Bronco	21.8	31.9	5.6	39.5	19.4	23.6	34.3	5	34.3	32.6	5-5	27.3	26.3	100	21	86	
Cimarron	23.2	28.3	19.7	44.4		29.7	37.4	10	37.4	32.8	4-23	50.6	23.1	100	43	110	
Coronado				44.5		23.3	33.9	2	36.6	33.9	4-26		22.9				
Cortez					42.3	42.3	42.3	1		35.7	4-21		21.0				
Dubois	20.1	23.7	18.2			20.7	20.7	3	31.7	33.9	4-27	19.4	23.8				
Jefferson				40.7		40.7	40.7	1	28.6	34.5	4-24		29.0				
Le Conte		24.8	28.0			26.4	26.4	2	33.8	31.9			20.4				
Moregrain	22.9	32.0	22.5	40.0		29.4	31.1	8	34.4	35.5	4-25	19.4	20.7	40	6	107	
Mustang	22.7	38.3				30.5	40.1	7	37.4	30.9	4-30	33.0	23.8	95	14	102	
Nora				30.5	31.3	30.9	30.9	2	31.1	35.6	4-27		20.4				
Norline	21.2	31.6	7.2	40.2	32.0	26.4	26.4	5	33.2	29.6	5-5	19.4	26.5				
Norwin	21.8	29.9	20.2	41.9	45.0	31.8	32.0	6	41.7	33.5	4-27	49.4	24.7		50		
Ora	21.6	32.3	21.6	40.2	28.6	28.9	28.9	5	35.6	35.6	4-25	19.4	21.4				
Roanoke	23.2					23.2	23.2	1	33.2	33.1			30.6				
Suregrain							39.6	3	33.0	34.5	4-26		20.4			97	
Victorgrain							48.9	2	35.3	32.4	4-24	31.8	22.0	50		109	
Winter Excel	20.4	30.6	16.6	48.1	22.0	27.5	34.7	7	36.4	33.7	4-28	79.4	24.6		71		
Wintok	21.4	29.4	14.3	55.6	23.1	28.8	37.1	10	37.1	33.1	4-29	53.0	24.1			104	
LSD — 5 percent	2.8	8.7		11.1													

<sup>1</sup>No data for 1962 because of storms.

<sup>2</sup>Comparable data based on years grown.

<sup>3</sup>Check varieties used in computing comparable yields.

TABLE 24. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OATS GROWN AT DENTON, 1959-68

Variety	Yield of grain, bushels per acre														
						1964-68		1959-68			Comparable agronomic data <sup>1</sup>				
	1964	1965	1966	1967	1968	Average for years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>	Test weight, pounds per bushel	Date first head	Plant height, inches	Crown rust, percent	Percent survival 3 years	Lodging, percent 6 years
Frazier <sup>2</sup>	60.0	48.8	29.3	61.2	67.0	53.3	61.5	10	61.5	32.8	4-12	35.7	22	70	49.2
New Nortex <sup>2</sup>	60.5	69.5	48.1	74.3	86.8	67.8	70.5	10	70.5	30.9	4-22	33.2	14	69	30.8
Fulwin <sup>2</sup>	52.3	56.3	57.0	75.0	56.2	59.4	63.5	10	63.5	28.9	4-22	40.8	56	97	39.2
Average	57.6	58.2	44.8	70.2	70.0	60.2	65.2	10	65.2	31.0	4-19	36.6			
Alamo							84.2	4	74.0	34.4	4-14	32.7	29	67	9.6
Alamo-X	57.4	52.5	37.9	65.3	75.9	57.8	59.8	8	61.2	31.0	4-16	37.0	23	50	22.5
Appler Rustproof	58.5	68.1	51.6	73.7	79.6	66.3	71.7	10	71.7	29.7	4-21	33.9	13	87	23.6
Arkwin	50.0					50.0	46.8	2	56.9	31.7	4-14	34.0	37	82	
Arlington	54.4	57.3				55.9	65.6	7	64.1	31.4	4-20	39.8	15	81	
Arlington 23	51.4	57.4	46.6			51.8	51.8	3	63.4	31.6	4-19	41.7	34		30.7
Blount	40.7	83.1	56.7	49.3		57.5	58.4	5	67.5	32.3	4-21	34.0	21	93	20.7
Bronco	48.3	84.0	58.2	84.7	69.7	69.0	72.2	10	72.2	30.2	4-23	37.5	25	97	10.2
Bruce	76.6	61.2	45.2	77.5	77.7	67.6	56.4	6	63.2	32.0	4-15	35.1	23		21.3
Carolee			53.2	71.2	68.3	64.2	73.6	7	69.7	30.8	4-20	34.2	17	61	16.8
Coker 242		78.6	44.1	62.0	75.9	65.1	65.1	4	69.5	33.8	4-19	34.8	11		
Coronado			42.5	75.0	80.2	65.9	65.9	3	69.4	32.1	4-17	32.1	7		19.4
Cortez				63.9	76.1	70.0	70.0	2	65.1	31.0	4-14	30.2	11		17.4
Dubois	42.3	68.2	37.3			49.3	49.3	3	61.3	32.3	4-20	33.6	36	99	22.7
Fairfax	56.7	71.7	40.4	63.1	59.3	58.2	67.3	9	65.5	30.9	4-21	40.6	15	78	14.1
Ferguson 560							73.5	2	67.8	30.3	4-22	34.6		78	61.8
Jefferson	63.3	66.9	44.9	66.5	63.7	61.1	66.8	9	68.3	33.0	4-18	37.3	22		24.0
Midsouth							81.4	3	74.2	34.4	4-16	35.9	26	78	17.6
Mustang	55.7	61.7				58.7	73.1	7	71.6	30.1	4-20	34.6	23	83	10.2
Moregrain	57.2	50.6	39.3	68.2	74.8	58.0	68.4	10	68.4	33.6	4-14	30.1	15	68	22.3
Nora				83.1	82.6	82.9	82.9	2	77.9	32.0	4-15	30.2	19		16.4
Norwin	66.0	51.7	39.6	75.3	68.4	60.2	63.8	7	66.8	31.6	4-15	31.1	31	99	37.9
Norline	18.6	75.0				46.8	46.8	2	54.1	24.7	4-24	32.4	44		20.7
Ora	68.0	91.5	63.1	73.5	85.1	76.2	80.1	7	83.1	31.1	4-15	31.0	6	96	2.6
Roanoke	48.1					48.1	69.4	6	66.5	31.9	4-21	40.9	18	72	7.3
Sumter							66.2	5	56.8	32.0	4-17	35.0	14	58	13.9
Sumter 3	62.8	37.3	40.4			46.8	35.1	4	47.8	30.6	4-17	36.7	26		18.0
Suregrain							71.7	5	66.7	33.5	4-16	30.5	Tr	51	19.6
Taggart	53.3						53.3	1	56.0	30.5	4-21	35.6	26	42	
Victorgrain	52.3	61.5				56.9	75.6	7	74.1	33.0	4-17	36.4	18	74	11.3
LSD — 5 per cent	10.7	11.2	12.3	9.5	6.7										

<sup>1</sup>Comparable data based on years grown.<sup>2</sup>Check varieties used in computing comparable data.



TABLE 25. ANNUAL YIELDS OF OAT VARIETIES GROWN AT OVERTON OR MT. PLEASANT 1955-68

Variety	Yield of grain, bushels per acre					
	1955	1956	1967	1963	1964	1968
New Nortex	18.8	31.6		46.1	62.1	46.4
Mustang	32.1	32.6	44.2	25.0	56.6	
Bronco	37.6	58.6	52.5			
Alamo	39.1	36.0	44.0	72.0	59.2	
Alamo-X				70.2	88.2	82.7
Houston				52.8	104.3	93.5
Suregrain				62.3	73.9	88.8
Ora				114.1		94.9
Moregrain				57.1	73.9	101.9
Florida 500						88.4
Cortez						97.0
Coronado						109.3

percent of the State's acreage of oats and harvest about 40 percent of this acreage. About 3 percent is grown in District 9 and 5 percent in District 11. Nearly all of this is used for grazing. Less cold tolerant varieties can be grown here, and owing to their more upright growth, these are preferred for winter pasture.

Performance trials were grown at Temple and McGregor throughout the period. At McGregor, Table 26, the best comparable yields were made by Ora, Coronado, Cortez, New Nortex, Nora, Florida 500 and Moregrain. Ferguson 560 and Ranger are no longer available. The leading varieties at Temple were New Nortex, Ora, Nora and Florida 500, Table 27. Radar I is no longer available. Agronomic data are given in the same tables. Forage estimates show that the more upright growing types were evaluated as better for forage than New Nortex, the check variety.

RESEARCH AREA V: Extension District 10 of South Texas grows 13 percent of the State's acreage but harvests only 6 percent; District 12 grows 8 percent and harvests 14 percent of that planted. Upright-growing, near spring-type varieties can be grown. Even true spring-type varieties from the Mid-west can be fall-seeded, but these varieties are damaged by livestock grazing more than others, so they are not used to any great extent.

Performance trials at College Station and Beeville are given in Tables 28 and 29. Disease resistance, especially resistance to the rusts, is an important factor in this area, and yield data reflect this reaction. Coronado, Cortez, Florida 501, Florida 500, Suregrain and Houston have given much better grain yields than others, and they also are among the best for winter pasture. Yields at Beeville are much lower and reflect the lower, more erratic rainfall of the area. Florida 501, Florida 500, Suregrain, Moregrain, Coronado and Cortez have produced the best grain yields.

### Spring-Sown Performance Trials

Spring-sown performance trials were grown only at Denton, Chillicothe and Bushland. Data for Denton, Table 30, show that Ora, Cortez, Coronado, Suregrain and Moregrain have produced the highest yields. These also have been the most rust resistant, an important factor in

yield of spring-sown oats, as the crop matures later than fall-sown oats. Yields at Chillicothe, Table 31, have been low. Actually the crop was almost a complete failure in 1966 and 1967. The highest comparable yields were produced by Cortez, Neal (a spring-type variety from Nebraska), Norwin, Cimarron, Moregrain and Suregrain. Yields under irrigation at Bushland were high but less than that of fall-sown oats under comparable conditions, Table 32. The varieties Ora, Norwin, Moregrain, Neal and Suregrain produced the highest yields.

## BARLEY

The barley acreage is considerably less than that of wheat or oats, Table 1, and it fluctuates widely. During the severe drought years of the 1950's, it dropped to 45,000 acres, the lowest since 1918. The largest acreage ever grown was in 1961 when 582,000 acres were seeded. An increasing proportion of the crop is grazed to maturity.

Barley is nearly all fall-sown, and the acreage is widely distributed over the State, Figure 5. A small acreage may be spring-sown in Research Areas I and II in favorable spring seasons or when the fall-sown crop is reduced by winter injury. The acreages by extension districts and research areas are given in Table 33.

Three types of barley are grown in Texas. They are (1) winter type, (2) intermediate winter and (3) spring type. Cold tolerant, winter-type varieties, such as Will and Harrison, produce prostrate growing seedlings that require a period of dormancy and cool weather (vernalization) before they will head normally. The intermediate-winter type varieties, such as Cordova and Era, are moderately cold tolerant, yet they produce broad-leafed, moderately upright growing seedlings that are well suited for forage purposes. Spring-type varieties, such as Goliad and Arivat, lack cold tolerance and produce seedlings with

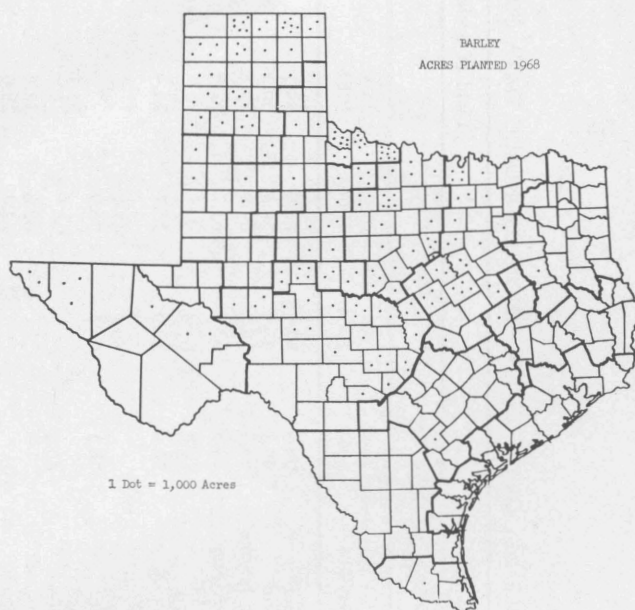


Figure 5. Distribution of 1968 Texas seeded acreage of barley.

TABLE 26. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OAT VARIETIES GROWN AT MCGREGOR, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>2</sup>								
	1963	1964	1966	1967	1968	1963-68		1959-68		Test weight, pounds per bushel	Date first head	Plant height, inches	Leaf rust, percent	Forage estimate, New Nortex 100 percent
						Average for years grown	Average for years grown	Number years grown	Comparable average <sup>2</sup>					
Frazier <sup>3</sup>	44.3	57.4	65.0	29.1	55.6	50.3	51.5	10	51.5	33.9	4-9	35.2	42.8	111
Fulwin <sup>3</sup>	49.1	41.4	58.3	30.1	40.5	43.9	41.9	10	41.9	29.0	4-19	34.2	62.3	100
New Nortex <sup>3</sup>	54.4	59.2	67.9	39.3	30.8	50.3	61.9	10	61.9	30.6	4-20	32.6	16.4	89
Average	49.3	52.7	63.7	32.8	42.3	48.2	51.8	10	51.8	31.2	4-16	34.0		
Alamo	18.8	91.8				55.3	54.9	7	52.5	31.8	4-12	32.6	26.7	111
Alamo-X	34.6	95.0	55.7	24.4	58.2	53.6	58.2	8	59.5	31.5	4-13	34.2	16.2	112
Alber							55.8	1	51.6	34.5	4-18	32.2	24.4	103
Arkwin		60.8	47.9		32.4	47.0	51.2	5	53.7	31.4	4-16	34.6	71.3	103
Blount	48.1	64.5	56.9			56.5	56.5	3	53.0	34.2	4-17	20.2	58.8	97
Bronco				35.7	10.5	23.1	47.4	6	47.7	29.5	4-23	34.3	43.1	79
Carolee	40.2					40.2	40.2	1	42.7	33.5	4-18	28.7	39.3	
Coker 242			66.8	22.4	51.2	46.8	46.8	3	52.3	29.5	4-13	33.4	20.6	104
Coronado			74.8	28.0	70.4	57.7	57.7	3	62.9	34.0	4-14	33.1	20.1	99
Cortez				34.2	74.8	54.5	54.5	2	68.7	36.0	4-10	32.3	28.1	
Dubois		58.6				58.6	58.6	1	57.7				39.5	100
Ferguson 560							73.5	4	66.9	33.2	4-19	32.6	5.0	99
Florida 500			78.9	19.9	69.0	55.9	55.9	3	61.4	35.6	4-11	27.8		109
Houston	4.3	96.0	61.3	21.7	56.6	48.0	48.0	5	51.6	34.0	4-14	28.1	21.6	109
Jefferson				33.8		33.8	33.8	1	52.7	31.8			46.1	
Le Conte		48.4				48.4	48.4	1	47.5					
Midsouth							64.6	4	57.9	33.9	4-14	34.1	26.7	115
Moregrain	40.3	95.0	83.5	28.6	47.6	59.0	61.4	10	61.4	37.2	4-11	30.8	12.9	109
Mustang	48.8	73.9	54.6			59.1	63.6	8	60.0	31.3	4-17	33.8	36.4	79
Nora				25.6	69.6	47.6	47.6	2	61.8	32.0	4-15	31.8	27.1	
Norline		34.8				34.8	34.8	1	33.9				64.5	103
Norwin				32.4	46.4	39.4	39.4	2	53.6	35.0	4-15	30.3	34.1	
Ora	40.2	103.5	91.1	25.2	69.0	65.8	65.8	5	69.4	32.6	4-15	32.5	21.6	104
Radar I							59.6	2	51.6	31.3	4-8	33.5	3.1	117
Ranger							78.2	2	72.8	32.5	4-19	33.7	14.4	103
Roanoke		61.1					61.1	1	60.2					
Sumter	32.4						32.4	1	34.9	33.5	4-22	31.7		
Victorgrain							70.6	3	60.8	34.4	4-13	33.9		115
Suregrain	23.1	91.2	81.6	21.0	65.0	36.4	59.9	10	59.9	36.1	4-13	30.9	3.7	107
Taggart	36.3	79.4	55.6		48.9	55.1	56.0	5	57.6	32.7	4-19	35.3	56.6	105
LSD — 5 percent	8.1	11.5	12.2	6.3										

<sup>1</sup>The 1965 crop was destroyed by storms.<sup>2</sup>Comparable average based on years grown.<sup>3</sup>Check varieties used to compute comparable data.

TABLE 27. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OAT VARIETIES GROWN AT TEMPLE, 1959-68

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>1</sup>								
	1964	1965	1966	1967	1968	1964-68		1959-68		Test weight, pounds per bushel	Date first head	Plant height, inches	Forage estimate, Percent of New Nortex	Percent winter survival 3 years
						Average for years grown	Average for years grown	Number comparisons	Comparable average <sup>1</sup>					
Frazier <sup>2</sup>	68.7	56.6	70.4	43.0	59.6	59.7	52.1	10	52.1	34.6	4-7	36.2	111	97
Fulwin <sup>2</sup>	62.0	42.6	55.4	46.2	68.4	54.9	48.0	10	48.0	32.4	4-16	35.7	97	98
New Nortex <sup>2</sup>	73.8	62.6	88.9	51.6	72.7	69.9	61.6	10	61.6	34.0	4-18	34.1	100	97
Average	68.2	53.9	71.6	46.9	66.9	61.5	53.9	10	53.9	33.7	4-14	35.3		
Alamo	66.8					66.8	43.4	6	47.4	32.7	4-12	33.5	111	77
Alamo-X	67.2	46.8	62.0	32.8	57.2	53.2	48.7	9	48.3	31.9	4-11	34.1	116	91
Arkwin 60	51.2	50.8				51.0	51.0	2	43.8	35.0	4-15	35.3	88	
Blount	57.3	52.5	61.7			57.2	59.8	4	50.7	35.4	4-8	35.2	106	99
Bronco	59.0	52.6		44.4	43.1	49.8	45.7	7	47.5	34.2	4-16	36.2	90	97
Coker 242		56.7	79.8	32.1	74.0	60.7	60.7	4	54.7	37.8	4-15	31.4	112	
Coronado			73.8	37.8	79.0	63.5	63.5	3	55.6	36.7	4-11	33.0	107	
Cortez				42.3	80.6	61.5	61.5	2	58.4	37.0	4-7	31.2	110	
Dubois	56.4	42.0				49.2	49.2	2	42.1	32.0	4-17	31.8		
Florida 500			82.8	41.7	74.6	66.4	66.4	3	58.4	35.0	4-6	37.7	113	
Forkeddeer							44.5	1	53.4	32.0	4-13			
Houston	60.3	44.8	65.7	40.3	55.0	53.2	41.9	7	37.1	34.2	4-9	25.9	112	31
Jefferson				47.2		47.2	47.2	1	54.1	35.0		36.3		
Midsouth							41.1	3	52.2	36.8	4-11	32.9	111	
Moregrain	65.6	59.0	75.2	38.8	64.5	60.6	55.2	10	55.2	36.6	4-9	30.6	110	95
Mustang	66.3	52.6	60.8	39.8		54.9	52.3	9	53.7	32.9	4-13	34.3	103	100
Nora				45.7	78.6	62.2	62.2	2	59.1	35.0	4-12	32.7	101	
Norwin		47.9		51.6	53.1	51.5	51.5	3	48.8	34.3	4-11	29.0	100	
Ora	80.9	72.2	77.7	46.6	76.2	70.7	67.4	6	60.3	36.6	4-12	31.1	105	99
Radar I							44.3	2	59.5	33.7	4-7	32.3	110	
Suregrain	67.2	54.3	73.4	44.2	77.7	63.4	53.0	10	53.0	36.1	4-10	29.8	111	85
Taggart	63.3	53.2				58.3	51.5	4	49.1	34.7	4-19	33.8	116	
Victorgrain							41.2	2	46.4	34.8	4-11	31.7	110	
LSD — 5 percent	9.4	7.5	12.7	7.9										

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties used in calculating comparable yields.

TABLE 28. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OAT VARIETIES GROWN AT COLLEGE STATION, 1959-68

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>1</sup>									
	1964	1965	1966	1967	1968	1964-68		1959-68			Test weight, pounds per bushel	Date first head	Plant height, inches	Forage value, percent of New Nortex	Percent leaf rust
						Average for years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>						
Frazier <sup>2</sup>	68.9	4.9	19.0	11.2	17.0	24.2	39.2	10	39.2	30.4	3-28	37.9	114	75	
New Nortex <sup>2</sup>	41.2	45.5	29.6	15.9	25.6	31.6	47.6	10	47.6	29.4	4-9	37.0	100	26	
Average	55.1	25.2	24.3	13.6	21.3	27.9	43.4	10	43.4	29.9	4-4	37.5			
Alamo	83.4	23.6				53.5	57.7	7	47.5	30.2	4-2	36.3	123	38	
Alamo-X	84.9	5.8	25.3	15.0		32.8	47.7	8	49.0	27.7	4-3	37.0	124	50	
Appler Rustproof	59.5	27.1	33.2	24.4	22.4	33.3	45.2	9	48.9	27.9	4-6	38.0	101	38	
Coker 242	77.9	35.1	57.4	42.8	21.1	46.9	50.1	6	60.9	34.7	4-4	36.1	117	12	
Coronado		52.9	73.1	58.1	77.1	65.3	65.3	4	87.6	36.3	4-5	39.5	106	0	
Cortez		52.0	65.5	64.1	71.9	63.4	63.4	4	85.7	36.1	3-26	34.2	116	0	
Clintland 64	63.0	10.0	30.7	38.3		35.5	35.5	4	49.4	32.7	4-8	38.4	125	16	
Florad							50.4	4	35.2	30.7	4-1	38.8	127	16	
Floriland							54.6	4	30.8	30.9	3-28	36.7	115	27	
Florida 500	82.9	29.1	64.7	42.2	54.6	54.7	54.7	5	70.2	34.5	3-27	35.5	100	Tr	
Houston	91.8	32.6	63.6	50.1	26.0	52.8	58.1	7	65.4	34.0	4-4	30.7	130	7	
Florida 501			59.0	41.9	43.0	48.0	48.0	3	71.6	37.7	3-22	34.0	120	0	
Midsouth							61.8	3	38.1	32.1	4-5	39.5	106	73	
Moregrain	96.4	25.6	57.3	37.3	23.6	48.0	58.7	10	58.7	34.3	3-29	33.5	118	38	
Nora				44.7	10.0	27.4	27.4	2	53.3	28.0	4-6	31.4	85	0	
Norwin				23.9		23.9	23.9	1	53.4	29.9	4-3	33.9	85	69	
Ora	77.3	39.8	54.5	54.5	27.2	50.7	54.2	6	65.0	31.9	4-2	34.7	104	12	
Radar I							69.0	4	54.9	30.4	3-30	32.7	117	16	
Ranger							56.8	3	33.1	27.1	4-12	35.5	100	28	
Sumter	88.2					88.1	70.4	2	67.6	30.4	4-1	39.2	110	28	
Suregrain	95.0	36.3	62.0	49.6	43.9	57.4	63.0	10	63.0	33.0	4-2	34.5	117	10	
Victorgrain							67.4	2	43.6	30.1	4-5	39.6	110	64	
LSD — 5 percent	16.1	10.4	13.4	10.2											

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties used to calculate comparable yields.

TABLE 29. GRAIN YIELDS AND AGRONOMIC DATA FOR FALL-SOWN OAT VARIETIES GROWN AT BEEVILLE, 1959-68<sup>1</sup>

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>2</sup>							
	1963	1964	1965	1967	1968	1959-68			Test weight, pounds per bushel	Plant height, inches	Leaf rust, percent	Stem rust, percent	Forage estimate, percent
						Average for years grown	Number years grown	Comparable yield <sup>2</sup>					
Frazier <sup>3</sup>	38.3	45.3	2.1	25.8	5.2	15.6	9	15.6	29.3	32.6	71	12	116
New Nortex <sup>3</sup>	39.6	43.0	11.9	22.3	29.9	22.9	9	22.9	26.3	31.9	53	9	100 <sup>3</sup>
Average	39.0	44.2	7.0	24.1	17.6	19.3	9	19.3	27.8	32.3	62	11	
Appler Rustproof				26.7	28.3	27.5	2	26.0	25.8		61		102
Alamo	39.9	57.3				24.7	6	23.1	28.6	34.7	48	2	110
Alamo-X	38.7	51.7	2.9	33.5		29.0	7	26.0	27.3	35.4	57	3	120
Clintland 64		37.1	13.3	26.4		25.6	3	19.8	27.7	34.5	41	7	133
Coker 242				40.6	14.8	27.7	2	26.2	31.6	28.8	61		124
Coronado				52.2	23.1	37.7	2	36.1	32.6	32.8	36		124
Cortez				58.5	30.5	44.5	2	42.9	32.4	36.8	36		122
Florida 501				56.9	50.2	53.5	2	52.0	31.1	32.8	15		122
Florida 500			47.7	47.3	40.9	45.3	3	48.4	29.8	33.8	19		124
Houston	42.7	60.9	18.7	55.4	25.7	40.4	6	34.9	32.4	31.1	40	11	129
Midsouth	0					3.6	3	16.1	24.7		73	16	103
Moregrain	49.6		6.3	53.7	10.3	35.9	8	39.0	33.8	34.4	25	35	118
Nora				51.9	0	26.0	2	24.4	33.7	29.8	55		99
Norwin				20.7		20.7	1	15.9	24.7	27.8	75		123
Ora	46.2	64.9	31.4	56.1	6.0	40.9	5	33.9	28.9	30.9	30		117
Radar I	40.4					31.4	5	34.5	29.3	31.1	39	10	110
Ranger						13.9	3	26.4	25.4	32.4	53	15	100
Suregrain	50.8		25.5	49.6	26.7	41.7	8	44.8	32.2	33.2	8	38	113
Victorgrain						6.5	2	18.3				17	
LSD — 5 percent	5.9	7.4	7.2	11.9									

<sup>1</sup>Severe storms in 1966 destroyed test.

<sup>2</sup>Calculated comparable data based on years grown.

<sup>3</sup>Check varieties used to calculate comparable data.

TABLE 30. ANNUAL, AVERAGE AND COMPARABLE GRAIN YIELD OF SPRING-SOWN OAT VARIETIES GROWN AT DENTON, 1960-68<sup>1</sup>

Variety	Number years tested	Comparable data <sup>2</sup>					Yield of grain, bushels per acre	
		Test weight, pounds per bushel	Date first head	Crown rust, percent	Plant height, inches	Lodging, percent 2 years	Actual average	Comparable average <sup>3</sup>
Frazier <sup>3</sup>	7	31.2	5-1	29	31.0	75	52.9	52.9
New Nortex <sup>3</sup>	7	27.0	5-9	20	27.5	24	49.4	49.4
Average		29.1	5-5	25			51.2	51.2
Alamo	4	28.2	5-5	25	28.8	24	47.1	44.9
Alamo-X	7	26.1	5-5	24	30.5	21	48.0	48.0
Cimarron	5	26.9	5-4	39	30.6	29	46.3	50.3
Clintland 64	4	30.5	5-13	8	33.4		33.9	38.3
Coronado	2	30.6	5-6	4	26.3		65.6	60.8
Cortez	1	30.1	5-3				60.3	61.6
Fulwin	2	27.4	5-6	39	32.8	28	51.4	53.1
Houston	6	28.9	5-4	11	24.8	42	50.1	53.6
Moregrain	6	29.9	5-4	24	27.2	15	51.8	55.3
Mustang	4	26.2	5-7	22	29.4	20	51.1	49.0
Neal	3	25.6	5-8	17	31.3	10	36.4	39.3
Norwin	5	27.6	5-5	29	28.1	40	51.9	53.4
Ora	3	31.6	5-3	1	22.8	40	58.8	61.7
Suregrain	6	30.3	5-5	16	26.6	8	54.6	58.2
Tonka	3	32.0	5-5		30.3	35	40.8	34.9

<sup>1</sup>No data for 1961 or 1968.

<sup>2</sup>Comparable data computed from years grown.

<sup>3</sup>Check varieties used to compute comparable yields.

broad, upright growing leaves. This type can be fall-seeded in South Texas or spring-seeded in Northwest Texas. More complete descriptions of barley varieties may be found in Texas Agricultural Experiment Station Bulletin 1087, "Barley Production in Texas."

RESEARCH AREA I: The High Plains area grows about 20 percent of the State's barley acreage. Both fall and spring seeding is practiced, but usually fall-sown barley produces higher yields and better quality grain than spring-sown barley. Before cold tolerant varieties were available,

TABLE 31. COMPARABLE GRAIN YIELDS AND AGRONOMIC DATA FOR SPRING-SOWN OATS AT CHILLICOTHE, 1958-68

Variety	Yield of grain, bushels per acre		Comparable agronomic data <sup>1</sup>			
	Average for years grown	Comparable <sup>1</sup>	Number years grown	Test weight, pounds	Date headed	Plant height, inches
Frazier <sup>2</sup>	16.2	16.2	10	26.5	4-14	20.6
New Nortex <sup>2</sup>	13.4	13.4	10	24.3	4-21	17.2
Average	14.8	14.8	10	25.4		
Alamo	17.6	12.9	3	24.9	4-16	
Alamo-X	16.4	16.6	9	25.8	4-16	15.8
Cimarron	17.1	17.3	9	27.5	4-15	19.8
Clintland 64	11.6	13.6	5	27.9	4-19	21.4
Coronado	8.4	16.3	3	29.6	4-17	17.4
Cortez	14.3	19.6	2	30.1	4-14	16.4
Florida 500	27.6		1	30.1		
Houston	11.4	13.4	7	27.1		15.4
Moregrain	17.7	17.1	10	29.3	4-15	17.2
Mustang	18.6	16.3	6	26.1	4-16	19.7
Neal	13.9	19.5	3	28.1		
Norwin	16.9	17.6	6	27.9	4-17	20.4
Ora	13.1	13.0	3	27.1	4-18	16.4
Suregrain	13.8	16.7	6	29.1		
Tonka	16.6	15.0	3	31.4		
Victorgrain	13.7	12.3	1			

<sup>1</sup>Calculated comparable data based on years grown.

<sup>2</sup>Check varieties used to compute comparable averages.

TABLE 32. GRAIN YIELDS AND AGRONOMIC DATA FOR SPRING-SOWN, IRRIGATED OAT VARIETIES AT BUSHLAND, 1956-68

Variety	Yield of grain, bushels per acre			Comparable agronomic data <sup>1</sup>		
	Average for years grown	Number years grown	Comparable average <sup>1</sup>	Test weight, pounds	Plant height, inches	Date first head
New Nortex <sup>2</sup>	70.4	7	70.4	31.9	28.0	5-24
Frazier <sup>2</sup>	74.5	7	74.5	32.4	30.6	5-21
Average	72.4	7	72.4	32.1	29.3	
Alamo	73.4	5	77.9	32.0	29.1	5-24
Alamo-X	74.6	6	73.5	30.6	28.4	5-24
Cimarron	82.9	6	77.9	32.7	28.6	5-22
Clintland 64	73.7	2	58.3	35.1	31.5	5-25
Coronado		1		33.7	29.8	
Cortez		1		31.6	29.8	
Florida 500				33.8	26.8	
Houston	76.6	5	69.8	33.8	24.8	5-24
Moregrain	84.7	5	81.9	34.3	27.4	5-22
Mustang	68.8	5	73.4	31.0	29.1	5-22
Neal	102.3	2	80.7	32.4	29.3	5-23
Norwin	89.1	4	83.0	31.7	28.5	5-25
Ora	94.7	2	83.1	34.3	24.8	
Suregrain	81.9	4	79.2	32.5	27.1	5-20
Tonca		1	66.8	36.5	29.8	

<sup>1</sup>Calculated comparable data based on years grown.

<sup>2</sup>Check varieties used to compute comparable averages.

a much greater proportion of the crop was spring-seeded than is now the case. Without irrigation, fall seeding in this area is still somewhat hazardous. Hail, shattering and lodging are other hazards of production in Area I.

Performance trials of irrigated barley have been conducted at Bushland for the full 10-year period, Table 34. Trials for shorter periods were conducted at Etter and Plainview, Table 35. The trials at Bushland were destroyed by hail in 1961 and 1963, and there was considerable damage by low temperatures in 1962 and 1963. Diseases are not usually important in this area. Will barley has produced outstanding yields and is resistant to the greenbug (aphid).

Wade, Zora and Rogers have performed well, but they are less hardy than Will and may be damaged by low temperatures. Chase, Harrison and Hudson are hardy and have performed well. Results at Etter and Plainview were similar to those at Bushland.

RESEARCH AREA II: Approximately 49 percent of the State's barley acreage was grown in this area in 1968. Winters are less severe here than in Area I; both winter and intermediate-winter types can be grown. In the Trans-Pecos, spring-type varieties were seeded in February after the removal of crops of sorghum or cotton. Cordova, Rogers and Will are the most popular commercial varieties.

TABLE 33. ACREAGES AND PRODUCTION OF BARLEY BY EXTENSION DISTRICTS AND RESEARCH AREAS

Extension district	Research testing area	Land use area	Number of acres			Percent of total		
			Seeded	Harvested	Percent harvested	Seeded	Harvested	Production, bushels
1	I	Northern High Plains	38,650	32,150	83	20.1	25.9	820,700
2	I	Southern High Plains	8,990	6,200	69	4.7	6.0	180,500
3	II	Low Rolling Plains	53,450	34,080	65	27.8	28.2	1,046,200
6	II	Trans-Pecos	10,750	6,450	60	5.6	5.2	139,750
7	II	Rolling Plains and Edwards Plateau	28,950	18,760	68	15.1	15.1	453,400
4	III	North Central Blacklands, Prairies and Cross Timbers	16,170	9,600	69	8.4	7.7	282,100
5	III	Northeast Timberlands	0	0				
8	IV	Central Blacklands, Prairies and Cross Timbers	29,430	15,380	54	15.3	12.4	417,050
9	IV	Central Blacklands, Prairies and Timberlands	2,260	200	9	1.4	0.2	
11	IV	Upper Coast and Southeast Timberlands	0					
10	V	South Central Blacklands, Prairies and Coastal Bend	2,750	200	7	1.4	0.2	2,900
12	V	Rio Grande Plain and South Texas	600	300	60	0.2	0.2	3,000
State Total			192,000	124,000	65			3,348,000

TABLE 34. ANNUAL, AVERAGE AND COMPARABLE AVERAGE YIELDS OF IRRIGATED FALL-SOWN BARLEY VARIETIES GROWN AT BUSHLAND, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>2</sup>								
						1962-68		1958-68						
	1962	1964	1966	1967	1968	Average for years grown	Average for years grown	Number years grown	Comparable average <sup>2</sup>	Test weight, pounds per bushel	Date first head	Plant height, inches	Lodging percent	Survival percent
Cordova <sup>3</sup>	44.4	50.6	78.7	57.2	58.4	57.9	62.1	8	62.1	47.3	5-3	33.6	22	53
Rogers <sup>3</sup>	37.9	96.1	88.7	61.6	73.6	71.6	72.9	8	72.9	48.8	5-7	35.3	28	51
Tennessee Winter <sup>3</sup>	37.4	52.8	53.8	42.9	68.9	51.2	52.4	8	52.4	44.6	5-6	32.4	7	72
Average										46.9				
Barsoy				35.9	40.9	38.4	38.4	2	40.4	48.5	4-28	28.1	0	53
Chase		92.9	95.8			94.4	94.4	2	86.7	48.6	5-7	37.1	40	100
Carstens					67.6	67.6	67.6	1	63.1	50.3	4-28	25.8	Tr	
Dicktoo							57.4	1	65.6	45.4	5-3	32.4	29	
Dutchess		93.1					93.1	1	89.1	45.5	5-12	34.8		100
Era		87.5	77.3	63.7	56.8	76.2	76.2	4	68.5	49.4	5-3	36.2	23	56
Harbine	30.5					30.5	44.2	4	47.0	46.2	5-4	33.2	9	41
Harrison		63.4	79.2	75.4	103.5	80.4	80.4	4	77.6	48.9	5-7	33.7	11	56
Hudson	60.0	83.6				71.8	76.2	3	77.6	49.3	5-6	38.8		93
Kearney	41.1	95.0				68.1	66.1	7	67.6	45.7	5-7	35.9	29	100
Meimi	48.3	85.3				66.8	70.3	3	71.7	49.2	5-4	36.3		100
Penrad		53.7				53.7	53.7	1	49.7	38.9	5-9	40.8		
Pueblo							49.6	2	51.1	45.0	5-7	32.4	49	
Tokak			87.6	80.0	59.9	75.8	75.8	3	73.4	47.3	5-8	35.9	58	60
Wade		85.7	106.6	104.3	97.8	98.6	98.6	4	95.8	47.2	5-5	33.6	11	75
Ward							59.8	3	56.1	44.3	5-6	32.4	39	81
Will	47.7	110.4	94.0	83.2	84.7	84.0	84.0	5	86.3	48.9	5-8	36.6	31	100
Wintex	58.3					58.3	67.0	4	69.8	44.6	5-7	33.5	49	60
Zora		80.4	86.7	81.3	81.0	82.4	82.4	4	79.5	47.8	5-2	34.4	11	62
LSD — 5 percent	15.9	13.9	22.3	29.7	19.8									

<sup>1</sup>Destroyed by hail in 1961, 1963 and 1965.<sup>2</sup>Calculated comparable averages based on years grown.<sup>3</sup>Check varieties used in computing comparable averages.



TABLE 35. COMPARABLE YIELDS AND AGRONOMIC DATA FOR IRRIGATED, FALL-SOWN BARLEY VARIETIES GROWN AT ETTER AND PLAINVIEW, 1966-68

Variety	Yield of grain, bushels per acre						Comparable agronomic data <sup>1</sup>			
	Etter			Plainview			Test weight, pounds per bushel		Plant height, inches	Heading date
	Actual average	Number Years grown	Com-parable average <sup>1</sup>	Actual average	Number years grown	Com-parable average <sup>1</sup>	Etter	Plain-view	Plainview	Etter
Barsoy	28.2	1	35.8	31.1	1	51.7	43.8	44.7	22	
Chase	71.0	2	67.3	65.4	1	44.7	49.0	47.4		5-6
Cordova <sup>2</sup>	62.5	3	62.5	62.8	2	62.8	48.0	45.1	28	5-3
Era	70.2	1	65.2				50.3			
Harrison	83.0	1	80.5	57.5	2	57.5	46.3	48.9	27	5-6
Hudson	91.4	1	88.9				47.3			5-7
Rogers <sup>2</sup>	67.8	3	67.8	55.4	2	55.4	46.6	47.4	29	5-7
Tennessee Winter <sup>2</sup>	52.6	3	52.6	43.6	1	43.6	44.7	47.7	23	5-5
Tokak	64.3	2	65.6	51.5	1	72.1	48.4	47.5	30	
Wade	74.6	3	74.6	58.8	1	79.4	46.6	47.3	24	5-4
Will	78.6	3	78.6	67.1	2	67.1	47.3	46.3	30	5-5
Zora	72.5	3	72.5	15.3	1	35.9	45.8	44.1	27	5-1

<sup>1</sup>Calculated comparable data based on years grown.

<sup>2</sup>Check varieties used in computing comparable data.

The majority of the barley is grown without irrigation, except in the Trans-Pecos.

Performance trials were conducted until 1965 under limited irrigation conditions at Iowa Park, Table 36. Era, Will and Rogers produced the best yields. At Chillicothe, Table 37, the performance of Rogers has been outstanding. Zora, Harbine, Cordova, Era and Will also have performed well and are adapted to this area. Barsoy, Harrison and Rogers have averaged highest in test weight and, are also adequately winter hardy for this area.

RESEARCH AREA III: The North Central Texas and Northeast Timberlands areas produced about 11 percent of the State's barley acreage in 1968. Cordova was the variety most extensively grown. Performance data were obtained only at Denton, Table 38. At this location, Barsoy has produced outstanding yields for the last 3 years, and Zora has produced well over a 7-year period. Era, Will, Dayton, Harrison and Rogers also have performed well at this location. Mildew, leaf rust and Helminthosporium leaf spots are frequently important in this area. Harrison and Jefferson showed the lowest rust infection, and several of the varieties are resistant to mildew, but none of the adapted varieties are highly resistant to all the leaf spots, although there are some differences in reaction.

RESEARCH AREA IV: Approximately 13 percent of the State's barley acreage is grown in this area, most of it in Extension District 8. Cold tolerance is less important in this area than the preceding ones. Here disease resistance is more important.

The barley is used extensively for winter forage, and a majority of the acreage is seeded to Cordova or other immediate-type varieties.

Performance trials were conducted at Temple and McGregor. At Temple, Tables 39 and 40, the highest comparable yields were produced by Zora, Cordova and Rogers. At McGregor, Table 40, Zora, Rogers, Era, Will

and Cordova produced the highest comparable yields. Rogers, Zora, Florida 102 and Harrison produced grain with the best test weight. Spring-type varieties were injured by low temperatures in 1962 and 1963, but this type of injury is rather infrequent. The spring-type varieties Peruvian, Cebada Capa and Goliad were rated highest in forage estimates.

RESEARCH AREA V: Only about 6 percent of the State's barley acreage is seeded in this area, and the majority of it is grazed to maturity. Diseases are important in grain production, but low temperatures rarely injure barley. Goliad, Cordova and Rogers are the principal varieties grown commercially.

Performance trials were conducted at College Station and Beeville. At College Station, Table 41, the highest comparable yields, based on only 3 years' tests, were produced by Florida 102 and Grande. Grande also produced good yields. Grown for longer periods, Rogers, Will, Cordova and Goliad have produced about equal yields.

At Beeville, Table 42, Florida 102, Grande and Gainesville I have produced the best grain yields, although most were tested only a short period. These varieties have considerable tolerance to leaf rust and Helminthosporium, important diseases of this area.

## FLAX

Flax is grown as a fall-sown crop only in Research Area V. The distribution of the 1968 acreages is shown in Figure 6. In recent years, the flax acreages have ranged from a low of 17,000 acres in 1957 to 189,000 acres in 1963. However, in 1949, 329,000 acres of flax were grown in Texas. Almost all of the crop was winterkilled in 1962, and about 30 percent was lost in 1963.

Performance trials were conducted for the full period only at College Station and Beeville, Tables 43 and 44.

TABLE 36. ANNUAL, AVERAGE AND COMPARABLE GRAIN YIELDS AND COMPARABLE AGRONOMIC DATA FOR FALL-SOWN BARLEY VARIETIES GROWN AT IOWA PARK, TEXAS, 1956-63

Variety	Yield of grain, bushels per acre								Comparable agronomic data <sup>1</sup>				
	1956	1957	1958	1959	1960	1961	1962	1963	Average for years grown	Comparable average <sup>1</sup>	Test weight, pounds	Date first head	Survival 1963
Cordova <sup>2</sup>	65.5	43.6	39.5	51.8	76.2	39.1	53.3	16.6	48.2	48.2	44.0	4-14	20
Harbine <sup>2</sup>	31.0	46.4	43.8	49.0	84.2	50.4	49.2	45.0	49.9	49.9	45.0	4-18	79
Kearney <sup>2</sup>	73.5	43.3	42.1	51.5	81.2	40.0	55.2	54.7	55.2	55.2	44.4	4-20	93
Tennessee Winter <sup>2</sup>	65.4	32.9	35.0	41.6	69.8	29.1	42.1	44.8	45.1	45.1	42.3	4-18	91
Wintex <sup>2</sup>	75.0	42.0	47.8	47.8	90.8	42.6	51.5	14.4	51.5	51.5	43.3	4-20	24
Average	54.0	41.0	39.4	47.5	76.7	39.5	48.2	35.5					
Chase								44.7	44.7	57.0	44.8	4-15	100
Dicktoo	69.7	33.7	33.0						45.5	48.4	42.1		
Era								60.8	60.8	73.1	44.8	4-12	85
Hudson							50.1	49.3	49.7	55.6	45.1	4-19	97
Meimi						33.1	46.0	34.0	37.7	44.4	45.3	4-17	98
Mo. Early Beardless	27.6	33.7	29.6						30.3	33.2	40.1	4-14	
Pueblo	60.3	42.9	29.0	38.5					42.7	44.9	41.3	4-19	
Rogers	92.8	48.8	48.6	55.0	98.0	56.4	63.7	61.2	65.6	65.6	46.9	4-20	89
Wade								46.0	46.0	58.3	43.8	4-15	91
Ward	66.0	39.0	29.6	34.9	75.5				49.0	45.0	42.7	4-23	
Will							64.0	68.0	66.0	71.9	46.3	4-12	99
LSD — 5 percent	9.8		4.1	7.2	6.7	5.7	9.5	10.8					

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties used in computing comparable data.

TABLE 37. ANNUAL, AVERAGE AND COMPARABLE AVERAGE YIELDS OF FALL-SOWN BARLEY VARIETIES GROWN AT CHILLICOTHE, 1959-68

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>1</sup>										
	1964	1965	1966	1967	1968	1964-68		1959-68			Test weight pounds per bushel	Date first head	Plant height, inches	Visual forage estimate, 3 tests	Lodged, percent 2 tests	Survival, percent 1963
						Average for years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>							
Cordova <sup>2</sup>	16.4	22.2	12.8	31.7	57.6	28.1	25.2	10	25.2	43.8	4-28	22.2	117	13	86	
Rogers <sup>2</sup>	16.1	20.2	14.2	46.2	55.3	30.4	28.3	10	28.3	46.1	4-29	22.6	107	9	88	
Tennessee Winter <sup>2</sup>	6.3	12.5	8.2	28.7	31.5	17.4	16.8	10	16.8	39.7	4-28	21.4	100	30	84	
Average	11.3	18.3	11.7	35.5	48.1	25.3	23.4			43.2	4-28	22.1	108	17	86	
Barsoy				36.1	33.1	34.6	34.6	2	16.0	47.1	4-20	16.4		10		
Chase	8.7	13.6	4.4			8.9	9.9	4	19.1	42.4	4-30	19.8			99	
Dutchess	1.0						1.0	1	12.9		5-10	15.4				
Era	17.0	19.7	9.9	32.7	46.3	25.1	24.8	6	24.7	42.5	4-25	23.2		20	86	
Harbine	16.3	20.9	13.4	41.6	37.9	26.0	25.9	10	25.9	43.9	4-27	21.7	110	40	95	
Harrison	15.1	16.6	8.6	29.0	46.5	23.2	23.2	5	21.4	46.4	5-2	20.1		Tr		
Hudson	11.7	7.2				9.5	8.5	4	17.3	43.8	5-6	20.7		16	85	
Kearney	8.3					8.3	17.3	6	20.7	44.0	4-30	22.5	103		91	
Meimi	9.9					9.9	11.2	4	17.4	41.6	4-28	22.6	119		95	
Penrad	15.4					15.4	15.4	1	27.4	41.8	5-7	21.4				
Pueblo							5.3	1	18.4		5-1	22.4	98			
Tokak			14.2	34.4	46.5	31.7	31.7	3	23.2	44.3	5-5	21.6		50		
Wade	12.3	12.5				12.4	13.6	3	22.0	43.7	4-30	15.4			85	
Ward							16.7	2	14.6	42.4	4-30	20.4	89	16		
Will	20.6	19.3	10.9	35.6	44.7	26.2	23.6	7	25.0	43.9	4-28	21.9		13	99	
Wintex							12.7	5	14.4	41.1	5-2	21.5	100	26	96	
Zora	19.6	24.5	15.3	32.0	54.1	29.1	27.2	6	27.2	42.9	4-26	20.9		1	88	
LSD — 5 percent	3.8	2.3	NS	4.4												

<sup>1</sup>Calculated comparable average based on years grown.

<sup>2</sup>Check varieties used in computing comparable yields.

TABLE 38. ANNUAL, AVERAGE AND COMPARABLE AVERAGE YIELDS OF FALL-SOWN BARLEY VARIETIES GROWN AT DENTON, 1959-68

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>1</sup>									
	1964	1965	1966	1967	1968	1964-68		1959-68		Test weight, pounds per bushel	Date first head	Plant height, inches	Percent survival 2 years	Leaf rust, percent	Lodging, percent
						Average for years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>						
Cordova <sup>2</sup>	48.5	49.6	47.9	49.4	62.1	51.5	46.9	10	46.9	43.7	4-14	31.5	61	28	9
Rogers <sup>2</sup>	34.6	46.5	36.8	53.7	53.3	45.0	48.5	10	48.5	45.0	4-19	33.6	85	16	30
Tennessee Winter <sup>2</sup>	40.9	39.5	42.0	37.0	46.8	41.3	37.2	10	37.2	42.5	4-17	29.5	66	21	16
Average	41.3	45.2	42.2	46.8	54.1	45.9	44.2								
Barsoy			70.1	51.6	66.7	62.8	62.8	3	59.3	45.8	4-17	33.0		37	10
Carstens					44.6		44.6	1	34.7	46.1	4-19	27.2		34	25
Chase	42.1	40.1				41.1	30.9	3	41.7	43.1	4-15	31.4	100	38	
Colonial 2	38.6	50.6	56.8	40.2	54.2	48.1	46.3	10	46.3	37.8	4-19	27.6		15	16
Davie	45.2					45.2	36.2	6	38.1	41.6	4-18	27.1		13	
Dayton	55.9	56.7	45.5	47.8	59.6	53.1	49.0	10	49.0	43.5	4-13	32.0	82	25	11
Early Maconee	38.4					38.4	38.0	4	41.9	40.8	4-14	32.3		29	
Era	63.2	53.1	47.0	45.2	58.9	53.5	50.8	6	52.5	44.4	4-12	32.6	97	28	18
Ga-Jet	33.2					33.2	36.3	5	37.8	39.2	4-13	27.2		25	
Harbine							38.6	2	36.6	44.6	4-19	32.5		13	8
Harrison	46.4	53.6	55.7	34.9	57.7	49.7	49.7	5	47.9	46.7	4-19	30.6		7	
Hudson	34.7	42.6				38.7	39.4	5	38.6	43.1	4-21	32.4		23	
Jefferson				29.6	45.3	37.5	37.5	2	31.2	44.6	4-21	29.2		7	5
Kearney							30.9	2	28.9	40.8	4-21	30.0		20	
Kenbar	42.5					42.5	43.8	6	45.7	44.1	4-15	32.7	90	21	20
Kenate							41.1	3	39.1	43.3	4-21	29.8		23	
Marconee							33.1	5	34.8	38.3	4-17	31.6		16	10
Miller					50.9		50.9	1	41.0		4-13	30.2			
Oma							44.2	2	43.7	44.3	4-16	33.5		19	
Pace							46.2	3	44.2	42.9	4-16	31.5		26	
Penrad	38.1	37.2				37.7	37.7	2	38.6	42.9	4-21	32.7			
Texan							43.6	2	41.7	43.8	4-14	31.0		17	
Tokak				42.3	38.5	40.4	40.4	2	34.2	40.6	4-19	31.7		57	60
Wade	26.6	49.8				38.2	42.3	4	46.4	38.7	4-17	26.2	84	21	7
Will	36.3	54.7	56.9	54.1	47.7	49.9	51.1	8	51.6	44.8	4-17	33.6	82	29	28
Wintex							29.8	5	31.6	42.2	4-21	29.8	63	23	
Wong	31.2	33.9	33.8	31.0	37.9	33.6	31.7	10	31.7	39.7	4-18	33.9		30	12
Zora	53.0	54.9	65.0	55.9	58.3	57.4	55.0	7	55.8	44.5	4-13	32.8		14	20
LSD — 5 percent	10.8	7.6	12.6	7.4	10.2										

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties used in calculating comparable data.

TABLE 39. ANNUAL, AVERAGE AND COMPARABLE AVERAGE YIELDS OF FALL-SOWN BARLEY VARIETIES AT TEMPLE, 1959-68

Variety	Yield of grain, bushels per acre					Comparable agronomic data <sup>1</sup>							
	1964	1965	1966	1967	1968	1964-68	1959-68			Test weight, pounds bushel	Date first head	Plant height, inches	Forage estimate, percent
						Average for years grown	Average for years grown	Number years grown	Comparable average <sup>1</sup>				
Tennessee Winter <sup>2</sup>	43.9	30.9	25.6	12.0	21.5	26.8	25.6	10	25.6	44.0	4-11	25.0	99
Cordova <sup>2</sup>	57.6	42.9	47.3	17.6	38.4	40.8	36.5	10	36.5	45.6	4-7	28.1	100
Rogers <sup>1</sup>	55.7	41.2	34.2	23.6	25.2	36.0	35.9	10	35.9	48.8	4-13	29.9	101
Average	52.4	38.3	35.7	17.7	28.4	34.5	32.7		32.7	46.1			
Cebada Capa							13.1	3	17.3	43.1	4-11	28.2	116
Chase	41.4	33.6				37.5	37.5	2	24.8	45.6	4-5	29.1	
Era	57.0	36.1	30.6	11.4	21.4	31.3	31.0	6	30.4	45.0	4-8	28.9	105
Florida 102					24.5	24.5	24.5	1	28.8	46.1	3-22	30.2	124
Forrajera 8158	58.1	42.8	36.2			45.8	40.4	4	34.8	46.7	4-15	29.7	105
Goliad	42.8					42.8	35.9	4	29.9	46.3	4-8	30.8	94
Harbine							28.4	2	26.7	44.6	4-14	27.7	102
Harrison	50.8	46.0	31.0	17.4		36.2	36.2	4	32.9	50.5	4-16	25.2	
Mo. E. Beardless							22.2	1	24.1	39.8	4-10	30.8	102
Kenbar							29.2	2	28.1	47.5	4-13	28.7	82
Kenate							29.1	1	31.0	46.8	4-16	30.8	82
Pace	47.6					47.6	30.4	4	29.1	44.1	4-7	27.1	102
Penrad	45.1						45.1	1	25.4	44.1	4-16	33.0	
Peruvian							18.0	2	21.4	43.1	3-30	30.2	114
Texan							34.5	2	32.7	45.5	4-11	27.7	102
Wade	48.2						48.2	2	29.3	45.5	4-10	25.2	102
Will	55.4	43.6	36.5	12.7	14.6	32.6	31.2	7	31.8	46.8	4-13	29.3	97
Zora	62.7	44.1	52.1	29.8	24.4	42.6	41.6	6	41.0	47.8	4-5	28.6	101
LSD — 5 percent	8.6	4.9	7.6	7.4									

<sup>1</sup>Calculated comparable average based on years grown.

<sup>2</sup>Check varieties used in computing comparable averages.

TABLE 40. ANNUAL, AVERAGE AND COMPARABLE AVERAGES YIELDS OF BARLEY VARIETIES GROWN AT MCGREGOR, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre									Comparable agronomic data <sup>2</sup>				
						1963-68		1958-68		Test weight, pounds per bushel	Date first head	Plant height, inches	Winter survival 1963 percent	Forage estimate, percent of Cordova
	1963	1964	1966	1967	1968	Average for years grown	Average for years grown	Number years grown	Comparable average <sup>2</sup>					
Cordova <sup>3</sup>	31.4	54.6	53.4	13.1	34.1	37.3	42.3	10	42.3	47.5	4-11	27.8	90	100
Rogers <sup>3</sup>	35.4	55.4	41.2	24.4	18.9	35.1	43.3	10	43.3	48.6	4-16	30.0	100	80
Tennessee Winter <sup>3</sup>	17.5	38.0	34.8	14.6	34.3	27.8	30.8	10	30.8	44.3	4-15	27.4	95	77
Average	28.1	49.3	43.1	17.4	29.1					46.8	4-14			
Chase		40.0				40.0	40.0	1	29.5	45.8	4-12	29.1		91
Cebada Capa	0					0.0	14.4	3	15.2	45.8	4-7	28.7	0	111
Era	28.2	52.4	53.2	17.4	35.1	37.2	37.3	5	42.6	44.7	4-9	29.3	85	89
Florida 102					46.2	46.2	46.2	1		48.1	4-9	31.4		
Forrajera 8158	26.8	53.2				40.0	40.0	2	40.1	47.1	4-20	29.1		
Goliad		43.9				43.9	42.3	5	37.4	44.6	4-5	30.5		110
Harbine							30.7	3	24.4	44.5	4-17	26.3		72
Harrison		44.3	27.3	13.2		28.3	28.3	3	30.5	47.8	4-13	26.9		84
Kenbar							46.9	3	40.7	45.8	4-15	28.6		69
Kenate							48.7	2	37.4	46.5	4-18	30.3		69
Mo. Early Beardless							26.8	2	15.5	41.0	4-11	32.3		79
Pace	25.9	50.2				38.1	39.6	5	37.6	44.7	4-6	27.8	80	93
Penrad		47.6				47.6	47.6	1	37.1	43.8	4-17	29.1		89
Peruvian							41.6	1	46.3	43.8	3-28	28.7		116
Texan							43.3	3	37.1	47.1	4-11	27.6		106
Wade	26.7					26.7	26.7	1	38.4	45.5	4-16	24.1	95	
Will	39.3	49.9	45.7	22.0	22.0	35.8	40.0	6	42.3	46.6	4-14	29.3	100	84
Zora	38.3	69.1	53.4	19.0	37.4	43.4	43.4	5	44.6	48.4	4-9	30.1	100	92
LSD — 5 percent	4.6	7.4	8.7	4.2										

<sup>1</sup>No data for 1965 because of storms.<sup>2</sup>Calculated comparable data based on years grown.<sup>3</sup>Check varieties used in computing averages.

TABLE 41. ANNUAL, MEAN AND COMPARABLE MEAN YIELDS OF BARLEY VARIETIES GROWN AT COLLEGE STATION, 1958-68

Variety	Yield of grain, bushels per acre										Comparable agronomic data <sup>1</sup>			
						1964-68		1958-68			Test weight, pounds per bushel	Date first head	Plant height, inches	Leaf rust, percent
	1964	1965	1966	1967	1968	Average for years grown	Average for years grown	Number years	Comparable average <sup>1</sup>					
Cordova <sup>2</sup>	56.4	27.4	16.1	17.9	27.2	29.0	29.4	10	29.4	43.7	3-31	28.1	27	
Goliad <sup>2</sup>	55.3	10.2	22.6	19.0	21.6	25.7	29.0	10	29.0	43.8	3-21	31.6	13	
Rogers <sup>2</sup>	33.2	19.4	9.8	4.9	30.9	19.6	31.7	10	31.7	44.9	4-6	30.6	17	
Average	48.3	19.0	16.2	13.9	29.2	24.8			30.0	44.1				
Arivat	58.5	6.4	25.9			30.3	27.1	7	26.5	42.6	3-13	26.3	38	
Calhoun							27.4	2	16.3	38.8	4-3	30.4	54	
Cebada Capa	6.0					6.0	19.4	4	14.8	38.4	4-15	29.8	0	
Colonial 2	60.5					60.5	34.8	6	28.0	40.9	4-5	27.0	16	
Davie	46.1					46.1	32.6	6	25.6	42.0	4-2	27.7	10	
Dayton	60.4					60.4	38.5	6	31.5	42.4	3-31	29.7	44	
Dickson			25.2	2.5		13.9	13.9	2	28.8	46.1	3-5	25.1	0	
Early Marconee	58.6					58.6	38.3	3	33.1	40.5	3-29	30.2	22	
Era	56.6			6.3	25.0	29.3	29.3	3	28.8	40.4	4-3	27.2	32	
Florida 102			24.8	22.8	44.0	30.5	30.5	3	40.8	44.3	3-9	33.0	26	
Ga-Jet	59.2					59.2	28.8	4	23.9	38.4	3-25	25.9	22	
Grande		18.0	25.8	25.1		23.0	23.0	3	36.6	46.1	3-12	30.2	60	
Harbine							36.6	2	25.5	43.8	4-8	29.4	3	
Harrison	60.6	18.1	8.8	3.0		22.6	22.6	4	28.3	45.8	4-14	26.5	18	
Hudson							23.4	3	14.6	43.9	4-3	28.2	23	
Kenbar	62.0					62.0	43.0	6	36.0	43.7	4-2	29.9	24	
Kenate							28.7	3	19.9	44.2	4-4	28.5	46	
Marconee							24.8	5	20.1	35.6	3-30	29.3	40	
Oma							35.4	3	26.6	43.1	3-28	28.3	18	
Pace	53.8					53.8	35.4	6	27.5	42.5	3-24	27.5	14	
Tennessee Winter			9.9	2.1		6.0	6.0	2	21.0	35.1	4-8	29.6	46	
Wade	39.4					39.4	28.4	3	23.3	42.2	4-2	26.9	14	
Will	50.4	15.1	13.0	2.7		20.3	26.9	6	31.2	41.7	4-6	31.8	25	
Zora	65.6	20.4	15.4	20.9	20.1	28.5	31.4	7	35.2	44.2	3-30	30.3	18	
LSD — 5 percent	9.2	6.1	7.5	5.6										

<sup>1</sup>Calculated comparable data based on years grown.<sup>2</sup>Check varieties grown for full period.

TABLE 42. ANNUAL, MEAN AND COMPARABLE YIELDS OF BARLEY VARIETIES GROWN AT BEEVILLE, 1958-68

Variety	Yield of grain, bushels per acre								Comparable agronomic data <sup>2</sup>			
	1963	1964	1965	1967	1963-68 <sup>1</sup>		1958-68		Test weight Pounds per bushel	Date first head	Plant height, inches	Leaf rust, percent
					Average for years grown	Average for years grown	Number years	Com- parable yields <sup>2</sup>				
Cordova <sup>3</sup>	20.3	37.4	7.7	14.1	19.9	15.2	9	15.2	40.8	3-31	24.9	46
Goliad <sup>3</sup>	22.2	33.5	14.6	24.2	23.6	22.8	9	22.8	41.9	3-19	28.4	14
Average	21.3	35.4	11.2	19.1	21.8	19.0		19.0	41.4	3-25	26.6	30
Arivat	27.1	46.6	20.0		31.2	23.6	6	24.8	39.1	3-9	23.8	51
Dickson				27.5	27.5	27.5	1	27.4	43.8	3-16	24.1	
Florida 102				36.5	36.5	36.5	1	36.4	38.8	3-21	27.1	
Grande			30.2	32.1	31.2	31.2	2	35.0	40.8	3-20	25.1	43
Gainesville I				36.4	36.4	36.4	1	36.3	39.8	3-19	25.1	
Harbine					10.0	10.0	1	11.0	35.8	4-12	17.1	30
Harrison		31.6			31.6	31.6	1	15.2	43.8		17.4	30
Kenbar						17.4	2	11.7	38.3	4-4	22.4	58
Oma						13.4	1	18.4	47.8	3-28	31.1	38
Pace	32.1	49.4			40.8	23.7	5	24.5	42.3	3-24	27.2	39
Ricardo	13.1				13.1	12.1	3	17.1	41.0	3-30	29.8	4
Rogers	20.0	42.0	0.7	10.3	18.3	14.3	9	14.3	41.7	4-6	27.0	56
Will		33.0	0.6	10.2	14.6	14.6	3	11.7	40.8	4-6	22.9	50
Zora			5.0	24.9	15.0	15.0	2	18.8	41.8	3-29	23.1	

<sup>1</sup>Actual average for years grown, no data for 1968.

<sup>2</sup>Calculated average based on years grown.

<sup>3</sup>Check varieties used in calculating comparable data.



Tests at Temple were conducted in 1958, 1959 and 1968, Table 45. Data for 1968 only were obtained at Robstown. Agronomic data for College Station and Beeville are given in Table 46.

Seedling disease and other factors caused poor stands in several seasons. Cold tolerance is more important at Temple and College Station than at the other locations. The most consistent high yields at these locations were produced by the winter-type varieties Mac, Dillman and Caldwell. These are the only ones that should be seeded in the southern Blacklands from San Antonio to Waco. Although comparable yields of Linda, Arny, Nored, Viking and Norland were higher than the winter-type varieties, they were tested in only a few seasons where winterkilling did not occur. DeOro, a popular commercial variety, was winterkilled at College Station in both 1962 and 1963.

At Beeville, the highest comparable yields were produced by spring-type varieties grown for short periods. These included Dunes, Norland, Norstar, Nored and Linda. Among varieties grown for the full period, the best yields were made by DeOro, B5128, Mac, Caldwell and Dillman, but differences among these were small and probably nonsignificant. DeOro was seriously damaged by flax rust in 1966 and 1969, so growers are cautioned of this hazard.

Test weight differences among varieties were generally small. On the sandy soils at College Station, flax bloomed 10 to 15 days earlier than at Beeville. There

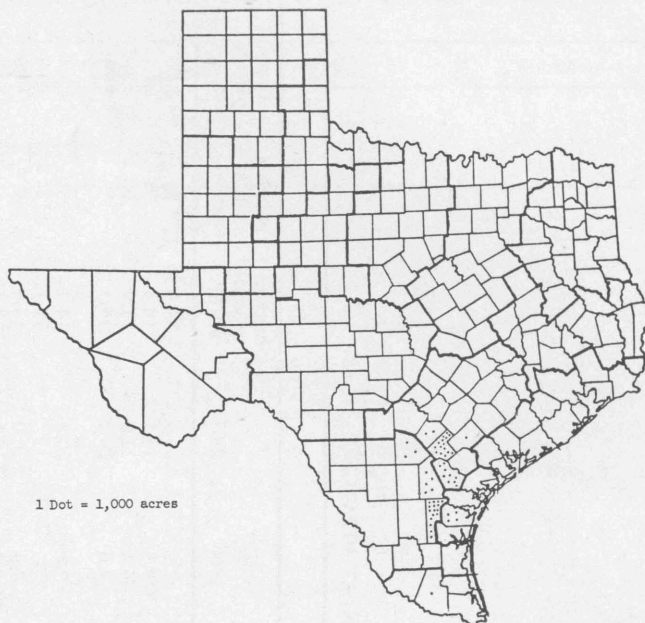


Figure 6. Distribution of 1968 Texas seeded acreage of flax.

were rather wide differences in blooming dates among both winter and spring types. Very early northern varieties, such as Arny, Windom and Bolley may be damaged by spring freezes. The new winter hardy varieties Mac, Dillman and Caldwell are shorter than most commercial

TABLE 43. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF FALL-SOWN FLAX VARIETIES GROWN AT COLLEGE STATION, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre									Average for years grown	Number years grown	Comparable average <sup>2</sup>
	1958	1959	1961	1962	1963	1964	1966	1967	1968			
B5128 <sup>3</sup>	19.9	22.9	29.9	23.4	9.1	13.2	12.5	19.2		18.8	8	18.8
Caldwell <sup>3</sup>	20.2	20.4	30.0	22.2	13.8	16.1	13.0	19.6		19.4	8	19.4
Rio <sup>3</sup>	20.7	19.6	26.0	20.7	7.6	13.8	13.4	19.8		17.7	8	17.7
Average	20.3	21.0	28.6	22.1	10.2	14.4	13.0	19.5		18.6	8	18.6
Arny	22.0	18.7								20.4	2	18.4
Bolley	21.4	15.5								18.5	2	16.5
Bonney Doon	16.5									16.5	1	15.6
Caldwell 32							10.5	21.7		16.1	2	18.5
Cree					1.1	15.4				8.3	2	14.6
DeOro	17.9	24.3	27.6	0	0.8	12.5	8.3	17.9		15.8	9	13.8
Dillman	20.7	22.6	31.4	21.4	18.0	11.4	14.7	20.4		20.1	9	20.1
Dunes								20.3		20.3	1	19.4
Kameniza								14.4		14.4	1	13.5
Linda	22.6	21.6	28.5							24.2	3	19.6
Linore								14.0		14.0	4	18.4
Mac	21.1	25.3	27.7	21.5	14.0	15.7	11.5	20.9		19.7	9	19.7
Marine	16.2									16.2	1	14.6
Newturk	10.8	15.3	29.1	23.0	14.6	10.8	12.9	18.1		16.8	9	16.8
Noralta							9.0			9.0	1	14.7
Norland	21.2	20.5								20.9	2	18.9
Nored								21.4		21.4	1	20.5
Norstar							6.3	23.5		19.4	2	17.3
Redwood	22.2	22.3	26.6	21.1	5.3	13.3	7.3	19.0		17.1	9	17.1
Viking	18.5	20.9	25.4							21.6	3	16.9
Windom				0	0		4.4	18.1		5.6	4	8.1
LSD — 5 percent		4.7	4.8		3.8	2.4	5.1	NS				

<sup>1</sup>No data for 1960, 1965 and 1968 because of poor stands, seedling disease, etc.

<sup>2</sup>Comparable average based on years grown.

<sup>3</sup>Check varieties used to compute comparable averages.

TABLE 44. ANNUAL, AVERAGE AND COMPARABLE YIELDS OF FALL-SOWN FLAX VARIETIES GROWN AT BEEVILLE, 1958-68<sup>1</sup>

Variety	Yield of grain, bushels per acre										Average for years grown	Number years grown	Comparable average <sup>2</sup>
	1958	1959	1960	1961	1963	1964	1965	1966	1967	1968			
B5128 <sup>3</sup>	17.3	18.7	11.6	20.8	5.7	16.8	13.5	7.2	20.0	14.6	9	14.6	
Caldwell <sup>3</sup>	16.2	20.5	10.9	22.0	6.3	15.6	10.1	9.3	18.5	14.4	9	14.4	
Rio <sup>3</sup>	17.4	15.9	10.6	18.5	6.4	16.3	11.2	6.4	22.0	13.9	9	13.9	
Average	17.0	18.4	11.0	20.4	6.1	16.2	11.6	7.6	20.2	14.3	9	14.3	
Army	14.8	15.1	9.0										
Caldwell 32							11.4	9.8	20.8	14.0	3	15.2	
Cree					7.1	16.2				11.7	2	14.8	
DeOro	14.2	21.6	11.6	21.3	5.5	19.3	12.1	7.4	20.0	14.8	9	14.8	
Dillman	15.8	21.3	9.9	18.8	5.7	17.8	12.7	8.0	19.5	14.4		14.4	
Dunes									21.5	21.5	1	15.6	
Kameniza									12.0	12.0	1	6.1	
Linda	13.0	18.9	10.7	19.1						15.4	4	13.0	
Linore					7.2	16.0	11.0	7.2	15.5	11.4	5	13.3	
Mac	17.2	18.3	11.9	21.6	8.0	17.6	10.8	4.5	20.8	14.5	9	14.5	
Marine	13.2									13.2	1	10.5	
Newturk	17.0	14.1	12.0	18.5	5.7	12.1	10.4	7.0	22.1	13.2	9	13.2	
Noralta							11.6	6.2		8.9	2	13.6	
Norland	15.3	17.5								16.4	2	13.0	
Nored								8.3	22.6	15.5	2	15.8	
Norstar								9.7	21.4	15.6	2	15.9	
Redwood	16.6	23.5	9.8	19.9	4.8	18.4	11.5	7.9	16.2	14.3	9	14.3	
Windom					0		11.8	6.7	17.3	9.0	4	11.9	
LSD — 5 percent		4.2	1.6	NS	1.8	3.3	2.3	2.1	NS				

<sup>1</sup>Test winterkilled in 1962. Poor stands in 1968.

<sup>2</sup>Comparable average computed from years grown.

<sup>3</sup>Check varieties used to calculate comparable data.

TABLE 45. ANNUAL AND AVERAGE YIELDS AND AGRONOMIC DATA FOR FALL-SOWN FLAX AT TEMPLE AND ROBSTOWN, 1958-68

Variety	Temple					Robstown
	Yield of grain, bushels			Test weight, pounds 1968	Winter injury 1968 <sup>1</sup>	Grain yield, bushels
	1958	1959	1968			
Arny	13.4	7.2				
B5128	16.3	10.7	12.0	55.9	2.0	9.2
Bolley	8.9	0				
Bonny Doon			10.5	56.5	3.2	10.7
Caldwell	15.2	9.8				
Caldwell 32			11.8	56.7	1.8	9.3
DeOro	13.0	8.7	12.1	54.6	3.5	9.6
Dillman	17.0	11.9	14.3	55.4	1.7	7.6
Dunes			8.2	55.8	4.0	10.1
Kamaniza			11.2	55.8	3.5	11.0
Linda	13.6	8.9				
Linnott			11.1	55.0	2.5	10.1
Linore			10.6	56.1	1.0	6.3
Mac	18.2	10.2	15.1	54.5	1.5	8.1
Newturk	17.4	10.4	11.7	56.2	1.2	8.7
Noralta			12.2	56.2	2.3	8.2
Nored			12.5	56.5	3.3	11.3
Norland	19.3	9.1				
Norstar			9.1	55.4	2.8	9.0
Redwood	11.4	7.2	11.2	56.0	2.7	8.7
Rio	14.2	8.2	10.4	56.1	2.0	8.9
Viking	14.6	11.6				
Windom			8.0	56.0	3.8	8.3

<sup>1</sup>Rated one to five with five plants killed.

TABLE 46. COMPARABLE AGRONOMIC DATA FOR FALL-SOWN FLAX VARIETIES AT COLLEGE STATION AND BEEVILLE, 1958-68<sup>1</sup>

Variety	Test weight, pounds per bushel		Date first bloom		College Station		Beeville		Percent survival 1962 and 1963		Pasmo score <sup>2</sup>	Percent oil	Iodine value <sup>4</sup>
	College Station	Beeville	College Station	Beeville	College Station	Beeville	College Station	Beeville	College Station	Beeville			
	B5128 <sup>2</sup>	53.4	52.5	3-10	3-27	27.3	25.6	55	66	2.0			38.3
Caldwell <sup>2</sup>	53.9	53.6	3-13	3-27	26.0	21.6	78	86	2.2			36.5	169
Rio <sup>2</sup>	53.8	52.4	2-27	3-21	26.8	23.6	53	79	1.8			38.1	172
Average	53.7	52.8			26.7	23.6							
Arny	54.6	51.2	3-1	3-21	25.0	24.8							
Bolley	53.6	51.8	2-12	3-17	24.0	20.6							
Bonney Doone	53.2	51.7	3-2	3-19	25.7	24.6			4.7				
Caldwell 32	53.7	52.0	3-12	3-26		21.1			2.8		36.4		167
Cree	55.6	52.5		3-17	27.0	25.0		80					
DeOro	53.3	52.3	3-7	3-22	27.0	24.4	2	61	4.0		38.3		177
Dillman	53.9	52.6	3-6	3-22	21.8	20.4	91	84	2.7		37.8		176
Dunes	53.7	51.7	3-1	3-15	20.7	18.6			6.0		41.9		169
Kameniza	52.2	51.7	3-1	3-14	23.7	23.6			6.3		36.7		172
Linda	52.8	51.8	2-26	3-19	26.2	24.2							
Linore	52.0	50.8	3-7	3-23	25.8	20.6	86	83	2.3		36.4		168
Mac	53.7	51.3	3-5	3-22	22.3	20.9	83	86	3.7		37.5		176
Marine	53.7												
Newturk	53.3	53.3	3-14	3-31	25.8	21.5	87	85	2.3		40.0		168
Noralta	52.7	49.5	2-28	3-18		23.3							
Norland	53.1	53.3	3-13	4-2	29.0	29.6							
Nored	54.2	50.3	3-3	3-21	22.7	24.9			2.3		39.3		179
Norstar	53.7	51.1	3-3	3-18	24.7	26.0			3.3		38.5		173
Redwood	54.3	53.0	2-26	3-19	24.3	23.1	6	70	1.7		37.9		177
Viking	53.0	51.6	3-4	3-24	27.2	25.0							
Windom	51.9	50.1	3-3	3-17	26.7	23.1	0	30	2.0		37.8		178

<sup>1</sup>Comparable data based on years grown.

<sup>2</sup>Check varieties used to compute comparable data.

<sup>3</sup>Rated one to 10 with 10 high infection and damage.

<sup>4</sup>Average of College Station and Beeville for 1967.

varieties and sometimes criticized for being too short to harvest easily. The winter-type varieties were more cold tolerant than spring-type varieties. B5128 and Rio have more cold tolerance than most other spring varieties. The seed of Dunes and Newturk were the highest in oil content while Caldwell and Linore were among the lowest in oil.

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