UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINSTRATION

Bureau of Plant Industry,
Soils, and Agricultural Engineering

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1951

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By

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Division of Cereal Crops and Diseases

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Contents

1/ The writer expresses appreciation to Dorothy M. Wilson, Agent, Virgil A. Johnson, Charles Pulham, and Geo. F. Worker, Jr. for their assistance in preparing this report.

EXPERIMENTS IN 1951

The third decade of the coordinated regional hard red winter wheat improvement program was begun in 1951. A brief look backward reveals that the varietal pattern has changed completely in the area during this time. Turkey, once universally grown, is now a minor variety in most states. Varieties of promise in the early years of this program have risen to great prominence but have given place to even more satisfactory varieties in late years. Thus the shift from Turkey to Kanred, Blackhull, Tenmarq, and Minturki meant much to the wheat industry, but even greater impact was felt when, more recently, Yogo, Minter, Iohardi, Nebred, Cheyenne, Wasatch, Pawnee, Comanche, Wichita, Westar, and Triumph received extensive culture in their respective areas of adaptation. Now Kiowa, Apache, Ponca, and Quanah are becoming established on farms where their special qualities will make them more suitable than some varieties previously grown. With so many varieties available it would seem that a grower should be able to choose exactly what he wants and needs. Unfortunately that is not the case because no one choice will assure him of the perfect wheat. Much basic research and breeding lie ahead if mosaic, stem and leaf rust, greenbugs, etc. are to be controlled through breeding, agronomic practice, or any type of chemotherapy.

In an effort to make a fresh appraisal of these and other research problems, the Hard Red Winter Wheat Advisory Committee was called into session at Dodge City, Kansas, September 26-28. Representatives from six states and the U. S. Department of Agriculturewere present and other states through correspondence made their situations clear. The committee resurveyed accomplishments, reviewed the problems new and old that now confront the growers and processors of hard winter wheat, and restated the investigational work that will be required to meet the problems. Funds needed to provide facilities and personnel to carry on an adequate research program were estimated. It was agreed that such an accelerated program would encompass three times as much work as at present with greater emphasis on breeding, plant pathology, ecological physiology, entomology, agronomic studies, quality, and extension service work. An expanded program as outlined would cost $1,500,000 annually at present values, but this amount is only .16 of one percent of the annual value of the crop. The cost of winter wheat research in this region is currently about $500,000. The 1947 research booklet is being revised to incorporate the full statement of current needs.

Experiments in 1951 completed on the various uniform tests are reported in this volume. The many fundamental studies being conducted by the various workers on breeding and genetics, diseases, insects, physiology, etc. are outside the scope of this summary. This report differs only slightly from those which have preceded it. Long-time yield averages and relative yields have not been included although 2-year averages are given wherever possible. This change is of a temporary nature made to release time for other, more pressing work. The full report style is anticipated for 1952. More space has been given to the winter-hardiness studies than in previous years.

The experiments reported here are the work of numerous individuals scattered over a dozen states. Adequate appreciation of their work cannot be indicated in a few words but those persons listed below deserve special acknowledgment. No doubt important omissions have been made. This is regretted and any such circumstance should be called to the attention of the writer.

COOPERATING AGENCIES, STATIONS, AND PERSONNEL
(The asterisk (*) indicates Government field stations)

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING:		
Division of Cereal Crops and Diseases		K. S. Quisenberry
Wheat Investigations		S. C. Salmon
Hard Red Winter Wheat Coordinator		L. P. Reitz
Rust, Smut, Mosaic		C. O. Johnston, H.A.Rodenhiser, H. Fellows
Milling and Baking		J. A. Shellenberger, Karl Finney
TEXAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Corn and Small Grains)		J. E. Adams
College Station	Agricultural Exp. Station	E. S. McFadden
Denton	Substation No. 6	I. M. Atkins (State Leader)
Chillicothe	Substation No. 12	J. R. Quinby
Bushland	Amarillo Experiment Station	K. B. Porter
NEW MEXICO AGRICULTURAL EXPERIMENT STATION:		
Clovis	Agr. Exp. Station	R. W. Livers
OKLAHOMA AGRICULTURAL EXPERIMENT STATION:		
Field Crops and Soils		H. F. Murphy
Stillwater	A. & M. College	A.M. Schlehuber (State leader), T. H. Johnston, H. C. Young
Cherokee	Wheatland Conservation Sta.	A. A. Garrett
*Woodard	Southern Great Plains Sta.2/	R. Hunter
Goodwell	Panhandle Agr. Exp. Sta.	Raymond Peck
KANSAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy		H. E. Myers
Manhattan	Kansas State College	H. H. Laude, E. G. Heyne, John Schmidt, D.E.Weibel, R.H.Painter, E. D. Hansing
Hays	Ft. Hays Branch Exp. Sta.	A. F. Swanson, A. J. Casady, Wm. Ross
Colby	Colby Branch Station	E. H. Coles, Ted Walters
Garden City	Garden City Agr. Exp. Sta.	A. E. Lowe, A. B. Erhart
COLORADO AGRICULTURAL EXPERIMENT STATION:		
Agronomy		D. W. Robertson
*Akron	U.S. Dry Land Field Sta.2/	J. F. Brandon, T. E. Haus
Fort Collins	State Agricultural College	R. E. Haus
Hesperus	Fort Lewis Substation	D. W. Koonce
IOWA AGRICULTURAL EXPERIMENT STATION:		
Ames	Iowa State College	R. E. Atkins
NEBRASKA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		F. D. Keim
Crops Research		R. A. Kiesselbach
Lincoln	Agricultural Exp. Sta.	L. P. Reitz, V. A. Johnson
North Platte	North Platte Substation	M. Greenwood
Alliance	Box Butte Exp. Farm	L. P. Reitz, Jack Davidson

WYOMING AGRICULTURAL EXPERIMENT STATION:

Agronomy		A. F. Vass
Laramie	Agr. Experiment Station	Chas. Rohde, R. P. Pfeifer
*Sheridan	U. S. Dry Land Field Sta.2/	C. R. Hills

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy		W. W. Worzella
Brookings	Agr. Experiment Station	J. W. Grafius

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy and Plant Genetics		H. K. Hayes
St. Paul	University Farm	E. R. Ausemus
Waseca	Southeast Experiment Sta.	R. E. Hodgson
Grand Rapids		E. R. Ausemus

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy		T. E. Stoa
Dickinson	Dickinson Substation	T. J. Conlon

MONTANA AGRICULTURAL EXPERIMENT STATION:

Agronomy		A. H. Post
Bozeman	Montana Experiment Station	E. R. Hehn
Moccasin	Judith Basin Branch Station	Ralph Williams
Havre	North Montana Branch Station	L. O. Baker
Huntley	Huntley Field Station	A. E. Seamans

CANADIAN DOMINION OF AGRICULTURE:

Lethbridge, Alta. Agr. Exp. Station	J. E. Andrews

2/ Cooperation with Division of Soil Management and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, as well as with the State experiment Stations.

ACCESSION NUMBERS ASSIGNED

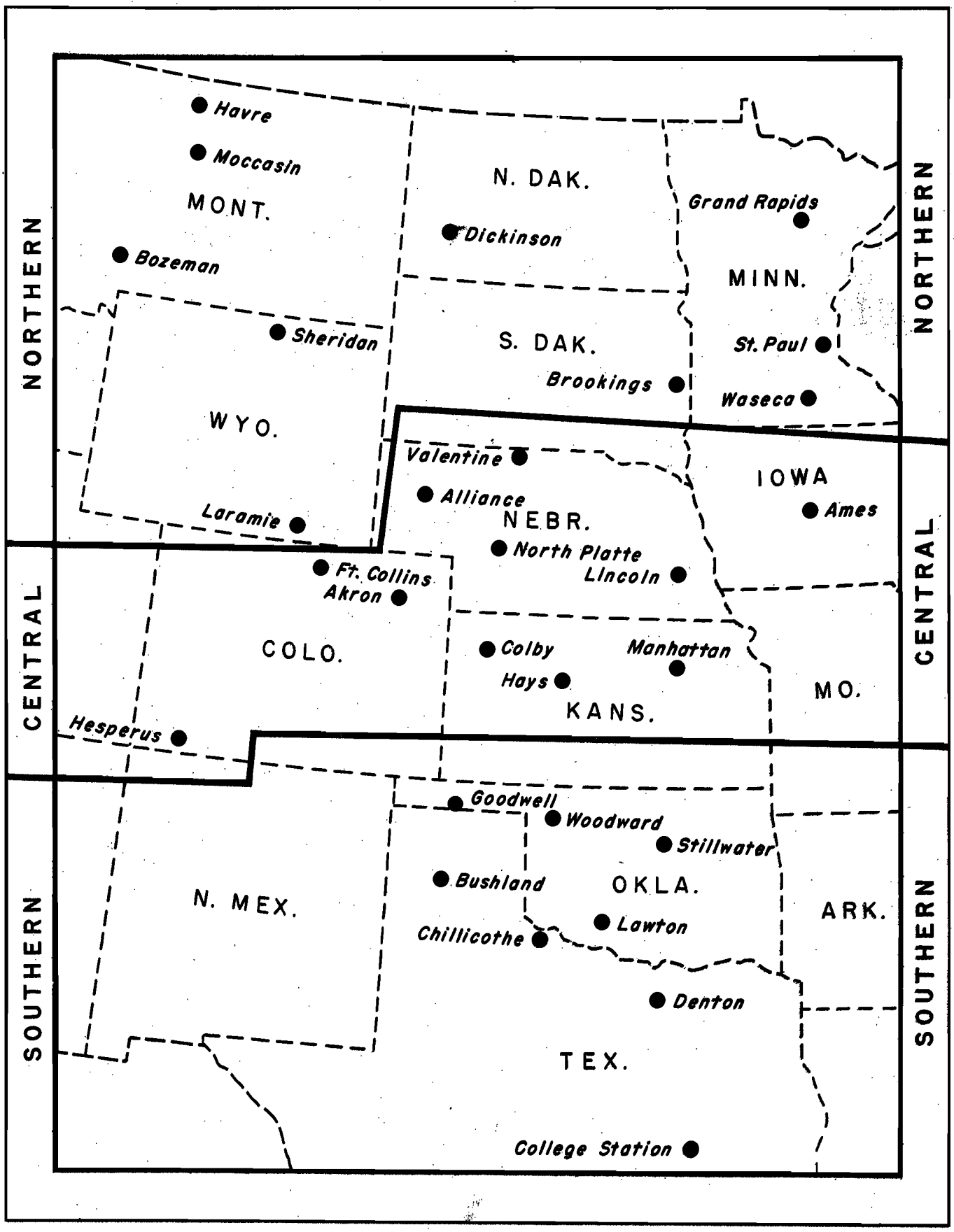
Cereal Investigation (C. I.) numbers of the Division of Cereal Crops and Diseases were assigned to many strains of wheat this year. The list includes new named varieties, promising selections, and important breeding stocks. In this report and in interstate communications the C. I. number takes precedence over all other numbers.

C. I. No.	Name	State No.
12715	Pawnee x Cheyenne	Nebr. 47NP1965
12716	Hope-Turkey x Cheyenne	Nebr. 44NP555
12717	Hope x Cheyenne^2	Nebr. 45910
12718	Oro x Marquillo-Oro	Nebr. 47511
12719	KanKing	E. G. Clark C43A31-16
12720	Triticum x Agropyron elongatum	Okla. Stw. 483946
12721	Marquillo-Oro x Oro-Turkey-Florence	Ks. 47B3
12722	do	Ks. 47B4
12723	do	Ks. 47B8
12724	Marquillo-Oro x Hussar-Hohenheimer	Ks. 47B121
12725	Comanche x Oro-Turkey-Florence	Ks. 47B139

C. I. No.	Name	State No.
12851	Marquillo-Oro x Pawnee	Ks. 462666
12852	Hope - Turkey x Turkey 11530	Ks. 44767
12853	Marquillo - Oro x Oro-Tenmarq	Ks. 431413
12854	do	Ks. 452033
12855	Pawnee x PI 94587 durum	Ks. 491058
12856	Pawnee-PI 94587 durum x Comanche-Pawnee	Ks. 473228
12857	Marquillo-Oro x Triunfo	Ks. 46422
12858	do	Ks. 51379 (48F6685)
12859	Gelou-Oro x Chiefkan-Tenmarq^2	Ks. 49428
12860	Berkeley Rock Sel. T-47-55	- - -
12861	Kawvale-Marquillo x Clarkan	Ks. 43F5821
12862	do	Ks. 43F5509-6
12863	do	Ks. 482481
12864	do	Ks. 432487
12865	Marquillo-Oro x Oro-Turkey-Florence	Nebr. 48NP505
12866	Oro x Oro-Turkey-Florence	Nebr. 461333
12867	Wichita - H44- Minturki^2 x Martin-Tenmarq-Khrakof	Colo. F.C. 1197
12868	Marquillo-Oro-Oro-Tanmarq x Mediterranean-Hope-Pawnee	Colo. F.C. 1199
12869	Turkey (Danne's Russian Turkey)	Joseph Danne
12870	Goss	A. E. Lowe

NEW VARIETIES

Ponca was the only new variety introduced by experiment stations this year for commercial production. It was named and released jointly by the Kansas and Oklahoma Agricultural Experiment Stations for culture in the eastern half approximately of these States. Ponca was formerly reported by its hybrid designation Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128). The variety was developed at the Kansas station in cooperative experiments with the Bureau of Plant Industry, Soils, and Agricultural Engineering and the Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture. Ponca resembles Pawnee in yield of grain, weight per bushel, time of maturity, strength of straw, plant height, and in resistance to loose smut. It is superior to Pawnee in leaf rust resistance, hessian fly resistance, and dough handling properties, and does not shatter so readily. It is decidedly less winter hardy and is more susceptible


Havre
Moccasin
MONT.
N. DAK.
Grand Rapids
Dickinson
Bozeman
MINN.
NORTHERN
Sheridan
S. DAK.
St. Paul
Brookings
Waseca
WYO.
Valentine
IOWA
Alliance
Ames
Laramie
NEBR.
North Platte
Lincoln
Ft. Collins
Akron
CENTRAL
COLO.
Colby
Manhattan
Hays
MO.
KANS.
Hesperus
Goodwell
Woodward
Stillwater
Bushland
OKLA.
N. MEX.
ARK.
Lawton
Chillicothe
SOUTHERN
Denton
TEX.
College Station

to bunt. About 1700 bushels in Kansas and 1200 bushels in Oklahoma were released to growers.

KanQueen and KanKing are newly named varieties being increased by E. G. Clark, Sedgwick, Kansas. The former is a semi-hard beardless variety resembling Chiefkan and has been distributed in small amounts to growers for two years. The latter is a bearded, brown-chaffed variety selected from a bulk hybrid developed at the Kansas station, but has not yet been released.

UNIFORM VARIETIES IN FIELD PLOTS OR ADVANCED NURSERIES

Uniform tests are planned by districts--southern, central, and northern, as shown by the map which accompanies this report. Some tests involve several districts and in other cases a district may be divided. In all cases the aim is to obtain the needed information rapidly and as economically as possible. Uniform varieties for 1951 and 1952 are as follows:

Variety	C.I.No.	1951				1952			
		S	C	NE	NW	S	C	NE	NW
Kharkof	1442	X	X		X	X	X		X
Tenmarq	6936	X	X			X	X		
Early Blackhull	8856	X				X			
Comanche	11673	X	X			X	X		
Pawnee	11669		X				X		
Red Chief	12109	X	X			X	X		
Triumph	12132	X							
Kiowa	12133	X	X			X	X		
Chiefkan x Oro-Tenmarq	12518		X						
Ponca	12128	X	X			X	X		
Quanah	12145	X							
Hard Federation Hybrid	12515					X			
Com. x Blk.-Ed. Fed.	12517					X			
Minturki	6155			X				X	
Yogo	8033				X				X
Minter	12138			X	X			X	X
H44 x Minturki^2	12532			X				X	
Iohardi	12510			X				X	
Ridit x Kharkof	12521				X				
Turkey x Oro	12705				X				X
H44-Minh. x Marmin	12704			X				X	

In addition to the uniform set of varieties, each station grows several varieties of local interest. All varieties reported by the various cooperators are included in the station data for plot varieties, thus giving a rather complete account of advanced testing. Permanent check varieties are Kharkof, Tenmarq, and Early Blackhull in the southern district, with Pawnee, Tenmarq, and Kharkof so designated in the central district. In the northeast Minturki and in the northwest Kharkof is used. New varieties and a few commercial varieties are included on a temporary basis.

PLOT DATA

Field plot or advanced nursery data involving varietal trials at 21 stations in 9 States are given in table 1. The data from each station are tabulated separately and the varieties at each station are listed in declining order of the yield in 1951. Before discussing the results at each of the stations, region-wide crop conditions will be reviewed and the major hazards of production indicated.

The winter wheat season extends from September of one year through harvest time of the next which varies from June 1 in the south to August 1 in the north and may be influenced by circumstances even earlier or later. The late summer months of 1950 were favored with good rains in most of the region. In mid-September one of the worst fall and winter droughts of record began over the southwest. Simultaneously the northeastern states of the region received a record snowfall exceeding 85 inches in places. The southwest was hard hit. The average precipitation for the months November through January in percent of normal for the various states was as follows: New Mexico 39, Texas 31, Oklahoma 37, Kansas 35, Nebraska 48. Local and temporary relief came in February and March. Germination was uneven and late in northcentral and east Texas and much winter wheat failed to head on this account. Wheat from Texas to Nebraska was poorly rooted over extensive areas. Frequent subzero temperatures killed most of the growth above ground and caused death to many of the weak, poorly rooted plants in dry soil. In February, wheat over a wide area went out of dormancy and began to grow. This

was followed by temperature readings in the fore part of March low enough to be lethal to wheat. Temperatures generally were below normal in March and the remainder of the crop season. April, May, and June were months of considerable rain, especially May and June. In the latter month, Kansas received 2½ times its normal and Iowa twice normal. In the three-month period Texas, New Mexico, Wyoming, and Montana had subnormal rainfall but all of the other states were above normal by as much as 76%. Heavy rain at harvest-time caused deterioration of the crop finally produced.

Leaf rust was wide-spread in the fall of 1950 and had almost defoliated the early sown wheat by mid-October. Stem rust including 15B became sparingly established during the fall in the south. Both rusts were almost wiped out by the drought and cold of fall and winter. Although ideal conditions for an epidemic developed in May and June, leaf rust was a minor disease until at the very end of the growing season and stem rust was exceedingly scarce except late in the season in southwestern Nebraska. Race 15B of stem rust was most frequently isolated from uredial collections this year followed by races 56, 17, and 38. Race 15B has now been found in 16 states.

So-called minor diseases were numberous and wide-spread. Black Chaff (Xanthomonas translucens) was the worst ever seen in this region. Likewise basal glume rot (Bacterium atrofaciens), scab (Gibberella saubinetti) and speckled leaf blotch (Septoria tritici) were major factors in the deterioration of the wheat in the last 60 days of its life. Mosaic was abundant in western Kansas and Nebraska and locally elsewhere. Root rots of various kinds were observed.

Insects of greatest prominence were greenbugs, cutworms, hessian fly, grasshoppers, wheat brown mites, sawfly, and wheat stem maggot. The most damage was done in the southwest by greenbugs which fed on the wheat during the cold spring months when the predators and the wheat were unable to make much growth or

development. The long duration of attack on already weakened plants was too much; consequently thousands of acres were abandoned. The percentage of the acreage of winter wheat abandoned from all causes by states was New Mexico 80, Texas 68, Oklahoma 35, Kansas 34, Nebraska 14, Colorado 33, and Montana 11. The hessian fly was observed in five states including Minnesota on one side of the region and Colorado on the other.

Crop failures occurred at several of the regional plot testing stations. At Denton true winters failed to head; Goodwell and Colby wheat failed because of drought; Garden City was hailed out; winterkilling was complete in South Dakota. Other stations reported the extreme range from quite low to very high yields. In Minnesota where winterkilling is expected, almost none occurred this year.

In the Chillicothe test, winter drought and greenbugs were major hazards. Rains late in the crop season came in time to increase seed plumpness and the yield of most varieties. C. I. 12702 yielded the most grain and Triumph least. Kiowa and C. I. 12517 also made high yields. The average yields for the last two years show that C. I. 12702, Kiowa, and Kanred were the most productive.

A near-failure at Bushland as a result of winter killing, drought, mites, and greenbugs was salvaged by beneficial rains near the close of the season. Kharkof and Red Chief were highest in yield and Early Blackhull lowest. Two-year averages favor Red Chief.

Modest yields were recorded at Stillwater with four new selections bred in Oklahoma occupying the highest positions. In the two-year comparisons C. I. 12517 has an impressive margin of superiority. Quanah, Early Blackhull, and Tenmarq performed poorest.

The Cherokee test finished with a spread in yield among the varieties of 24.9 bushels in which C. I. 12517 was highest by a big margin. Its two-year average is excellent. The conspicuous loss in stand which occurred throughout this test at dates too late to be explained by winter killing, are attributed

primarily to injury by severe drought and greenbugs. Varieties with relatively poor survival in early spring were damaged most.

Greenbugs and drought were factors in reducing yields at Woodward but Red Chief, C. I. 12516, and C. I. 12515 surpassed 23 bushels to the acre. Triumph was lowest in yield. Late rains favored the development of plump grain. The two-year averages favor Red Chief and C. I. 12517 in yield.

An excellent crop was produced at Manhattan where conditions were much more favorable than southwestward. Much lodging occurred following the heavy June rains and leaf rust attained considerable prominence. Test weights were low. Kans. 2795, 462666, Triumph and C. I. 12518 yielded over 47 bushels to the acre. Seven varieties yielded below 40 bushels. Among two-year averages Stafford, Kans. 2795, 462666 and C. I. 12518 averaged over 46 bushels. Red Chief with an average of 36.5 was the lowest yielding variety.

At Hays Kiowa, C. I. 12518, Apache and Blue Jacket yielded above 40 bushels to the acre. Four varieties yielded below 30 bushels. Heavy rains occurred in the latter part of the season. Leaf rust appeared too late to be an important yield factor. Two-year averages above 29 bushels to the acre were made by Apache, Comanche, Kiowa, and C. I. 12518.

Varieties at Akron developed under dry, cool conditions. Yields above 20 bushels to the acre were made by six varieties and below 16 by one. Two-year averages differ only slightly with small margins shown for Kiowa and C. I. 11970.

High yields and test weights were recorded at Ft. Collins. Cheyenne and C. I. 11972 yielded most this year and have the highest two-year averages. All test weights were above 60 pounds to the bushel. There was no lodging.

After surviving a moderately severe winter, all varieties at Lincoln showed good progress until the heavy rains of June made conditions favorable for several diseases, especially black chaff and scab. Many varieties deteriorated visibly after mid-June and final yields were far below expectations. Red Chief,

C. I. 12142, Nebred and C. I. 12523 were best this season. Nebred has the best two-year average followed by C. I. 12142, 12523 and Cheyenne.

Winter survival and yield of grain were closely correlated at North Platte. Nebred and C. I. 12523 made over 31 bushels to the acre and had the highest survivals. Only Red Chief had a test weight above 60 pounds. Two-year averages favor Nebred and C. I. 12523.

Extensive winter killing followed by mosaic and hessian fly reduced the Alliance crop so much that only two varieties yielded above 10 bushels to the acre. These were Cheyenne and C. I. 12711. The two-year averages made by these same varieties are quite impressive in view of conditions.

Winterkilling at Ames thinned some varieties but many survived with 90 per cent stands or better. Yields ranged from 9.6 bushels to the acre for Comanche to 20.3 for Minturki and Blackhawk. The best two-year averages were made by Minturki and Iotark and all varieties surpassed Kharkof.

All varieties survived with full stands at the three Minnesota stations and good yields were produced. Blackhawk yielded most considering the combined data from Waseca and St. Paul. Minnesota 2809 at Waseca and 2828 at St. Paul gave excellent yields also. The yields at Grand Rapids did not differ significantly.

Kanred, Minter and Cheyenne ranked highest in grain yield at Sheridan, but the total spread among varieties was not large. Winter wheat ripened later than the spring type this year. Kanred has the best two-year average.

At Bozeman very high yields were obtained. Three exceeded 70 bushels to the acre and among these, C. I. 12521 and Karmont have the highest two-year averages. Lodging resistance was pronounced in some varieties. All except five of the varieties have considerable resistance to bunt and several are resistant to dwarf bunt as well.

Cheyenne, Tenmarq and C. I. 12705 were the three varieties highest in yield at Huntley. Tests have been conducted for many years at this station, but have not been reported in the regional summary in recent years.

At Moccasin, winter killing was an important factor in the final yield. Karmont, Newturk, and Yogo were highest in yield this year. Two-year averages favor Karmont, Yogo, and Selection 9 from the cross Yogo x Wasatch.

At Havre, winter wheat ripened later than the spring typs but good yields were obtained. One variety winter killed badly. C. I. 12108 yielded most this year and has the highest two-year average.

Table 1. Yield of grain and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 21 stations in the region in 1951, with 2-year average yields.

Chillicothe, Texas
Ten plots ; rod rows

Variety	C. I. Or Sel. No.	Date Head-ed	Date Ripe	Weight per bushel	Av. Acre yield 1951	Av. Acre yield 1950-51
			June	Lbs.		
Sinv.-Wich.^{2} x Hope-Chey.	12702	5/4	12	63	23.5 1/	29.4
Com. x Blk.-Hd. Fed.	12517	5/1	8	64	21.8	-
Kiowa	12133	4/28	12	63	21.6	27.7
Sinv.-Wich.^{2} x Hope-Chey.	237-46-26-2	4/26	5	62	21.2	-
Kanred	5146	5/5	22	62	21.0 1/	27.3
Westar	12110	4/29	8	62	20.8	-
Wichita	11952	4/26	5	63	20.7	25.5
Martin-Tq. x Chiefkan	160-44-135	4/30	8	63	20.4	-
Red Chief	12109	5/5	22	63	20.2 1/	23.7
Sinv.-Wich. x Hope-Chey.	208-46-12	5/2	12	62	19.9	26.5
do	208-47-32	4/27	5	61	19.9	-
Sinv. x Wichita	201-46-33	4/26	5	62	19.5	24.5
Sinv.-Wich.^{2} x Hope-Chey.	237-46-23-2	4/28	8	62	19.5	-
Kharkof	1442	5/6	22	61	19.1	26.4
Wich. x Mqo.-Oro	218-46-5	5/5	22	62	19.1	-
Comanche	11673	4/28	22	62	18.9	25.0
Sinv. x Wichita	201-47-4	4/28	22	62	18.8	-
Ponca	12128	5/3	22	63	18.6	25.1
Tenmarq	6936	4/28	12	61	18.1	25.2
Quanah	12145	4/28	5	61	17.2	24.6
29-34-275 D. Cr.	12511	4/28	8	61	17.2	23.6
Blackhull	6251	5/3	22	61	16.5	25.4
Early Blackhull	8856	4/26	12	61	16.0 1/	22.9
Sinv.-Wich. x Hope-Chey.	12701	4/28	8	62	14.0	20.4
29-34-275 D. Cr.	12512	5/5	22	61	12.9	22.5
Triumph	12132	4/27	5	63	9.3 1/	16.5

1/ One plot interpolated. Standard error of a difference = 1.55 bushels

Bushland, Texas
Ten plots, 4 irrigated ; rod rows

Variety	C. I. No.	Sur-viv-al	Date		Plant height	Wt. per bushel	Av. acre yield	
			Head-ed	Ripe			1951	1950-51
		%	May	June	Ins.	Lbs.	Bus.	Bus.
Kharkof	1442	95	20	24	25	58.0	13.8	10.2
Red Chief	12109	97	18	21	25	61.5	12.7	14.1
Kiowa	12133	95	13	18	21	61.0	11.7	12.9
Tenmarq	6936	95	16	21	23	60.0	10.3	9.8
Triumph	12132	95	10	15	21	60.5	9.5	8.0
Comanche	11673	93	15	18	20	60.0	9.2	10.3
Ponca	12128	93	14	17	21	61.0	9.0	9.1
Quanah	12145	78	15	18	22	59.5	8.9	5.7
Early Blackhull	8856	95	8	15	21	61.5	8.4	8.9

Standard error of a difference = 1.32 bushels

Stillwater (Perkins), Oklahoma
Four 1/68 acre plots

Variety	C. I. No.	Date Headed	Date Ripe	Plant height	Wt. per bushel	Av. Acre yield 1951	Av. Acre yield 1950-51
			June	Ins.	Lbs.	Bus.	Bus.
Hard Federation Hybrid	12515	5/5	12	31	60.5	22.8	-
Com. x Blk.-Hd. Fed.	12517	5/5	12	29	60.8	22.5	27.1
Blk.-Oro x Pawnee	12709	5/9	15	29	61.1	20.3	-
do	12516	5/6	14	29	60.8	19.5	-
Cheyenne	8885	5/9	17	29	59.0	19.1	21.7
Kharkof	1442	5/10	17	31	59.5	19.0	20.4
Kiowa	12133	5/4	12	28	59.7	18.4	21.0
Westar	12110	5/6	14	30	58.4	18.2	22.4
Ponca	12128	5/5	12	28	60.6	17.9	19.8
Comanche	11673	5/5	12	29	58.9	17.4	20.1
Wichita	11952	5/2	8	28	59.4	16.9	22.3
Pawnee	11669	5/4	10	28	58.6	16.8	20.3
Clarkan	8858	5/9	18	33	61.2	16.4	20.8
Tenmarq	6936	5/8	16	30	59.1	16.2	18.8
Triumph	12132	4/30	7	26	59.2	15.4	19.9
Red Chief	12109	5/7	17	33	62.2	15.1	19.7
Quanah	12145	5/6	14	28	58.7	14.9	15.6
Early Blackhull	8856	4/30	8	28	59.8	14.1	18.8

Standard error of a difference = 1.64 bushels

Cherokee, Oklahoma
Five plots ; red rows

Variety	C. I. No.	Stand			Plant height	Wt. per. bushel	Av. acre yield	
		Early Spring	April 14	June 4			1951	1950-51
		%	%	%	Ins.	Lbs.	Bus.	Bus.
Com. X Blk.-Hd. Fed.	12517	100	90	89	25	62.5	41.3	31.9
Hard Federation Hybrid	12515	100	90	90	27	61.6	36.1	-
Kiowa	12133	100	90	85	26	61.0	32.3	24.0
Kharkof	1442	100	90	86	28	60.3	31.7	23.7
Blk.-Oro X Pawnee	12516	100	90	90	26	62.7	31.2	-
Comanche	11673	100	90	86	28	60.5	30.2	23.8
Blk.Oro X Pawnee	12709	100	90	90	24	61.8	29.2	-
Wichita	11952	99	89	80	25	59.5	27.7	24.3
Westar	12110	100	90	86	27	59.5	27.5	22.8
Tenmarq	6936	100	90	84	27	60.5	26.8	22.0
Red Chief	12109	100	90	84	28	63.1	26.3	22.2
Cheyenne	8885	100	90	79	28	59.3	24.6	22.1
Early Blackhull	8856	100	90	82	26	60.7	22.5	18.7
Pawnee	11669	100	90	71	26	59.3	19.5	17.0
Triumph	12132	100	90	55	24	59.5	19.3	16.3
Quanah	12145	74	67	32	31	58.7	16.5	11.6
Ponca	12128	94	85	44	27	58.6	16.4	14.1

Standard error of a difference = 2.41 bushels

Woodward, Oklahoma
Four plots ; rod rows

Variety	C. I. No.	Date		Plant height	Wt. per bushel	Av. Acre yield	
		Headed	Ripe			1951	1950-51
		May	June	Ins.	Lbs.	Bus.	Bus.
Red Chief	12109	22	26	28	63.8	24.9	19.4
Blk.-Cro x Pawnee	12516	18	23	25	63.7	23.7	-
Hard Federation Hybrid	12515	17	23	23	62.3	23.3	-
Cheyenne	8885	24	28	25	61.0	21.9	18.8
Con. x Blk.-Hd. Fed.	12517	19	23	22	63.2	21.4	19.0
Comanche	11673	18	22	22	61.9	21.4	16.6
Blk.-Cro x Pawnee	12709	22	26	25	63.1	21.2	-
Tenmarq	6936	20	24	25	61.7	21.0	16.2
Kiowa	12133	19	24	23	62.0	20.4	16.5
Kharkof	1442	23	26	25	61.2	20.4	15.8
Westar	12110	20	25	23	61.7	19.2	16.2
Wichita	11952	15	20	21	61.1	17.6	14.6
Early Blackhull	8856	11	18	21	61.0	17.3	13.5
Pawnee	11669	20	23	22	60.2	17.2	14.1
Quanah	12145	22	26	23	61.1	14.8	11.8
Ponca	12128	23	26	22	61.8	14.4	12.6
Triumph	12132	16	20	18	59.8	8.4	9.0

Standard error of a difference = 2.06 bushels.

Manhattan, Kansas
Three 1/53.78 acre plots

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Early Growth 1/	Plant height	Lodging	Leaf rust	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		May			Ins.	%	%	Lbs.	Bus.	Bus.
Mqo.-Oro X Oro-Tq.	k.2795	25	7/4	S	40	50	T	57.0	49.5	46.9
Mqo.-Oro X Pawnee	462666	23	7/2	R	35	30	T	56.6	48.4	46.6
Truumph	12132	18	6/26	S	38	37	90	57.1	47.7	44.0
Chiefkan X Oro-Tq.	12518	23	7/2	R	41	40	70	57.7	47.2	46.3
Mqo.-Oro X Pawnee	12505	23	7/3	I	39	35	T	57.4	46.8	44.2
Kiowa	12133	22	7/2	R	41	35	78	58.1	46.8	44.9
Stafford	12706	26	7/4	R	43	55	40	58.1	46.5	46.4
Ponca	12128	23	7/2	R	40	45	T	58.1	46.3	45.1
Pawnee	11669	22	7/1	S	40	45	78	57.2	45.6	44.9
Tenmarq	6936	26	7/3	I	42	50	78	55.9	45.4	42.6
Quanah	12145	27	7/6	R	41	35	T	57.3	45.0	-
Mqo.-Oro X Oro-Tq.	12406	25	7/5	S	42	40	T	57.4	44.9	42.6
Kv.-Tq. X Comanche	12524	22	7/1	R	38	40	60	56.2	44.8	43.7
Kan Queen	12762	25	7/5	S	47	25	80	59.9	44.6	41.4
Comanche	11673	25	7/1	I	41	50	43	57.3	44.5	43.8
Blue Jacket	12502	26	7/5	S	45	35	78.	58.7	44.1	40.1
Turkey	1558	28	7/4	R	41	75	30	55.6	42.0	41.6
Red Jacket	12713	24	7/6	I	45	30	78	58.5	41.7	40.9
Wichita	11952	22	6/30	I	43	50	87	57.1	41.1	44.9
Kharkof	1442	29	7/6	S	42	45	70	56.0	39.9	38.6
Moking	12556	27	7/8	I	47	30	80	59.0	39.4	38.2
Iohardi	12510	26	7/5	S	43	40	67	58.0	39.0	38.0
Vigo	12220	30	7/5	I	47	20	34	55.8	38.7	-
Red Chief	12109	24	7/4	S	45	40	67	59.5	38.5	36.5
Kanred	5146	29	7/5	S	41	70	30	55.3	38.5	38.9
Pawnee Sel. 33	12707	15	6/25	R	37	45	80	57.1	36.6	-

1/ Vigor Oct. 14 : S- slow, I-intermediate , R-rapid.

Standard error of a difference = 2.46 bushels

Hays, Kansas

Four 1/50 acre plots ; two on fallow, two on crop land

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Plant Height	Leaf rust	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		May	July	Ins.	%	Lbs.	Bus.	Bus.
Kiowa	12133	25	3	36	30	60.8	41.6	29.2
Chiefkan X Cro-Tenmarq	12518	27	3	37	30	60.9	40.8	29.0
Apache	12122	27	3	35	15	59.8	40.3	30.1
Blue Jacket	12502	28	4	39	10	62.9	40.2	28.7
Comanche	11673	25	3	37	20	59.0	39.7	29.7
Cheyenne X Blackhull	12101	28	5	36	5	59.9	39.7	-
Stafford	12706	28	4	38	5	62.4	39.7	28.6
Red Jacket	12713	29	4	40	15	63.0	38.6	27.0
Pawnee	11669	24	3	34	15	59.9	37.7	28.5
Red Chief	12109	28	3	38	20	64.0	37.7	26.6
Tenmarq	6936	29	3	37	15	58.3	37.3	28.6
Kharkof	1442	6/1	5	35	5	58.8	36.8	25.9
Mqo.-Cro X Cro. Tq.	12406	28	4	36	T	60.6	36.7	-
Ponca	12128	28	3	35	0	59.9	35.5	25.6
Mqo.-Cro X Pawnee 1/	K462666	28	4	31	0	59.4	35.4	25.9
Blackhull	6251	28	4	36	25	59.9	34.5	26.2
Wichita	11952	22	1	36	15	60.9	34.4	27.9
Turkey	1558	30	5	35	30	59.5	32.2	23.0
Early Blackhull	8856	21	1	35	10	61.0	29.6	26.0
Quanah 2/	12145	30	3	33	0	59.9	29.2	20.8
Triumph	12132	20	6/30	32	25	58.8	28.8	23.7
Pawnee Sel.	12707	19	6/28	32	T	60.0	27.3	-

1/ Survival 80%. 2/ Survival 55%

Standard error of a difference = 2.14 bushels

Akron, Colorado

Four 1/41 acre plots ; Two after fallow,, Two after corn

Variety	C. I. No.	Date Headed June	Date Ripe July	Wt. per bushel Lbs.	Av. acre yield 1951	Av. acre yield 1950-51
Tenmarq	6936	12	17	59.8	21.9	21.7
Kiowa	12133	10	16	60.8	21.8	22.3
Kharkof	1442	15	18	59.5	21.7	22.2
Cheyenne	8885	15	18	60.0	20.6	21.9
Pawnee	11669	9	13	61.3	20.6	20.4
Kan.-H.Fed. X Minh.-Mint.	11970	8	15	60.5	20.6	22.5
Chiefkan X Oro-Tenq.	12518	10	16	61.0	19.7	-
Red Chief	12109	9	16	61.0	19.3	20.9
Wichita	11952	6	13	61.3	19.1	20.6
Comanche	11673	7	13	61.5	18.9	20.4
Ponca	12128	9	16	60.8	18.8	19.3
Minturki	6155	17	18	59.8	18.8	19.5
Alton	1438	17	18	60.0	18.1	18.5
Early	8856	5	13	60.5	16.8	18.8
Triumph	12132	6	13	60.8	15.6	16.6

Standard error of a difference = 1.48 bushels

Ft. Collins, Colorado
Seven plots ; rod rows

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Plant Height	Wt. per bushel	Av. Acre yield 1951	Av. Acre yield 1950-51
		June	July	Ins.	Lbs.	Bus.	Bus.
Cheyenne	8885	12	22	41	63.5	67.5	61.2
Cheyenne x Tenmarq	11972	10	20	39	63.5	65.3	60.9
Tenmarq	6936	12	22	40	62.4	63.7	54.2
Red Chief	12109	8	18	44	62.3	63.5	-
Chiefkan x Cro-Teng.	12518	7	17	40	61.6	62.6	-
Wichita	11952	6	16	40	62.7	62.4	56.5
Kiowa	12133	7	17	39	63.1	62.0	54.1
E. Blk.-Mar. x Hope-Med.	-25	8	18	40	61.7	61.4	57.5
Comanche	11673	6	16	36	63.4	60.5	53.2
Pawnee	11669	6	16	37	61.8	59.3	51.9
Kharkof	1442	14	23	39	62.3	58.3	56.6
Ponca	12128	7	17	36	62.6	55.8	52.1
E.Blk.-Mar. x Hope-Med.	-73	11	21	41	60.3	52.5	50.6
do	-76	10	20	40	61.2	51.2	48.9
Triumph	12132	4	14	37	60.7	51.0	43.9

Standard error of a difference = 3.43 bushels

Lincoln, Nebraska
Five 1/57 acre plots

Variety	C. I. No.	Date headed	Plant height	Lodging 6-21	2,4-D response 1/	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		June	Ins.	%		Lbs.	Bus.	Bus.
Red Chief	12109	2	45	2	1	60.0	32.8	38.9
Cheyenne X. Turkey	12142	4	42	28	1	56.4	30.2	42.7
Nebred	10094	5	42	50	1	57.6	30.1	43.7
Tk.-Tq.-Chey. X Tk.	12523	4	44	40	1	58.2	30.1	40.5
Iohardi	12510	7	46	35	1	59.8	29.4	39.3
Blue Jacket	12502	2	47	10	1	60.9	27.2	37.0
Minter	12138	11	46	97	1	59.2	26.9	36.4
Cheyenne	8885	8	44	8	4	56.1	25.8	40.7
Nebr. 60 X Med.-Hope	12500	1	41	3	1	56.4	25.6	38.4
Hung. Sel. X Nebred	12507	7	42	0	1	55.5	25.2	38.0
Comanche	11673	1	41	6	3	55.0	24.8	40.4
Turkey	12137	8	45	93	2	57.0	24.8	37.2
Chiefkan X Oro-Teng.	12518	1	42	8	1	57.7	24.6	-
Pawnee	11669	5/31	40	0	3	55.3	24.6	39.0
Wichita	11952	5/30	42	T	1	55.8	24.4	39.0
Kharkof	1442	11	44	92	3	56.7	24.0	38.3
Tenmarq	6936	5	44	1	4	54.8	23.7	39.5
Kiowa	12133	1	42	0	3	57.0	22.8	37.2
Hope-Turkey X Turkey	12712	1	39	0	5	57.2	21.6	35.8
Ponca	12128	2	39	18	4	56.0	21.2	34.8
Turkey N. P.	12143	8	43	T	5	53.4	15.9	31.5

1/ Grade 1 = slight effect from fall spray. Yield area not sprayed.

Standard error of a difference = 0.98 bushels.

North Platte, Nebraska
Four 1/50 acre plots on fallow 1/

Variety	C. I. No.	Survival	Date Headed	Date Ripe	Plant height	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		%	June	July	Ins.	Lbs.	Bus.	Bus.
Nebred	10094	82	18	24	33	57	33.3	35.8
Tk.-Tq.-Chey. X Tk.	12523	78	18	22	36	-	31.9	32.1
Red Chief	12109	48	19	23	35	61	30.8	30.6
Turkey X Cheyenne	12711	52	18	25	33	57	26.7	-
Kharkof	1442	53	22	27	39	55	25.6	31.3
Cheyenne X Turkey	12142	63	20	24	33	54	24.2	29.8
Kiowa X Oro-Tenq.	12133	40	18	21	31	56	21.7	27.4
Cheyenne	8885	63	21	25	36	-	21.7	30.2
Chiefkan X Oro-Tenq.	12518	43	19	23	34	57	20.8	-
Tenmarq	6936	42	20	25	33	52	18.5	27.5
Hung. Sel X Nebred	12507	33	22	26	32	-	16.0	24.0
N. P Turkey	12143	33	20	25	35	-	16.0	26.1
Comanche	11673	30	19	22	31	50	15.0	25.2
Pawnee	11669	30	19	22	29	49	13.1	22.3
Wichita	11952	8	19	21	28	-	8.3	20.8
Ponca	12128	6	20	23	28	-	6.7	20.3

1/ Data other than yield based on five plots.

Standard error of a difference = 2.69 Bushels

Alliance, Nebraska
Six plots ; rod rows on fallow

Variety	C. I. No.	Sur-viv-al	Date headed	Wt. per bushel	Av. acre yield	
					1951	1950-51
		%	June	Lbs.	Bus	Bus.
Turkey X Cheyenne	12711	64	14	56.7	16.7	18.1
Cheyenne	8885	50	18	55.1	13.8	16.3
Kiowa	12133	19	14	55.0	9.4	12.8
Nebred	10094	63	15	50.0	9.2	13.6
Kharkof	1442	40	20	53.0	8.6	13.2
Turkey	12137	48	19	52.8	8.3	12.3
Hope X Cheyenne^2	N.45910	26	15	55.6	7.7	12.3
North Platte Turkey	12143	28	17	-	6.5	11.1
Red Chief	12109	11	17	-	6.1	10.4
Cheyenne X Turkey	12142	44	17	-	6.0	11.9
Comanche	11673	16	15	-	4.7	9.7
Chiefk. X Oro-Tenmarq	12518	16	14	-	4.6	-
Tk.-Tq.-Chey. X Tk.	12523	57	15	-	3.8	10.8
Hung. Sel. X Nebred	12507	15	18	-	2.4	7.9
Wichita	11952	5	15	-	2.3	9.5
Pawnee	11669	8	16	-	2.3	8.1
Hope-Turkey X Cheyenne	NP44541	19	17	-	2.1	9.8
Hope-Chey. X Cheyenne	N.437165	13	20	-	1.8	-
Tenmarq	6936	8	19	-	1.4	9.1
Nebred X Hope-Turkey	N.456812	13	17	-	1.3	9.1
Hope X Cheyenne^2	N.45904	16	18	-	.7	11.0
Ponca	12128	4	20	-	.6	7.5
Hope-Turkey X Turkey	12712	8	17	-	.5	7.3

Standard error of a difference = 1.53 bushels

Ames, Iowa
Three plots ; rod rows

Variety	C.I. or Sel. No.	Survival	Date Headed	Date Ripe	Plant height	Loose smut 1/	Bact. leaf spot	Septoria	Leaf rust	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		%	June	July	Ins.	No.	%	%	%	Lbs.		
Minturki	6155	97	19	21	37	13	20	25	65	56.4	20.3	30.0
Blackhawk	12218	79	21	26	36	1	20	30	5	57.8	20.3	29.3
Iobardi	12510	95	18	22	34	1	45	35	60	57.6	20.0	28.7
H44 X Minturki 2	12532	97	20	21	36	1	20	25	65	57.4	19.9	28.4
Marmin	11502	93	18	22	36	3	35	35	55	57.2	19.7	27.3
Ioturk	11883	88	21	25	36	4	25	45	70	57.0	19.3	30.4
H44-Minh. X Marmin	12704	93	18	21	34	0	20	30	70	54.0	19.0	26.5
Minter	12138	98	19	21	35	4	35	30	25.7	57.0	18.7	29.7
Iowin	10017	78	19	23	34	0	15	40	15	56.0	17.6	27.5
Iobred 73	11997	81	19	26	35	8	30	65	15	56.0	15.8	-
Kharkof	1442	75	23	26	35	1	25	50	50	53.6	14.3	24.2
Kiowa	12133	72	16	22	30	1	10	30	65	58.2	13.9	-
Comanche	11673	48	17	22	29	0	15	60	60	-	9.6	-

1/ Heads in 48 feet of row.

Waseca, Minnesota
Three 1/40 acre plots

Variety	C.I. or Minn. No.	Head Date: Headed.	Head Date: Ripe	Plant height	Lodging	Leaf rust	Wt. per bushel	Av. acre yield: 1950	Av. acre yield: 1950-51
		June	July	Ins.	%	%	Lbs.	Bus.	Bus.
Blackhawk	12218	17	26	44	30	T	60.5	37.4	34.0
H44 X Minturki 4	2809	16	25	44	27	45	60.2	35.8	32.3
Marmin X H44-Mint. 2	2795	16	25	42	27	25	59.8	35.2	30.4
Iohardi	12510	15	24	43	73	70	60.5	35.1	32.8
H44 X Minturki 2	12532	16	25	45	50	40	60.8	34.8	32.5
H44-Minh. X Marmin	12704	15	25	42	0	60	58.8	34.3	29.3
Minturki	6155	17	26	44	27	40	59.7	33.1	33.6
H44 X Minturki 2	2812	18	26	44	27	8	59.3	33.0	29.9
H44-Minh. X Marmin	2811	17	26	42	0	15	59.7	32.9	31.3
Minter	12138	16	25	41	27	30	60.5	32.2	31.5
Mint.-Io. X H44-Mint. 2	2827	16	26	46	43	T	60.2	31.7	-
do	2828	17	26	42	0	10	60.7	31.4	-
H44 X Minturki 2	2829	15	24	45	83	10	59.0	31.3	-

Standard error of a difference = 2.40 bushels

St. Paul, Minnesota
Three 1/40 acre plots

Variety	C.I. or Minn. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		June	July	Ins.	%	Lbs.	Bus.	Bus.
Mint. Io. X H44-Mint.^{2}	2828	13	18	44	50	61.3	38.3	-
Blackhawk	12218	13	20	46	15	59.3	38.0	32.6
Iohardi	12510	11	18	44	53	60.2	37.6	35.6
H44-Minh. X Marmin	2811	12	17	42	50	60.5	37.2	32.5
Mint.-Io. X H44-Mint.^{2}	2827	12	19	48	15	59.8	36.4	-
H44 X Minturki	2829	12	17	46	53	59.7	35.7	-
H44-Minh. X Marmin	12704	12	18	39	53	57.8	35.0	32.2
H44 X Minturki^2	12532	13	20	45	53	60.5	34.9	31.0
H44 X Minturki^4	2809	12	19	44	50	59.8	33.4	30.9
H44 X Minturki^2	2812	13	20	42	47	59.3	32.0	29.9
Minter	12138	13	16	44	45	60.5	31.4	28.5
Marmin X H44-Mint.^{2}	2795	13	19	43	53	59.2	30.2	28.4
Minturki	6155	14	18	41	45	58.3	27.6	26.1

Standard error of a difference = 4.85 bushels

Grand Rapids, Minnesota
Three 1/40 acre plots

Variety	C.I. or Minn. No.	Date Heading	Date Ripe	Plant height	Leaf rust	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		June	July	Ins.	%	Lbs.	Bus.	Bus.
H44-Minh. X Marmin	2811	21	30	45	28	59.3	50.1	41.7
H44 X Minturki^4	2809	21	28	45	45	61.5	48.8	44.3
H44 X Minturki^2	2812	21	29	43	13	61.3	48.0	39.8
Minter	12138	20	28	43	50	59.7	46.5	40.5
Minturki	6155	21	31	46	78	60.0	46.2	41.9
Marmin X H44-Mint.^{2}	2795	21	29	44	53	59.5	45.5	40.2
Blackhawk	12218	21	29	48	28	59.3	44.9	40.4
H44-Minh. X Marmin	12704	21	28	43	60	58.5	44.8	37.0
Mint.-Io. X H44-Mint.^{2}	2827	20	29	48	18	61.5	44.5	-
H44 X Mint.^{2}	12532	21	29	45	35	60.2	43.9	39.8
Iohardi	12510	19	29	46	70	61.8	43.6	36.5
Mint.-Io. X H44-Mint.^{2}	2828	21	30	47	30	60.8	43.0	-
H44 X Minturki^2	2829	19	28	46	35	61.5	40.3	-

Standard error of a difference = 6.45 bushels (Non-significant)

Sheridan, Wyoming
Three 1/50 acre plots on fallow

Variety	C. I. NO.	Sur-viv-al	Date Head-ed	Date Ripe	Plant height	Wt. per bushel	Av. acre yield 1951	Av. acre yield 1950-51
		%	June	Aug.	Ins.	Lbs.	Bus.	Bus.
Kanred	5146	90	24	5	30	58.0	23.8	35.7
Minter	12138	87	20	5	36	58.0	22.9	34.7
Cheyenne	8885	90	24	3	32	57.8	22.3	33.0
Karmont	6700	95	23	5	33	58.0	21.7	33.0
Yogo	8033	90	25	5	34	58.0	21.7	33.7
Ridit X Kharkof	12521	90	25	3	35	57.8	21.4	32.3
Nebred	10094	87	22	3	29	58.3	20.6	32.0
Kharkof	1442	90	25	3	33	58.0	20.2	31.7
Marmin	11502	90	24	7	35	58.3	19.6	30.6
Martin X Tenmarq	11824	85	18	4	32	58.0	19.6	32.1
Turkey X Oro	12705	88	24	3	32	55.0	19.3	29.0

Standard error of a difference = 2.14 bushels

Bozeman, Montana
Six nursery plots

Variety	C. I. (or Sel. No.	Date head-ed	Plant height	Lodging		Wt. per bushel	Av. acre yield	
				%	degrees		1951	1950-51
		June	Ins.			Lbs.	Bus.	Bus.
Ridit X Kharkof	12521	30	47	90	50	57.2	79.0	66.6
Karmont	6700	30	45	76	40	61.6	71.1	61.9
Rex X Rio^3 F_5- 13	-	7/6	43	33	45	55.3	70.4	-
Rio-Rex X Nebred	482215	27	38	0	0	62.6	66.6	-
Newturk	6935	30	42	50	20	61.6	65.6	55.1
Rio-Rex X Nebred	482235	25	37	0	0	62.5	65.1	-
Yogo X Wasatch -11	-	7/4	44	33	30	63.2	62.8	-
Blackhull-Rex X Chey.	482296	27	42	0	0	60.3	62.4	-
Yogo X Wasatch -9	-	7/2	44	42	35	58.5	61.9	-
Cheyenne	8885	29	40	0	0	61.8	60.7	-
Huntley 5B	-	28	43	0	0	59.0	59.0	43.9
Rio-Rex X Chey.	472361	24	38	0	0	63.8	58.4	-
Rex X Rio	43096	22	36	0	0	62.7	57.9	-
Tenmarq	6936	24	42	8	25	62.2	57.6	-
Kharkof	1442	29	44	20	10	62.5	57.1	48.6
Mqo.-Oro X O.-T.-Flo.	K47B9	23	42	0	0	62.5	55.9	-
Turkey X Oro	12705	30	45	23 1/	30	60.7	52.9	49.3
Nebred	10094	27	41	26	30	62.9	52.7	50.0
Wasatch	11925	27	43	15	30	62.1	51.5	49.7
Turkey X Oro -205	-	29	43	9	30	63.2	51.1	46.2
Yogo	8033	7/2	44	26	20	62.1	50.4	47.5
Comanche	11673	22	42	5	30	60.2	50.4	-
Minter	12138	7/1	44	10	20	63.6	48.8	44.8
Turkey X Oro - 216	-	26	42	0 1/	0	62.6	47.2	44.7
Rio X Rex	43131	21	38	0	0	63.3	47.1	-

1/ Severely broken at crown
Standard error of a difference = 5.09 bus.

Huntley, Montana
Six - nursery plots

Variety	CI I. No.	Date headed	Plant height	Loose smut	Av. acre yield 1951
		June	Ins.	No. 1/	Bus.
Cheyenne	8885	16	33	16	29.5
Tenmarq	6936	15	34	17	29.3
Turkey X Oro	12705	17	35	0	29.0
Comanche	11673	14	35	0	28.3
Newturk	6935	16	34	0	27.8
Ridit X Kharkof	12521	17	35	0	27.7
Karmont	6700	17	34	2	26.8
Nebred	10094	17	32	0	26.5
Kharkof	1442	17	34	0	26.5
Yogo	8033	19	36	0	26.0
Turkey X Oro - 205	--	16	35	0	25.5
Yogo X Wasatch -11	--	21	38	3	25.3
Wasatch	11925	16	35	2	25.2
Turkey X Oro -216	--	16	32	0	24.6
Yogo X Wasatch -9	--	19	35	0	23.6
Minter	12138	19	36	0	23.3

1/ Total in six replications

Standard error of a difference = 1.74 bus.

Moccasin, Montana
Six nursery plots

Variety	C. I. No.	Survival	Date Headed	Plant height	Weight per bushel	Av. Acre yield	
						1951	1950-51
		%	June	Ins.	Lbs.	Bus.	Bus.
Karmont	6700	61	12	29	55	17.1	24.1
Newturk	6935	66	10	29	56	16.1	21.4
Yogo	8033	68	12	29	55	16.0	24.1
Yogo x Wasatch - 9	-	70	14	29	55	15.3	24.8
Cheyenne	8885	59	13	27	57	14.9	-
Ridit x Kharkof	12521	41	12	29	55	14.8	23.3
Tenmarq	6936	33	14	28	53	14.1	-
Yogo x Wasatch - 11	-	43	13	29	54	13.6	23.9
Minter	12138	70	12	29	55	13.4	23.0
Nebred	10094	45	12	27	55	12.9	20.3
Kharkof	1442	63	12	29	55	12.2	-
Turkey x Oro	12705	43	13	29	55	11.6	-
Wasatch	11925	29	13	30	55	11.1	-
Turkey x Oro - 205	-	33	14	28	53	9.5	-
do - 216	-	24	12	28	55	9.4	14.8
Comanche	11673	13	10	27	55	8.2	-

Standard error of a difference = 1.88 bus.

Havre, Montana
Three 1/50 acre plots on fallow

Variety	C. I. No.	Sur-viv-al	Date Head-ed	Plant height	Weight per bushel	Average acre yield	
						1951	1950-51
		%	June	Ins.	Lbs.	Bus.	Bus.
Mont. 36-Belog. x Kanred	12108	83	18	32	59.5	36.2	23.5
Karmont	6700	82	21	34	57.6	34.4	20.6
Kharkof	1442	83	21	34	59.1	33.7	21.5
Newturk	6935	70	21	36	57.6	31.2	-
Yogo	8033	80	22	34	56.8	31.0	22.7
Minter	12138	78	22	37	57.3	29.8	20.7
Turkey x Oro	12705	68	22	33	56.8	28.3	14.2
Ridit x Kharkof	12521	32	25	36	55.6	25.4	15.3

Standard error of a difference = 3.17 bushels

STANDARD ERRORS

Standard errors have been calculated on the yield data for the current year. A summary of these is shown in table 2 together with the number of plots and average yields at each station. A footnote indicates where nursery plots were used in place of field plots.

The analysis of variance was used on the data at each station. The square root of the mean square due to error, or the standard deviation, was divided by the square root of the number of replications of each variety to obtain the standard error of the mean. The standard error of a difference between any two variety means was obtained by multiplying the standard error of a mean by the square root of 2. Error expressed as a percentage of the mean is given also. These statistics have considerable practical value to the agronomist even though complete random arrangement of plots was not followed at all stations.

SUMMARY OF PLOT DATA

Summaries of yield data for 1951 and the recent two-year period appear in sections which follow along with an average of other agronomic data for 1951.

YIELDS BY DISTRICTS

Yields in the southern district were obtained uniformly for 9 varieties at 5 stations in 1951 and have been assembled in table 3. Kiowa and Kharkof head the list followed by Red Chief and Comanche. Triumph had a bad year, being too advanced to profit from the late rains of the season.

Varietal rank involving the two-year averages as shown in table 4 is similar to that mentioned for 1951. Kiowa led with a margin of 0.7 bushel over the next variety. The two earliest maturing varieties and Quanah ranked last.

Yields in the central district are assembled in table 5 for 9 varieties grown at 7 stations in 1951. Red Chief and Kiowa averaged over 32 bushels to the acre. Ponca and Wichita did well southeastward but gave low yields at northern and western stations because of winter killing.

In table 6 the central district two-year average yields are shown. Kiowa had the highest 16-station-year average followed closely by the other varieties. Red Chief and Ponca had averages below 30 bushels to the acre.

Six varieties were grown in uniform plot tests in the northeastern district. Yields for 1951 are summarized in table 7 and for the recent two year period in table 8. Blackhawk and Iohardi have the highest averages in both comparisons but these varieties have less winterhardiness than the others.

The northwestern district summary of yields for 1951 is in table 9 and the summary for 1950 - 1951 is in table 10. Karmont and C.I. 12521 lead in both comparisons.

Table 2. Number of plots, average yield, and standard errors for the variety test at the cooperating stations, 1950.

State and Station	No. of plots	No. of Var.	Average yield all varieties	Standard error of a			
				Single plot	Difference between means	Mean in	
						Bushels	Percent
			Bus.	Bus.	Bus.		
Texas							
Chillicothe**	10	26	18.64	3.47	1.55	1.10	5.89
Bushland *	10	9	10.38	2.95	1.32	0.93	8.99
Oklahoma							
Stillwater	4	18	17.80	2.32	1.64	1.16	6.52
Cherokee **	5	17	27.00	3.81	2.41	1.70	6.31
Woodward *	4	17	19.30	2.91	2.06	1.46	7.55
Kansas							
Manhattan	3	26	43.59	3.01	2.46	1.74	3.99
Hays	4	22	36.06	3.02	2.14	1.51	4.19
Colorado							
Akron	4	15	19.46	2.10	1.48	1.05	5.38
Ft. Collins *	7	15	59.81	6.42	3.43	2.43	4.06
Nebraska							
Lincoln	5	21	25.50	1.55	0.98	0.70	2.70
North Platte	4	16	20.65	3.80	2.69	1.90	9.20
Alliance *	6	23	5.24	2.66	1.53	1.09	20.70
Wyoming							
Sheridan	3	12	20.12	2.62	2.14	1.51	7.50

Table 2 contd.

Minnesota							
St. Paul	3	13	34.40	5.94	4.85	3.43	10.00
Waseca	3	13	33.70	2.93	2.40	1.69	5.01
Grand Rapids	3	13	45.40	Not significant			
Montana							
Bozeman *	6	25	58.50	8.81	5.09	3.60	6.14
Huntley *	6	16	26.60	3.02	1.74	1.23	4.63
Moccasin *	6	16	13.10	3.25	1.88	1.33	10.12
Havre	3	8	31.25	3.88	3.17	2.24	7.16

* Nursery Plots.

Table 3. Summary of average yields of varieties grown uniformly at 5 stations in the southern district, 1951.

Variety	C. I. No.	Average yield in bushels per acre at					Five station average
		Chilli-cothe	Bush-land	Still-water	Chero-kee	Wood-ward	
Kiowa	12133	21.6	11.7	18.4	32.3	20.4	20.9
Kharkof	1442	19.1	13.8	19.0	31.7	20.4	20.8
Red Chief	12109	20.2	12.7	15.1	26.3	24.9	19.8
Comanche	11673	18.9	9.2	17.4	30.2	21.4	19.4
Tenmarq	6936	18.1	10.3	16.2	26.8	21.0	18.5
Ea. Blackhull	8856	16.5	8.4	14.1	22.5	17.3	15.8
Ponca	12128	18.6	9.0	17.9	16.4	14.4	15.3
Quanah	12145	17.2	8.9	14.9	16.5	14.8	14.5
Triumph	12132	9.3	9.5	15.4	19.3	8.4	12.4

Table 4. Summary of varietal yields from plot tests at 6 stations in the southern district for one or both of the years 1950 and 1951.

Variety	C. I. No.	Average yield in bushels per acre at						Six station average
		Dent-on	Chilli-cothe	Bush-land	Still-water	Chero-kee	Wood-ward	
No. years grown.....		1	2	2	2	2	2	11
Kiowa	12133	10.3	27.7	12.9	21.0	24.0	16.5	19.5
Red Chief	12109	8.6	23.7	14.1	19.7	22.2	19.4	18.8
Kharkof	1442	9.7	26.4	10.2	20.4	23.7	15.8	18.4
Comanche	11673	8.6	25.0	10.3	20.1	23.8	16.6	18.2
Tenmarq	6936	9.3	25.2	9.8	18.8	22.0	16.2	17.6
Ponca	12128	13.4	25.1	9.1	19.8	14.1	12.6	15.9
Ea. Blackhull	8856	7.7	22.9	8.9	18.8	18.7	13.5	15.8
Quanah	12145	13.4	24.6	5.7	15.6	11.6	11.0	13.7
Triumph	12132	8.1	16.5	8.0	19.9	16.3	9.0	13.4

Table 5. Summary of average yields of the varieties grown uniformly at 7 stations in the central district in 1951.

Variety	C. I. No.	Average yield in bushels per acre at							Seven-station average
		Man-hattan	Hays	Akron	Fort Collins	Lin-coln	North Platte	All-iance	
Red Chief	12109	38.5	37.7	19.3	63.5	32.8	30.8	6.1	32.7
Kiowa	12133	46.8	41.6	21.8	62.0	22.8	21.7	9.4	32.3
Chiefk. X Oro - Tq.	12518	47.2	40.8	19.7	62.6	24.6	20.8	4.6	31.5
Kharkof	1442	39.9	36.8	21.7	58.3	24.0	25.6	8.6	30.7
Tenmarq	6936	45.4	37.3	21.9	63.7	23.7	18.5	1.4	30.3
Comanche	11673	44.5	39.7	18.9	60.5	24.8	15.0	4.7	29.7
Pawnee	11669	45.6	37.7	20.6	59.3	24.6	13.1	2.3	29.0
Wichita	11952	41.1	34.4	19.1	62.4	24.4	8.3	2.3	27.4
Ponca	12128	46.3	35.5	18.8	55.8	21.2	6.7	0.6	26.4

Table 6. Summary of varietal yields from plot tests at 9 stations in the central district for part or all of the period 1950 - 1951.

Variety	C. I. No.	Average yield in bushels per acre at									Nine-station average
		Man-hattan	Hays	Garden City	Colby	Akron	Ft. Collins	Lin-coln	North Platte	Alli-ance	
No. years grown.....		2	2	1	1	2	2	2	2	2	16
Kiowa	12133	44.9	29.2	15.9	38.6	22.3	54.1	37.2	27.4	12.8	31.9
Wichita	11952	44.9	27.9	17.4	42.0	20.6	56.5	39.0	20.8	9.5	31.1
Comanche	11673	43.8	29.7	13.0	37.9	20.4	53.2	40.4	25.2	9.7	31.0
Kharkof	1442	38.6	25.9	11.3[1/]	32.9[1/]	22.2	56.6	38.3	31.3	13.2	31.0
Tenmarq	6936	42.6	28.6	11.3	35.1	21.7	54.2	39.5	27.5	9.1	30.8
Pawnee	11669	44.9	28.5	18.8	37.2	20.4	51.9	39.0	22.3	8.1	30.4
Red Chief	12109	36.5	26.6	10.8	27.5	20.9	56.1[2/]	38.9	30.6	10.4	29.9
Ponca	12128	45.1	25.6	8.7	31.7	19.3	52.1	34.8	20.3	7.5	28.1

1/ Turkey 2/ One year interpolated.

Table 7. Summary of average yields at 6 varieties grown uniformly at 4 stations in the northeastern district in 1951.

Variety	C. I. No.	Average yield per acre in bushels at				
		Ames	Waseca	Saint Paul	Grand Rapids	Four stations
Blackhawk	12218	20.3	37.4	38.0	44.9	35.2
Iohardi	12510	20.0	35.1	37.6	43.6	34.1
H44 X Minturki 2	12532	19.9	34.8	34.9	43.9	33.4
H44 - Minh. X Marmin	12704	19.0	34.3	35.0	44.8	33.3
Minter	12138	18.7	32.2	31.4	46.5	32.2
Minturki	6155	20.3	33.1	27.6	46.2	31.8

Table 8. Summary of yields made by uniform varieties in the northeastern district during the two year period 1950 - 1951.

Variety	C. I. No.	Average acre yield in bushels at				
		Ames	Waseca	Saint Paul	Grand Rapids	Four stations
No. years grown.....		2	2	2	2	8
Blackhawk	12218	29.3	34.0	32.6	40.4	34.1
Iohardi	12510	28.7	32.8	35.6	36.5	33.4
H44 X Minturki 2	12532	28.4	32.5	31.0	39.8	32.9
Minturki	6155	30.0	33.6	26.1	41.9	32.9
Minter	12138	29.7	31.5	28.5	40.5	32.6
H44 - Minh. X Marmin	12704	26.5	29.3	32.2	37.0	31.3

Table 9. Summary of average yields of varieties grown uniformly at 5 stations in the northwestern district in 1951.

Variety	C. I. No.	Average acre yield in bushels at					Five-station Average
		Sheridan	Bozeman	Huntley	Moccasin	Havre	
Karmont	6700	21.7	71.1	26.8	17.1	34.4	34.2
Kharkof	1442	20.2	57.1	26.5	12.2	33.7	29.9
Ridit X Kharkof	12521	21.4	79.0	27.7	14.8	25.4	33.7
Yogo	8033	21.7	50.4	26.0	16.0	31.0	29.0
Turkey X Oro	12705	19.3	52.9	29.0	11.6	28.3	28.2
Minter	12138	22.9	48.8	23.3	13.4	29.8	27.6
Cheyenne	8885	22.3	60.7	29.5	14.9	--	--
Nebred	10094	20.6	52.7	26.5	12.9	--	--

Table 10. Summary of average yields of varieties grown in 1950 and 1951 at 5 stations in the northwestern district.

Variety	C. I. No.	Average acre yield in bushels at					Five-station Average
		Sheridan	Bozeman	Huntley	Moccasin	Havre	
No. years grown.....		2	2	1	2	2	9
Karmont	6700	33.0	61.9	26.8	24.1	20.6	34.0
Ridit X Kharkof	12521	32.3	66.6	27.7	23.3	15.3	33.6
Yogo	8033	33.7	47.5	26.0	24.1	22.7	31.3
Minter	12138	34.7	44.8	23.3	23.0	20.7	30.0
Nebred	10094	32.0	50.0	26.5	20.3	--	--
Kharkof	1442	31.7	48.6	26.5	--	21.5	--
Turkey X Oro	12705	29.0	49.3	29.0	--	14.2	--

SUMMARY OF AGRONOMIC DATA

Data other than yield of grain are summarized for the varieties by districts in tables 11 to 14. In all tables the varieties are listed in order of decreasing weight per bushel. The number of stations reporting on each varietal character is shown at the top of each column of data.

Nine varieties were compared in the southern district (table 11). Quanah and Ponca survived poorest, Early Blackhull and Triumph were earliest to head and ripen, Red Chief was tallest and had the heaviest weight per bushel. In the central district nine varieties were rated on seven characters at 2 or more stations (Table 12). Ponca and Wichita survived poorest and Kharkof best, Wichita was earliest to head and ripen while Kharkof was latest, Pawnee and Ponca were shortest, Kiowa lodged least and Ponca had the most resistance to leaf rust. Red Chief and Kiowa had weights per bushel over 60 pounds.

Six varieties were grown at four stations in the northeastern district where they were rated on five characters (Table 13). Not much difference was manifest in heading and ripening although Iohardi appeared earliest; C. I. 12704 was shortest; Blackhawk had the lowest readings on leaf rust; Iohardi was the heaviest in weight per bushel. Six varieties were compared in the northwestern district (table 14). C. I. 12705 and C. I. 12521 survived with poorer stands than the other varieties and had lower weight per bushel.

Table 11. Summary of agronomic data other than yield for varieties grown in plot tests in the southern district, 1951.

Variety	C. I. No.	Survival	Av. date		Plant height	Weight per bushel
			Headed	Ripe		
		%	May	June	Ins.	Lbs.
Number of stations.....		2	4	4	4	5
Red Chief	12109	94	13	22	29	62.7
Kiowa	12133	93	9	17	25	61.3
Ponca	12128	89	11	19	25	61.0
Early Blackhull	8856	93	4	13	24	60.8
Comanche	11673	92	9	19	25	60.7
Tenmarq	6936	93	11	18	26	60.5
Triumph	12132	93	6	12	22	60.4
Kharkof	1442	93	15	22	27	60.0
Quanah	12145	73	10	16	26	59.8

Table 12. Summary of agronomic data other than yield for varieties grown in plot tests in the central district, 1951.

Variety	C. I. No.	Survival	Date		Plant height	Lodging	Leaf rust	Weight per bushel
			Headed	Ripe				
		%	June	July	Ins.	%	%	Lbs.
Number of stations.....		2	7	5	5	2	2	5
Red Chief	12109	30	6	13	41	21	44	61.4
Kiowa	12133	30	5	12	38	18	54	60.0
Chiefk. X Oro - Tq.	12518	30	6	12	39	24	50	59.8
Wichita	11952	7	4	10	38	25	51	59.6
Ponca	12128	5	7	12	36	32	T	59.5
Comanche	11673	23	5	11	37	28	32	59.2
Pawnee	11669	19	5	11	36	23	47	59.1
Kharkof	1442	47	12	16	40	69	38	58.6
Tenmarq	6936	25	9	13	39	26	47	58.1

Table 13. Summary of agronomic data other than yield for varieties grown in the northeastern district, 1951.

Variety	C. I. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Weight per bushel
		June	July	Ins.	%	Lbs.
Number of stations.....		4	4	4	4	4
Iohardi	12510	16	24	42	63	60.0
H44 X Mint.[2]	12532	18	24	43	48	59.7
Minter	12138	17	23	41	38	59.4
Blackhawk	12218	18	25	44	12	59.2
Minturki	6155	18	24	42	57	58.6
H44-Minh. X Marmin	12704	17	23	39	61	57.3

Table 14. Summary of agronomic data other than yield for varieties grown in plot tests in the northwestern district, 1951.

Variety	C. I. No.	Survival	Date headed	Plant height	Weight per bushel
		%	June	Ins.	Lbs.
Number of stations.....		3	5	5	4
Kharkof	1442	78	21	35	58.7
Minter	12138	78	21	36	58.5
Karmont	6700	79	21	35	58.1
Yogo	8033	79	22	35	58.0
Turkey X Oro	12705	66	21	35	56.9
Ridit X Kharkof	12521	55	22	36	56.4

UNIFORM YIELD NURSERY

Workers at seventeen stations cooperated in planting and collecting data on the 25 varieties comprising the uniform yield nursery. Plantings failed to make a grain crop at Denton, Clovis, Colby, Akron, and Ames, Kharkof, Blackhull, and Early Blackhull were again included as the permanent check varieties. Five new selections were added in 1951 and seven older selections discontinued. Three to ten replications were planted at each station. The entries in the current test were the following:

Entry No.	Name	C.I.No.	State No.
1	Kharkof	1442	
2	Blackhull	6251	
3	Early Blackhull	8856	
4	Pawnee	11669	
5	Comanche	11673	
6	Triumph	12132	
7	Blue Jacket	12502	
8	29-34-275 D. Cross	12511	Tex. 172-43-205
9	do	12512	Tex. 172-44-104
10	Kiowa	12133	H.C. 46-112
11	Chiefkan x Oro-Tenmarq	12518	H.C. 46-41
12	Mqo. - Oro x Oro - Tenmarq	12406	Kans. 431420
13	Hd. Federation Hybrid	12515	Wd. 43 h 1-399
14	Blackhull-Oro x Pawnee	12516	Wd. 43 h 1-400
15	Comanche x Blk. - Hd. Fed.	12517	Wd. 43 h 2 - 123
16	Kawvale - Tenmarq x Comanche	12524	Kans. 451689
17	Quiv. x Kan.-Hd. Fed. x Prel.-Kan.	12525	Kans. 373963
18	Sinvalocho - Wichita x Hope-Chey.	12701	Tex. 208-46-22
19	C. I. 12701 x Wichita	12702	Tex. 237-46-22
20	C. I. 12701 x Wichita	12703	Tex. 237-46-23-1
21	Stafford	12706	S. E. Blackburn
22	Pawnee Selection 33	12707	F. J. & W. P. Raleigh
23	Comanche x Chey. - Blackhull	12708	Wd. 43h3-86
24	Blackhull-Oro x Pawnee	12709	Wd. 43h1-398
25	Comanche x Blk. - Hd. Fed.	12710	Wd. 43h2-315

DATA OBTAINED

Data collected in 1951 at twelve of the stations are in table 15. A two-year average yield for the older entries is shown also. This is a better evaluation of the yielding ability of a variety than is a single year. Standard error of a difference values given for each station refer to the yield of grain in 1951.

Conditions over the area where this nursery was grown have been covered in some detail in this report under "Plot Data." With few exceptions, noted here, the same or similar conditions prevailed in this and the plot series. Drought, green bugs and winterkilling were the dominant hazards. Late seasonal rains aided late maturing varieties more than they aided early types.

There were two tests harvested in Texas. At Chillicothe, heading was at about the normal date but ripening was much later. However, a good yield of plump grain was produced. C. I. Nos. 12708, 12702, 12517, 12515 and Blue Jacket made the highest yields with Triumph scarcely two-fifths as good. Two-year averages favor C. I. 12702 12515 and 12516. In the Bushland test the average yield was only 9.7 bushels to the acre. Kharkof and C. I. 12710 ranked highest. Two very early varieties yielded least. Two-year averages are low also with Blue Jacket showing the highest yield.

Three nurseries in Oklahoma resulted in good yields and much information. At Stillwater and Cherokee C. I. No. 12517 was very outstanding. At the former station C. I. 12702, 12515 and 12709 also did well. Early varieties occupied the four positions of lowest yield. All test weights were above 60 pounds with six entries above 62. Two-year averages strengthen the position of promise shown by C. I. 12517, 12702, and 12515 although 12701 and 12516 are good also at this location. In the Cherokee test there was considerable decline in stand from that of early spring to late May. This appeared to be an interaction of greenbug attack on winter weakened varieties. In addition to C. I. 12517, C. I. 12515, 12406, Blue Jacket, and 12709 gave excellent yields. Two-year averages emphasize the good performance of C. I. 12517 and 12515. Lower yields were made by most varieties at Woodward than at Cherokee with highest ranking positions going to C. I. 12702, 12515, 12701 and 12517. In general, early varieties were among the poorest in yield this year. The two years gave the varieties similar rank in yield.

The two Kansas tests gave good yields. At Manhattan, Kiowa and the sister line C. I. 12518 yielded over 40 bushels to the acre. Kharkof was lowest and for some reason Pawnee gave a low yield also. Leaf and stem rust were present. Two-year averages favor Kiowa, C. I. 12518, and Blackhull. All except C. I. 12511 and 12512 survived with excellent stands at Hays. Maturity was delayed on account of heavy rains and weight per bushel was below 60 in all cases. C. I. 12517 yielded most and has the best two-year average.

In Colorado, the Akron test was destroyed by cut worms. The Ft. Collins test resulted in excellent yields and test weights with lodging reported on only two varieties. C. I. 12516 and 12702 exceeded 70 bushels to the acre and these with C. I. 12517 and 12406 have two-year averages over 62 bushels to the acre.

Stands were thinned by winterkilling at the three Nebraska locations. At Lincoln, however, killing was limited in extent with serious consequences in a few varieties. Maturity was later than normal. Leaf rust developed rather abundantly and was loosely related to yield in varieties with good survival. C. I. 12406, 12515 and 12710 made the highest yields. Two-year averages made by C. I. 12515 and 12517 were highest whereas 12511 was lowest. At North Platte, C. I. 12707 was the only variety surviving with more than a half stand, most averaging about 1/3 to 1/4 stand

with considerable variability in the replications. The stand was strongly correlated with yield. Hessian fly did some damage. Owing to the low yield level, weight per bushel was obtained on only part of the varieties. C. I. 12518, 12709, and Kharkof were highest in yield. Two-year averages favor C. I. 12517, 12515 and 12406. Winter-killing was even more severe at Alliance where survivals ranged from zero to 30 per cent. Varietal response was rather inconsistent in different replications. Mosaic and hessian fly further depressed growth, resulting finally in the total failure of 14 entries. C. I. 12515 and 12406 yielded over 10 bushels to the acre and have good two-year averages along with Kharkof and 12518.

The Iowa nursery at Ames was thinned extensively by winter killing. Notes on three diseases were recorded and may be of interest to cooperators. No yields were taken.

Table 15. Yield and other data for varieties grown in the uniform yield nursery in cooperative experiments at 12 stations in the hard winter wheat region in 1951, and average yield for 1950 - 51.

Chillicothe, Texas
Four plots

C. I. No.	Date		Weight per bushel	Av. acre yield	
	Headed	Ripe		1951	1950-51
		June	Lbs.	Bus.	Bus.
12708	4/28	12	63	24.6	--
12502	4/28	8	63	23.3	25.2
12702	5/1	12	63	23.0 1/	28.0
12517	5/1	8	64	22.2	26.4
12515	4/28	5	63	22.1	27.9
12703	4/25	5	63	20.6	21.9
12516	5/3	8	--	20.5	27.3
12518	5/3	12	62	20.3	24.2
12709	5/3	12	62	20.2	--
12133	4/28	12	63	19.8	24.6
1442	5/6	22	61	19.2	25.0
12710	5/3	22	61	18.5	--
11673	4/28	22	62	18.0	23.8
11669	5/5	22	61	17.9	22.5
12707	4/25	5	62	17.9	--
12524	4/28	5	62	17.3	23.0
12706	5/3	22	62	16.5	--
12525	4/20	5	63	16.3 1/	17.8
12406	4/28	12	62	15.8	20.9
6251	5/3	22	61	15.6	22.2
12511	4/28	8	61	13.6	21.0
12701	4/28	8	62	13.0	18.4
8856	4/26	12	61	12.9 1/	20.2
12512	5/5	22	61	10.3	18.7
12132	4/27	5	63	8.9 1/	16.3

1/ One plot interpolated.
Standard error of a difference = 3.20 bushels.

Bushland, Texas
Ten plots, Four irrigated

C. I. No.	Survival	Date headed	Plant height	Weight per bushel	Av. acre yield	
					1951	1950-51
	%	May	Ins.	Lbs.	Bus.	Bus.
1442	95	20	25	58.0	13.8	10.2
12710	98	18	23	59.5	13.4	--
12502	95	16	27	60.5	13.1	13.4
12515	90	13	22	60.5	12.4	10.7
12518	95	13	22	60.5	12.3	11.3
12709	95	18	24	60.5	12.1	--
12133	95	13	21	61.0	11.7	12.9
6251	95	16	24	59.5	11.4	11.2
12516	90	16	22	60.5	10.1	8.7
12706	95	17	25	60.5	10.0	--
12703	90	13	20	60.0	9.9 1/	9.7
12132	95	10	21	60.5	9.5	8.0
12517	88	13	20	62.0	9.5	8.1
11673	93	15	20	60.0	9.2	10.3
12511	75	15	22	59.5	8.7	5.1
8856	95	8	21	61.5	8.4	8.9
12701	90	12	18	60.5	8.3	6.3
12512	75	15	22	59.5	8.2	5.7
12702	93	13	20	62.0	8.1	7.7
12708	83	17	23	59.5	8.1	--
11669	97	13	21	60.5	8.0	9.3
12524	95	12	19	61.0	7.5	7.5
12406	88	14	21	59.0	6.6 1/	5.6
12707	90	7	18	61.0	6.4 1/	--
12525	88	7	19	62.5	6.1	4.5

1/ One replication interpolated
Standard error of a difference = 1.18 bushels.

Stillwater, Oklahoma
Four plots

C. I. No.	Date		Plant height	Leaf rust		Weight per bushel	Av. acre yield	
	Headed	Ripe		Type	Severity		1951	1950-51
	May	June	Ins.	1/	%	Lbs.	Bus.	Bus.
12517	4	14	33	4	19	62.8	41.0	36.7
12702	4	12	33	4,0,x	3	60.8	37.5	34.8
12515	5	12	32	4	15	62.0	36.3	34.6
12709	7	16	31	4	11	62.3	36.2	--
12701	3	11	31	2,4,0,x	1	61.2	35.8	35.2
12516	6	14	33	4	16	62.9	35.3	34.6
12708	8	16	32	1,4	14	61.1	35.0	--
12710	8	15	31	4	17	61.1	34.8	--
11673	5	12	32	4	18	61.0	34.7	30.3
12524	4	11	29	4	42	61.1	33.0	30.8
12518	4	12	31	4	32	60.3	33.0	31.6
12133	3	11	30	4	30	61.0	30.9	28.4
1442	10	17	32	4	22	60.6	30.4	29.0
11669	4	12	29	4	37	61.2	30.1	28.1
12502	6	17	35	4	30	62.0	29.6	27.7
2703	3	14	29	1,4,x	2	61.3	29.0	27.1
6251	9	17	32	4	22	61.0	28.9	28.1
2406	5	15	31	4	13	61.3	28.8	27.4
2706	7	16	32	4	23	61.2	28.5	--
2511	8	15	31	3,4,x	2	60.1	26.9	26.2
2512	9	16	32	3,4,0	4	60.1	25.7	24.0
2132	4/30	8	26	4	27	61.8	25.5	24.7
3856	1	10	29	4	15	61.9	25.1	24.9
3525	4/26	9	25	4	3	63.1	22.5	24.1
2707	4/28	7	25	4	28	61.1	21.2	--

All rust readings by Botany and Plant Pathology Department. 0 = 0; or fleck type. 4 = susceptible.
Standard error of a difference = 2.16 bushels.

Cherokee, Oklahoma
Four plots

C. I. No.	Stand			Plant height	Loose smut 1/	Weight per bushel	Av. acre yield	
	Early Spring	April 14	May 25				1951	1950-51
	%	%	%	Ins.	No.	Lbs.	Bus.	Bus.
12517	100	81	76	29	3	62.4	39.9	30.7
12515	97	84	79	31	0	60.1	31.2	25.5
12406	100	89	89	27	6	61.0	30.9	22.8
12502	99	83	80	34	2	62.1	30.4	22.6
12709	100	85	83	31	4	61.2	29.1	--
12516	99	81	73	30	0	61.5	28.6	23.4
12701	100	90	88	28	1	60.7	28.1	23.1
12525	100	89	87	24	0	61.7	27.8	18.6
12708	100	85	83	29	0	59.5	27.5	--
11673	97	85	79	31	3	59.2	27.3	22.8
12702	99	86	80	28	0	59.7	26.3	22.4
12710	99	88	81	29	0	57.6	25.9	--
1442	99	86	85	31	1	58.6	25.5	20.3
12518	99	89	78	29	15	59.7	25.0	19.2
12133	94	84	71	27	24	59.4	24.5	19.5
12703	99	88	88	25	4	59.1	23.7	18.6
12706	100	90	79	31	1	60.7	22.7	--
12524	100	86	74	27	0	58.1	21.1	17.2
8856	100	90	84	27	3	60.1	20.4	16.4
6251	97	86	84	31	2	58.8	20.2	18.4
12707	97	86	84	25	0	59.0	19.8	--
12132	94	79	58	26	0	57.1	17.4	15.6
11669	96	84	58	27	0	58.0	14.4	14.0
1251.2	79	69	41	32	38	59.3	13.3	--
1251.1	771	71	30	32	6	57.0	12.8	9.1

1/ Av. number heads per 40 feet of row.
Standard error of a difference = 2.71 bushels

Woodward, Oklahoma
Four plots

C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
	Headed	Ripe			1951	1950-51
	May	June	Ins.	Lbs.	Bus.	Bus.
12702	17	22	24	63.0	22.9	20.3
12515	18	23	25	63.0	22.8	23.5
12701	16	22	23	62.5	21.5	17.8
12517	19	24	23	63.8	20.3	22.6
12518	19	24	23	63.0	20.0	18.9
12709	20	25	27	63.8	19.6	--
12710	20	25	24	61.8	19.3	--
12133	19	25	24	62.3	18.8	15.1
12516	19	24	24	64.0	18.5	18.4
1442	23	26	26	61.9	17.9	15.7
6251	22	25	27	62.5	17.8	17.2
11673	20	25	23	62.5	17.4	15.3
12524	19	23	21	62.3	17.1	14.5
12706	21	27	28	63.0	16.5	--
12708	22	25	26	62.9	16.2	--
12502	20	25	29	63.0	15.8	15.3
12406	18	25	24	62.4	15.4	15.1
11669	21	24	23	62.0	15.2	11.9
12703	15	20	22	60.8	14.0	13.3
12132	12	17	19	60.1	12.9	10.3
8856	13	19	22	62.0	12.3	12.1
12525	8	15	20	62.2	12.1	11.1
12707	8	14	22	59.5	11.2	--
12511	21	27	26	61.2	11.0	10.7
12512	21	26	23	62.0	9.3	--

Standard error of a difference = 2.27 bushels.

Manhattan, Kansas
Six plots

C. I. No.	Date headed	Plant height	Rust 1/		Loose Smut	Weight per bushel		Av. acre yield	
			Leaf	Stem		Early cut	Av. early & late cut	1951	1950-51
	May	Ins.	%	%	2/	Lbs.	Lbs. 3/	Bus.	Bus.
12133	29	38	65	60	T	58.5	57.3	41.6	29.5
12518	28	37	65	60	T	58.0	57.3	40.6	29.0
12515	29	38	20	40	0	59.0	58.0	38.5	26.8
12706	31	40	49	70	T	60.0	59.1	38.6	--
12406	29	37	9	40	T	58.5	57.5	37.4	26.1
12709	6/1	38	14	60	2	56.5	56.7	37.4	--
6251	31	39	52	80	1	59.5	58.7	36.2	28.2
12132	21	34	60	60	0	58.5	57.7	36.0	24.6
12702	27	38	5	40	0	59.0	57.7	35.6	26.2
12703	27	37	2	70	T	58.5	57.8	35.5	24.2
12516	29	36	23	60	T	59.0	58.1	35.0	24.9
11673	29	38	24	80	0	54.5	54.6	34.9	24.7
12524	29	35	63	60	T	56.5	55.8	34.7	24.4
12702	31	40	78	80	1	59.5	58.9	34.6	26.9
12508	6/1	37	21	70	0	55.5	55.2	34.5	--
12517	27	38	20	60	T	56.5	56.3	33.5	24.2
12511	6/1	37	4	40	T	57.5	56.9	33.1	20.9
12710	6/1	39	30	90	T	52.5	52.6	33.0	--
8856	23	38	63	70	T	59.5	58.6	31.0	22.0
12525	19	33	27	80	1	58.5	57.7	29.7	19.5
12701	25	34	4	20	T	60.0	58.9	29.2	19.6
12707	20	35	63	70	0	58.0	57.2	28.8	--
11669	29	36	70	70	T	56.5	56.2	27.9	21.2
12512	6/2	36	3	40	3	57.5	56.8	27.9	18.8
1442	6/3	37	72	80	1	53.5	53.4	27.4	21.6

1/ Av. of 4 replications for leaf rust, one for stem rust; latter from artificial inoculum.
2/ Zero, none; 1, 1-2 plants per 8'; 3, 5-7 plants per 8'.
3/ Early cut on July 17; others July 21.

Standard error of a difference = 1.79 bushels.

Hays, Kansas
Four plots

C. I. No.	Survival	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1951	Av. acre yield 1950-51
	%	May	July	Ins.	Lbs.		
12517	100	25	4	38	57.8	51.5	40.4
12708	100	28	7	38	56.3	45.1	--
12706	100	30	8	39	58.6	44.6	--
12709	100	28	7	39	57.0	44.4	--
12516	100	28	7	38	56.6	43.9	33.9
11673	100	26	5	39	56.1	42.6	35.4
12524	100	25	4	37	55.5	42.0	34.4
12515	100	26	5	39	56.5	41.6	33.3
12702	99	25	4	39	57.0	41.2	34.7
12710	99	31	8	38	55.3	40.9	--
6251	100	29	8	40	56.4	39.9	33.0
12518	100	26	5	37	56.8	39.7	32.4
12703	98	24	3	39	56.6	39.1	29.5
12133	100	25	4	37	57.6	38.6	31.9
11669	100	24	3	37	55.9	38.3	33.2
8856	100	21	1	38	57.3	37.3	32.3
12132	99	19	6/29	35	56.6	37.0	32.1
12502	99	29	7	41	59.6	36.1	30.2
12406	100	26	6	37	57.1	35.9	30.4
12707	100	18	6/28	33	56.6	33.4	--
12512	74	31	8	39	57.1	32.3	24.1
12525	100	16	6/27	30	58.0	31.2	24.9
12511	71	31	8	35	56.1	28.4	24.3
12701	98	21	1	32	55.5	27.9	22.0
1442	100	6/1	9	38	53.5	27.2	25.0

Standard error of a difference = 2.95 bushels.

Ft. Collins, Colorado
Five plots

C. I. No.	Date		Plant height	Ledging	Weight per bushel	Av. acre yield	
	Headed	Ripe				1951	1950-51
	June	July	Ins.	%	Lbs.	Bus.	Bus.
12516	9	22	40	0	63.8	71.3	62.5
12702	6	21	41	0	64.0	70.1	62.5
12518	8	23	41	0	62.4	68.9	60.8
11673	8	23	39	0	62.8	68.6	53.8
12517	6	23	40	0	63.8	67.3	62.7
12515	7	24	40	0	63.4	66.1	61.4
12406	8	23	40	0	63.5	65.1	62.5
11669	8	23	39	0	62.1	64.9	54.2
12703	6	22	39	0	62.9	64.3	55.1
12524	6	21	36	0	62.8	64.1	55.7
12709 1/	13	23	41	0	63.8	63.4	--
12512	11	23	40	0	62.2	62.7	54.8
12511	10	23	40	0	62.0	62.2	54.3
12502	9	24	45	0	63.1	62.2	54.7
12133 1/	9	23	39	0	62.4	61.5	55.8
12132	5	20	38	0	63.2	59.4	49.7
8856	4	20	40	0	62.8	59.3	50.4
6251	9	23	42	0	63.1	58.9	50.3
12708 1/	13	24	40	0	62.5	57.5	--
1442	14	25	42	20	62.0	57.1	47.4
12525	5/28	19	33	0	64.3	56.5	49.6
12710 1/	13	24	39	0	62.1	54.2	--
12706 1/	11	24	44	4	63.0	52.1	--
12701	5	20	34	0	62.8	50.8	40.1
12707 1/	5/30	19	34	0	61.9	50.5	--

1/ Stands thin (82 - 88%) due to poor emergence.

Standard error of a difference = 4.83 bushels.

Lincoln, Nebraska
Five plots

C. I. No.	Surviv-al	Date head-	Plant height	Lodg-ing	Rust		Weight per bushel	Av. acre yield	
					Leaf 1/	Stem 2/		1951	1950-51
	%	June	Ins.	%	%	%	Lbs.	Bus.	Bus.
12406	98	5	43	2	5	65	58.0	34.4	44.7
12515	100	2	43	12	5	85	56.4	32.8	47.0
12710	99	9	43	12	5	95	57.6	31.4	--
12502	98	5	48	8	50	80	61.3	31.0	41.5
12708	97	8	42	3	5	90	58.6	30.8	--
12709	98	9	45	8	10	60	59.5	30.0	--
11669	99	2	41	2	40	75	56.2	29.9	43.5
12707	95	5/28	38	8	25	75	60.3	29.8	--
12524	99	2	39	0	15	85	57.5	29.3	43.4
12706	100	8	48	17	10	75	61.5	28.9	--
12517	100	1	43	11	5	90	55.3	28.9	46.6
12132	94	5/29	38	3	65	50	59.8	28.7	40.9
12518	100	4	43	0	45	65	57.7	28.5	43.0
12133	100	3	43	1	40	75	56.7	28.3	44.0
12516	99	6	43	11	25	85	58.3	28.2	42.6
11673	99	5	44	0	30	80	55.1	27.7	42.5
1442	100	13	45	21	25	75	55.6	25.8	39.1
8856	90	5/31	43	13	40	70	59.0	24.6	38.3
6251	95	10	46	11	35	70	59.4	24.3	35.8
12701	82	4	43	15	5	5-75	56.0	23.5	41.4
12702	87	4	43	16	2	75	57.4	23.2	40.8
12703	95	1	40	5	T	45	58.4	23.1	37.3
12512	60	12	41	0	3	10	58.6	22.8	35.5
12525	96	5/28	35	0	5	95	56.7	20.8	37.0
12511	43	12	39	1	10	10	56.8	17.7	32.7

1/ One replication. 2/ Rust nursery data. Artificially inoculated.

Standard error of a difference = 2.38 bushels.

North Platte, Nebraska
Three plots

C. I. No.	Survival	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1951	Av. acre yield 1950-51
	%	June	July	Ins.	Lbs.	Bus.	Bus.
12518	48	11	23	30	57.0	11.6	21.4
1442	35	22	28	33	55.0	10.5	21.7
12709	38	16	25	32	55.0	10.0	--
12706	45	15	26	34	57.5	8.7	--
12406	37	12	25	29	56.5	8.2	22.0
12502	33	16	26	32	59.5	7.7	16.9
12133	37	15	25	30	54.5	7.5	19.8
12517	35	13	25	29	55.0	7.4	23.7
12516	35	15	25	30	--	6.5	17.0
6251	20	17	27	33	--	6.4	15.5
12710	32	19	27	33	--	6.2	--
12515	28	15	26	29	--	5.8	22.4
12708	42	17	24	30	--	5.7	--
12701	25	14	23	29	--	5.6	15.3
11669	22	14	23	28	--	5.2	18.5
12702	27	14	23	31	--	5.0	18.3
12524	25	17	25	27	--	4.9	19.5
11673	23	16	24	29	--	3.9	17.9
12703	22	14	25	29	--	3.5	12.8
8856	17	8	26	28	--	3.4	13.8
12707	52	4	20	25	--	3.2 1/	--
12525	17	4	22	25	--	1.4	10.3
12132	15	11	20	26	--	1.2	12.0
12511	7	21	27	28	--	0.5	6.0
12512	7	21	28	27	--	0.2	8.3

1/ Half lost by ground squirrels.

Standard error of a difference = 2.51 bushels.

Alliance, Nebraska
Three plots

C. I. No.	Survival	Date headed	Weight per bushel	Av. acre yield	
				1951	1950-51
	%	June	Lbs.	Bus.	Bus.
12515	30	14	57.0	14.4	15.1
12406	18	15	--	10.2	12.0
12133	10	14	55.0	7.0	11.5
1442	30	20	53.0	6.7	14.0
12502	17	18	--	5.7	10.9
12518	23	13	--	5.4	12.6
12517	20	15	--	5.1	10.4
12706	10	19	--	4.5	--
11673	10	15	--	4.0	10.0
12524	15	14	--	3.9	8.7
11669	7	14	--	2.4	7.9
12132	15	13	--	0	7.6
12516	15	14	--	0	8.3
12709	10	18	--	0	--
12701	7	15	--	0	5.0
12525	7	12	--	0	4.7
12702	6	14	--	0	7.6
12707	4	14	--	0	--
12708	4	18	--	0	--
6251	3	18	--	0	8.6
12703	2	14	--	0	7.4
8856	2	15	--	0	7.6
12511	1	21	--	0	0
12710	1	20	--	0	--
12512	1	21	--	0	0

Standard error of a difference = 2.90 bushels.

Ames, Iowa
Three plots

C. I. No.	Survival	Bacterial Leaf spot	Septoria	Leaf rust
	%	%	%	%
1442	75	25	50	50
6251	37	35	50	40
8856	15	35	35	35
11673	48	15	60	60
12132	20	20	40	55
12502	47	20	35	35
12511	1	15	45	30
12512	1	30	25	30
12133	72	10	30	65
12518	67	15	25	65
12406	42	10	35	40 1/
12515	17	25	65	25 1/
12516	23	35	55	35
12517	15	20	35	30
12524	33	30	50	30
12525	35	35	45	20
12701	1	15	25	40
12702	8	20	60	T 1/
11669	22	50	45	40
12703	5	35	55	20 1/
12706	59	60	45	25
12707	51	95	60	25
12708	27	40	45	15 1/
12709	45	40	25	25
12710	30	20	35	30

1/ Type 1 pustules.

STANDARD ERRORS

A statistical summary of the yields produced in the various uniform nursery tests is made in table 16. Standard methods of computing the values were used as explained in connection with the plot tests. Standard errors of a mean in percent of the general average indicate the relative variation at each of the stations. It will be noted that very high coefficients appear for two of the Nebraska stations for reasons already explained.

SUMMARY OF NURSERY YIELDS

The yield of grain made by each variety at each of the stations is assembled in table 17 and averaged by states and for the whole region. High varieties by states were: Texas, Blue Jacket and Hard Federation Hybrid (C.I. 12515); Oklahoma, Comanche x Blackhull-Hard Federation (C. I. 12517) and C.I. 12515; Kansas, C.I. 12517 and Stafford; Colorado, Blackhull-Oro x Pawnee (C.I. 12516); Nebraska, C.I. 12515 and Marquillo-Oro x Oro-Tenmarq (C.I. 12406). The eleven-station average places C.I. 12517 and 12515 at the top, ten bushels per acre above the lowest yielding variety which was C.I. 12707.

Twenty of the varieties were grown in 1950 and 1951. A summary of the average yields is given in table 18. Comanche x Blackhull-Hard Federation (C.I. 12517) and Hard Federation Hybrid (C.I. 12515) had the highest eleven-station averages. In Texas C.I. 12515 and Blue Jacket averaged best while in Oklahoma C.I. 12517 and 12515 held top positions. In Kansas C.I. 12517, 12518 and Kiowa were high and in Nebraska the region-wide favorites prevailed.

C.I. 12517 and 12515 have now been tested for three years in this nursery. In 1949 these varieties ranked first and tenth respectively among 25 varieties grown at 14 stations. Their three-year records have been so impressive that both were entered as uniform plot varieties in the southern district for 1952. C.I. 12517 was entered in several of the plot tests at stations in Kansas.

Table 16. Number of plots, average yield, and standard errors for the uniform yield nursery at the various stations in 1951.

State and Station	No. of plots	No. of varieties	Average yield all varieties	Standard error of a			
				Single plot	Difference between means	Mean in	
						Bushels	Per cent
			Bus.	Bus.	Bus.		
TEXAS							
Chillicothe	4	25	17.93	5.06	3.20	2.26	12.61
Bushland	10	25	9.70	2.64	1.18	0.84	8.61
OKLAHOMA							
Stillwater	4	25	31.02	3.05	2.16	1.52	4.92
Cherokee	4	25	24.53	3.84	2.72	1.92	7.83
Woodward	4	25	16.62	3.21	2.27	1.61	9.67
KANSAS							
Manhattan	6	25	34.11	3.10	1.79	1.27	3.72
Hays	4	26	38.35	4.17	2.95	2.09	5.44
COLORADO							
Ft. Collins	5	25	61.57	7.63	4.83	3.41	5.54
NEBRASKA							
Lincoln	5	25	27.38	3.77	2.38	1.69	6.16
North Platte	3	25	5.61	3.08	2.51	1.78	31.65
Alliance	3	11	6.31	3.55	2.90	2.05	32.45

Table 17 Summary of the average yields in bushels per acre made by the 25 entries grown in the uniform yield nursery at 11 stations in 1951, with State averages.

Variety	C.I. NO.	Texas				Oklahoma				
		Chilli-cothe	Bush-land	Av.	Rank	Still-water	Chero-kee	Wood-ward	Av.	Rank
Com. X Bl.-Hd. Fed.	12517	22.2	9.5	15.9	8	41.0	39.9	20.3	33.7	1
Hard Fed. Hybrid	12515	22.1	12.4	17.3	2	36.3	31.2	22.8	30.1	2
Chiefk. X Oro-Tenq.	12518	20.3	12.3	16.3	5	33.0	25.0	20.0	26.0	10
Sv.-Wich-Ho-Chey X Wich^2	12702	23.0	8.1	15.6	10	37.5	26.3	22.9	28.9	3
Bl.-Oro X Pawnee	12516	20.5	10.1	15.3	11	35.3	28.6	18.5	27.5	6
Kiowa	12133	19.8	11.7	15.8	9	30.9	24.5	18.8	24.7	13
Mqo.-Oro X Oro-Tq.	12406	15.8	6.6	11.2	19	28.8	30.9	15.4	25.0	12
Comanche	11673	18.0	9.2	13.6	13	34.7	27.3	17.4	26.5	8
Blue Jacket	12502	23.3	13.1	18.2	1	29.6	30.4	15.8	25.3	11
Kv.-Tq X Comanche	12524	17.3	7.5	12.4	17	33.0	21.1	17.1	23.7	15
Kharkof	1442	19.2	13.8	16.5	3	30.4	25.5	17.9	24.6	14
Blackhull	6251	15.6	11.4	13.5	14	28.9	20.2	17.8	22.3	17
Pawnee	11669	17.9	8.0	13.0	16	30.1	14.4	15.2	19.9	20
Sv.-Wich-Ho-Chey X Wich.^{2}	12703	20.6	9.9	15.3	11	29.0	23.7	14.0	2212	18
Early Blackhull	8856	12.9	8.4	10.7	22	25.1	20.4	12.3	19.3	21
Sv.-Wich. X Ho.-Chey.	12701	13.0	8.3	10.7	22	35.8	28.1	21.5	28.5	4
Triumph	12132	8.9	9.5	9.2	25	25.5	17.4	12.9	18.6	22
Quivira Hyb.	12525	16.3	6.1	11.2	19	22.5	27.8	12.1	20.8	19
29-34-275D.Cr.	12511	13.6	8.7	11.2	19	26.9	12.8	11.0	16.9	24
29-34-275D.Cr.	12512	10.3	8.2	9.3	24	25.7	13.3	9.3	16.1	25
Blk.-Oro X Pawnee	12709	20.2	12.1	16.2	6	36.2	29.1	19.6	28.3	5
Com. X Chey.-Blk.	12708	24.6	8.1	16.4	4	35.0	27.5	16.2	26.2	9
Com. X Blk.-Hd. Fed.	12710	18.5	13.4	16.0	7	34.8	25.9	19.3	26.7	7
Stafford	12706	16.5	10.0	13.3	15	28.5	22.7	16.5	22.6	16
Pawnee Sel.	12707	17.9	6.4	12.2	18	21.2	19.8	11.2	17.4	23

(Table 17 continued)

C. I. No.	Kansas				Colorado		Nebraska					Eleven-station average	Rank
	Manhattan	Hays	Av.	Rank	Fort Collins	Rank	Lincoln	North Platte	Alliance	Av.	Rank		
12517	33.5	51.5	42.5	1	67.3	5	28.9	7.4	5.1	13.8	8	29.7	1
12515	38.5	41.6	40.1	5	66.1	6	32.8	5.8	14.4	17.7	1	29.5	2
12518	40.6	39.7	40.2	4	68.9	3	28.5	11.6	5.4	15.2	3	27.8	3
12702	35.6	41.2	38.4	10	70.1	2	23.2	5.0	0	9.4	20	26.6	6
12516	35.0	43.9	39.5	8	71.3	1	28.2	6.5	0	11.6	15	27.1	5
12133	41.6	38.6	40.1	5	61.5	15	28.3	7.5	7.0	14.3	5	26.4	7
12406	37.4	35.9	36.7	15	65.1	7	34.4	8.2	10.2	17.6	2	26.2	9
11673	34.9	42.6	38.8	9	68.6	4	27.7	3.9	4.0	11.9	14	26.2	10
12502	34.6	36.1	35.4	17	62.2	13	31.0	7.7	5.7	14.8	4	26.3	8
12524	34.7	42.0	38.4	10	64.1	10	29.3	4.9	3.9	12.7	10	25.0	13
1442	27.4	27.2	27.3	25	57.1	20	25.8	10.5	6.7	14.3	5	23.8	16
6251	36.2	39.9	38.1	12	58.9	18	24.3	6.4	0	10.2	17	23.6	17
11669	27.9	38.3	33.1	19	64.9	8	29.9	5.2	2.4	12.5	11	23.1	18
12703	35.5	39.1	37.3	13	64.3	9	23.1	3.5	0	8.9	22	23.9	15
8856	31.0	37.3	34.2	18	59.3	17	24.6	3.4	0	9.3	21	21.3	21
12701	29.2	27.9	28.6	24	50.8	24	23.5	5.6	0	9.7	19	22.2	19
12132	36.0	37.0	36.5	16	59.4	16	28.7	1.2	0	10.0	18	21.5	20
12525	29.7	31.2	30.5	22	56.5	21	20.8	1.4	0	7.4	24	20.4	22
12511	33.1	28.4	30.8	21	62.2	13	17.7	0.5	0	6.1	25	19.5	24
12512	27.9	32.3	30.1	23	62.7	12	22.8	0.2	0	7.7	23	19.3	25
12709	37.4	44.4	40.9	3	63.4	11	30.0	10.0	0	13.3	9	27.5	4
12708	34.5	45.1	39.8	7	57.5	19	30.8	5.7	0	12.2	13	25.9	11
12710	33.0	40.9	37.0	14	54.2	22	31.4	6.2	0	12.5	11	25.2	12
12706	38.6	44.6	41.6	2	52.1	23	28.9	8.7	4.5	14.0	7	24.7	14
12707	28.8	33.4	31.1	20	50.5	25	29.8	3.2	0	11.0	16	20.2	23

Table 18 Summary of two-year average in bushels per acre for 20 varieties grower in the Uniform Yield Nursery at 11 stations in 1950 and 1951.

Variety	Texas					Oklahoma				
	C. I. NO.	Chilli-cothe	Bush-land	Av.	Rank	Still-water	Chero-kee	Wood-ward	Av.	Rank
Com. X Bl.-Hd. Fed.	12517	26.4	8.1	17.3	7	36.7	30.7	22.6	30.0	1
Hd. Fed. Hybrid	12515	27.9	10.7	19.3	1	34.6	25.5	23.5	27.9	2
Chiefk. X Oro-Tq.	12518	24.2	11.3	17.8	6	31.6	19.2	18.9	23.2	6
Sv.-Wich.-Chey. X Wich.[2]	12702	28.0	7.7	17.9	5	34.8	22.4	20.3	25.8	3
Bl.-Orc X Pawnee	12516	27.3	8.7	18.0	4	34.6	23.4	18.4	25.5	4
Kiowa	12133	24.6	12.9	18.8	3	28.4	19.5	15.1	21.0	12
Mqo.-Oro X Oro-Tq.	12406	20.9	5.6	13.3	15	27.4	22.8	15.1	21.8	9
Comanche	11673	23.8	10.3	17.1	9	30.3	22.8	15.3	22.8	7
Blue Jacket	12502	25.2	13.4	19.3	1	27.7	22.6	15.3	21.9	8
Kv.-Tq. X Comanche	12524	23.0	7.5	15.3	13	30.8	17.2	14.5	20.8	13
Kharkof	1442	25.0	10.2	17.6	7	29.0	20.3	15.7	21.7	10
Blackhull	6251	22.2	11.2	16.7	10	28.1	18.4	17.2	21.2	11
Pawnee	11669	22.5	9.3	15.9	11	28.1	14.0	11.9	18.0	15
Sv.-Wich.-Ho.-Chey. X Wich.[2]	12703	21.9	9.7	15.8	12	27.1	18.6	13.3	19.7	14
Early Blackhull	8856	20.2	8.9	14.6	14	24.9	16.4	12.1	17.8	17
Sv.-Wich. X Ho.-Chey.	12701	18.4	6.3	12.4	17	35.2	23.1	17.8	25.4	5
Triumph	12132	16.3	8.0	12.2	18	24.7	15.6	10.3	16.9	18
Quivira Hyb.	12525	17.8	4.5	11.2	20	24.1	18.6	11.1	17.9	16
29-34-275 D. Cross	12511	21.0	5.1	13.1	16	26.2	9.1	10.7	15.3	19
29-34-275 D. Cross	12512	18.7	5.7	12.2	18	24.0	-	-	-	-

(Table 18 continued)

	Kansas				Colorado		Nebraska					Eleven
C.I. NO.	Man-hatten	Hays	Av.	Rank	Fort Collins	Rank	Lin-coln	North Platte	Alli-ance	Av.	Rank	station Average
12517	24.2	40.4	32.3	1	62.7	1	46.6	23.7	10.4	26.9	2	30.2
12515	26.8	33.3	30.1	6	61.4	5	47.0	22.4	15.1	28.2	1	29.8
12518	29.0	32.4	30.7	2	60.8	6	43.0	21.4	12.6	26.3	3	27.7
12702	26.2	34.7	30.5	5	62.5	2	40.8	18.3	7.6	22.2	12	27.6
12516	24.9	33.9	29.4	8	62.5	2	42.6	17.0	8.3	22.6	11	27.4
12133	29.5	31.9	30.7	2	55.8	7	44.0	19.8	11.5	25.1	5	26.6
12406	26.1	30.4	28.3	12	62.5	2	44.7	22.0	12.0	26.2	4	26.3
11673	24.7	35.4	30.1	6	53.8	14	42.5	17.9	10.0	23.5	8	26.1
12502	26.9	30.2	28.6	10	54.7	11	41.5	16.9	10.9	23.1	10	25.9
12524	24.4	34.4	29.4	8	55.4	8	43.4	19.5	8.7	23.9	7	25.4
1442	21.6	25.0	23.3	16	47.4	19	39.1	21.7	14.0	24.9	6	24.5
6251	28.2	33.0	30.6	4	50.3	16	35.8	15.5	8.6	20.0	15	24.4
11669	21.2	33.2	27.2	13	54.2	13	43.5	18.5	7.9	23.3	9	24.0
12703	24.2	29.5	26.9	15	55.1	9	37.3	12.8	7.4	19.2	17	23.4
8856	22.0	32.3	27.2	13	50.4	15	38.3	13.8	7.6	19.9	16	22.4
12701	19.6	22.0	20.8	20	40.1	20	41.4	15.3	5.0	20.6	13	22.2
12132	24.6	32.1	28.4	11	49.7	17	40.9	12.0	7.6	20.2	14	22.0
12525	19.5	24.9	22.2	18	49.6	18	37.0	10.3	4.7	17.3	18	20.2
12511	20.9	24.3	22.6	17	54.3	12	32.7	6.0	0	12.9	20	19.1
12512	18.8	24.1	21.5	19	54.8	10	35.5	8.3	0	14.6	19	-

SUMMARY OF AGRONOMIC DATA

Observations on characters other than yield have appeared in the individual station reports. Wherever two or more stations reported on the same character, an average expression was calculated. These averages are given in table 19. The varieties were listed in decreasing order of weight per bushel. Three varieties weighed over 61 pounds and only two fell below 59.

Survival at seven stations points out conclusively the lack of hardiness in C. I. 12511 and 12512. Other than Kharkof, only three varieties survived with stands over 70 per cent.

The varieties are rather clearly classified as to maturity by heading and ripening dates. A spread of 15 days in heading and 10 days in ripening existed among the entries in 1951.

Plant height varied from 27 to 37 inches.

Lodging at only two stations indicated that all varieties had better strength than Kharkof.

Leaf rust was noted at four stations in the regular nursery plantings and at St. Paul, Minnesota where all entries were grown in the supplementary winterhardiness nursery. The Sinvalocho hybrids had the lowest infection with the 29-34-275 and Marquillo crosses next best.

Stem rust was noted only under artificial epiphytotics. Again the St. Paul data are included where some 15B was included in the inoculum. C. I. 12511, a Fronteira derivative had the lowest infection followed by C. I. 12701 a Hope hybrid.

Table 19 Summary of agronomic data other than yield for varieties grown in the uniform yield nursery, 1951.

Variety	C. I. No.	Survival	Date Headed	Date Ripe	Plant height	Lodging	Rust Leaf	Rust Stem	Wt. Per bushel
		%	May	July	Ins.	%	%	%	Lbs.
Number of stations.....		7	10	6	9	2	5	3 1/	9
Blue Jacket	12502	67	27	3	37	4	54	62	61.6
Stafford	12706	71	27	6	36	11	34	57	61.2
Quivira Hybrid	12525	62	17	6/26	27	0	27	68	61.1
Blkh.-Oro X Pawnee	12516	63	27	2	33	6	31	57	60.8 2/
do	12709	67	29	3	34	4	24	50	60.7
Sv.-Wich.^{3} X Hope-Chey.	12702	58	25	1	33	8	6	42	60.7
Early Blackhull	8856	58	21	6/30	32	7	45	53	60.6
Hd. Federation Hybrid	12515	64	25	1	33	6	20	50	60.4
Mqo.-Oro X Oro-Tq.	12406	67	25	3	32	1	18	37	60.3
Kiowa	12133	71	25	2	32	1	53	52	60.2
Com. X Blkh.-Hd. Fed.	12517	63	25	1	33	6	29	60	60.2
Sv-Wich. X Hope-Chey.	12701	56	24	6/29	30	8	14	23	60.1
Sv-Wich.^{3} X Hope-Chey.	12703	57	24	6/30	31	3	8	45	60.1
Blackhull	6251	62	29	5	35	6	45	57	60.1
Triumph	12132	60	21	6/26	29	2	53	43	60.1
Chiefk. X Oro-Tq.	12518	75	25	2	33	0	55	52	60.0
Com. X Chey.-Blk.	12708	63	29	3	33	2	21	60	59.9
Pawnee Sel.	12707	68	18	6/26	28	4	39	58	59.9
Kv.-Tq. X Comanche	12524	65	25	6/30	30	0	46	58	59.6
Pawnee	11669	62	26	2	31	1	52	52	59.3
Comanche	11673	65	26	4	33	0	38	57	59.2
29-34-275 D, Cr.	12512	41	30	6	33	0	18	37	59.1
do	12511	37	29	3	32	1	13	18	59.0
Com. X Blkh.-Hd. Fed.	12710	64	30	4	33	6	28	68	58.7
Kharkof	1442	74	6/1	6	34	21	48	67	58.3

1/ From artificial inoculations at Manhattan, Lincoln and St. Paul.

2/ Only 8 stations.

UNIFORM WINTERHARDINESS NURSERY

Two uniform hardiness nurseries were grown in 1951 known as the "uniform" and "supplementary" units. The latter was sown at Alliance, Akron, Brookings, St. Paul, Moccasin and Dickinson. There were 117 entries in duplicate 8-foot rows at each location. Differential survival notes were obtained at Alliance and Moccasin only. These were summarized and reported to breeders in the area but are not made a part of this report. Entries surviving better than the average of the four Kharkof checks (56.5 per cent) were Kiowa, Wichita x M-O-K-T (H.C 2040 and H.C. 2042), Cheyenne-Red Chief x Pawnee - Marquillo-Oro (H.C.2044 and 2045), Wheat x Rye (Nebr. 496608 and 496610), and Turkey-Tenmarq-Cheyenne x Turkey (C.I.12523).

The other unit contained 26 entries in 3-row or 4-row plots replicated three times at most of the 10 stations where the test was sown. Six stations got differential killing and these results have been placed in table 20. Varieties averaging over 80 per cent survival were Kharkof M.C. 22, Minturki, Minter, Yogo, Minhardi, and H44 x Minturki.[2] These varieties regularly occupy top positions in such tests and nothing is known among common winter wheats surpassing them. Least hardy were two Nebraska selections from the cross Hope x Cheyenne.[2] Grain yields and test weights were determined at several stations as noted in table 21. At Ames, C.I. 12532, at Alliance and Sheridan C.I. 12711 and at Havre Kharkof made the highest yields. The four-stations average showed Kharkof, Yogo, and C.I. 12711 were best, followed closely by Nebred, Minturki and Iohardi. C.I. 12711 was the heaviest in weight per bushel at two of the three stations reporting. Miscellaneous data in table 22 complete the summary of notes recorded on the material in the uniform winterhardiness nursery.

Table 20. Survival of wheat planted in the Uniform Winterhardiness Nursery, 1950-51.

Name	C. I. or Sel. No.	Average survival at 1/						Six-Station Average
		Alliance Nebr.	Laramie Wyo.	Sheridan Wyo.	Havre Mont.	Ames Iowa	Waseca Minn.	
		%	%	%	%	%	%	%
Kharkof	1442	40	70	90	65	68	100	72.2
Kharkof M. C. 22	6938	92	78	94	70	87	100	86.8
Nebred	10094	63	68	90	58	95	90	77.3
Minturki	6155	72	64	90	68	97	90	80.2
Minter	12138	73	59	94	72	97	100	82.5
Iohardi	12510	68	70	90	63	90	90	78.5
Ridit x Kharkof	12521	8	52	83	30	49	85	51.2
Turkey x Oro	12705	53	68	94	48	69	100	72.0
Yogo x Wasatch	Mont. 9	..	..	..	42	..	...	....
Minn. II-40-54	....	80	..	..	..	95	100	....
Yogo	8033	96	58	94	63	86	85	80.3
Yogo x Wasatch	Mont. 10	..	..	..	33	..	...	....
Chiefkan x Oro-Teng.	12518	16	..	..	..	64	100	....
Yogo x Wasatch	Mont. 11	..	..	..	7	..	...	....
Cheyenne x Turkey	12142	44	71	91	35	73	100	69.0
Cheyenne x Turkey	12711	64	69	92	50	76	100	75.2
Minhardi	5149	88	69	89	82	88	90	84.3
Oro x Mqo.-Oro	N. 47511	23	64	88	52	71	100	66.3
Hope-Turkey x Cheyenne	N.P. 44541	19	55	94	22	47	100	56.2
do.	N.P. 44552	33	46	84	33	40	100	56.0
do.	N.P. 44555	33	59	97	62	77	85	68.8
Hope x Cheyenne^2	45904	16	52	90	27	29	80	49.0
Hope x Cheyenne^2	45910	26	50	94	43	49	100	60.3
Hope x Cheyenne^2	437165	13	56	83	20	29	80	46.8
Mint.-Io. x H44-Mint.^{2}	II-40-52	73	46	99	62	95	100	79.2
H44 x Minturki^2	II-40-56	57	55	98	80	97	100	81.2
H44 x Minturki^2	12532	65	..	..	92	98	100	....
H44-Minhardi x Marmin	12704	90	..	..	83	99	100	....

1/ Nurseries were sown at Dickinson, N. Dak., Brookings, S. Dak., St. Paul, Minn. and Lethbridge, Alberta, Canada, but differential readings were not obtained.

Table 21. Yield and test weight data for varieties grown in the uniform winterhardiness nursery in 1951.

Variety	C. I. or Sel. No.	Av. acre yield at					Weight per bushel at			
		Ames	Alliance	Sheridan	Havre	4 stations	Laramie	Sheridan	Havre	3 Stations
		Bus.	Bus.	Bus.	Bus.	Bus.	Lbs.	Lbs.	Lbs.	Lbs.
Kharkof	1442	14.9	6.7	26.2	55.1	25.7	60.3	6.13	59.5	60.4
Yogo	8033	14.5	12.6	31.7	42.2	25.3	61.0	60.5	58.9	60.1
Turkey X Cheyenne	12711	12.7	17.9	35.8	34.3	25.2	60.7	62.6	60.4	61.2
Nebred	10094	21.7	10.3	27.2	38.7	24.5	61.1	61.0	60.3	60.8
Minturki	6155	27.3	9.5	28.6	32.7	24.5	60.1	60.6	58.7	59.8
Iohardi	12510	16.5	15.6	26.8	38.2	24.3	-	61.4	59.6	-
Kharkof M. C. 22	6938	14.6	13.1	19.9	48.8	24.1	59.8	58.0	56.6	58.1
Hope X Cheyenne[2]	N.45910	7.7	10.6	32.4	41.7	23.1	61.0	61.9	58.9	60.6
Hope-Tk. X Chey. 1/	12716	15.9	8.1	32.2	35.9	23.0	59.3	61.4	59.5	60.1
Turkey X Oro	12705	9.1	7.4	33.2	37.7	21.9	60.5	60.2	58.9	59.9
Oro X Mqo.-Oro	N.47511	16.4	0	32.8	38.1	21.8	60.7	62.2	59.7	60.9
Minter	12138	19.2	3.4	29.5	33.9	21.5	60.7	60.6	59.8	60.4
Cheyenne X Turkey	12142	9.8	7.4	30.9	37.1	21.3	59.9	59.9	58.5	59.4
Minhardi	5149	15.5	9.0	24.1	31.9	20.1	60.2	59.2	58.3	59.2
H44 X Mint.[2]	II-40-56	20.4	6.9	23.1	28.2	19.7	60.0	60.0	58.2	59.4
M.-Io. X H44-Mint.[2]	II-40-52	19.5	10.7	22.2	24.5	19.2	60.3	59.8	57.8	59.3
Hope -Tk. X Chey.	N.44552	4.4	2.8	28.0	34.1	17.3	60.5	59.3	58.7	59.5
Hope X Cheyenne[2]	N.45904	4.2	.6	30.8	32.7	17.1	60.8	61.5	59.5	60.6
Ridit X Kharkof	12521	5.2	0	30.0	32.0	16.8	60.4	60.5	58.3	59.7
Hope-Tk. X Chey.	N.44541	6.4	2.7	33.3	24.8	16.8	59.3	60.6	57.6	59.2
Hope X Cheyenne[2]	N.437165	3.5	1.3	30.7	26.3	15.5	59.9	59.3	58.6	59.3
H44 X Mint.[2]	12532	22.8	5.6	-	32.1	-	-	-	58.9	-
H44-Minh. X Marmin	12704	18.8	5.8	-	32.5	-	-	-	59.0	-
Standard error of a difference		-	2.90	2.77	-	-	-	-	-	

1/ Also known as N. P. 44555.

Table 22. Miscellaneous data recorded on wheat grown in the uniform winter hardiness nursery in 1951.

Variety	C. I. or Sel. No.	Rust		Date headed 4-sta. av.	Plant height 2-sta. av.
		Leaf 1/	Stem 1/		
		%	%	June	Ins.
Kharkof	1442	63	25	24	36
Kharkof	6938	60	40	26	37
Nebred	10094	60	20	20	31
Minturki	6155	57	30	24	37
Minter	12138	43	T	23	36
Iohardi	12510	57	20	21	35
Ridit x Kharkof	12521	70	60	25	34
Turkey x Oro	12705	60	40	23	35
Yogo	8033	67	30	26	36
Cheyenne x Turkey	12142	60	5	22	32
Turkey x Cheyenne	12711	57	10	18	30
Minhardi	5149	75	43	25	35
Oro x Mqo.-Oro	N.47511	23	10	22	34
Hope-Tk. x Cheyenne	NP44541	43	T	21	32
do	NP44552	53	5	22	33
do	12716	47	5	20	32
Hope x Cheyenne 2	N.45904	50	5	20	30
do	N.45910	47	10	20	32
do	N.437165	53	10	23	33
M.-Io. x H44-Mint.2	II-40-52	27	40	22	39
H44 x Minturki2	II-40-56	60	40	22	37
do	12532	60	10	22	35
H44-Minh. x Marmin	12704	53	5	22	33

1/ St. Paul only.

DATA FROM THE DISEASE NURSERIES

Data from the uniform rust nurseries will appear as a separate report but the uniform bunt nursery for Plains winter wheats is given below.

The 49 entries in the 1951 uniform bunt nursery were sown in duplicate 8-foot rows at seven stations for tests with local races of ordinary bunt. All seed was packeted at Lincoln and inoculated or left clean as cooperators requested. In the latter case, cooperators inoculated the seed. All nurseries were inoculated with bunt composed of collections within the state where the test was grown. Results were obtained at four stations as shown in table 23. Bozeman showed the most infection being about twice that at Ft. Collins and Manhattan and five times that at Stillwater. Two selections had no bunted heads at any of the stations and ten others averaged less than 1 per cent bunt. Five selections were in the very susceptible class, having an average above 41 per cent, and Red Chief, with 70.3 per cent, was the most susceptible of all. Several of the 49 entries have been tested in other years but no cumulative record is given in the present report.

In addition to the tests with ordinary bunt, several varieties were planted at Spring Hill, Mont. where dwarf bunt exists. Dr. C. S. Holton also tested 40 selections to dwarf bunt tester races by inoculating and growing the wheat at Pullman, Wash. Results of these tests are given in table 24. A useful service is hereby performed, giving all concerned a better understanding of the reaction of the varieties. Many of the selections show excellent resistance.

DATA FROM THE QUALITY LABORATORY

Grain harvested from the uniform plots, uniform yield nursery, and uniform winterhardiness nursery along with that from promising new strains of local interest was sent by cooperators to the Federal Hard Wheat Quality Laboratory for milling and baking studies. Results on these samples will appear in a separate report prepared by laboratory workers.

Table 23. Percentage of heads infected with bunt in varieties and strains of winter wheat grown in the Great Plains uniform bunt nursery in 1951. 1/

Variety or Cross	C.I. or Sel. No. 2/	Average percent bunt at Ft. Collins Colo.	Still-water Okla	Boze-man Mont.	Man-hattan Kans.	Four-station average
Mqo-Oro X Oro-Tk-Flo.	NP48505	0	0	0	0	0
Oro X Oro-Tk-Flo	N461333	0	0	0	0	0
Mqo-Oro-Oro-Tq X M-H-Pn	FC1199	T	0	0	T	0.1
Mqo-Oro X Oro-Tk-Flo	K47B4	0	0	1	0	0.3
Com X Oro-Tk-Flo	K47B139	0	0	1	0	0.3
Oro X Oro-Tk-Flo	K47B168	0	0	1	0	0.3
Ridit	6703	0	0	1	0	0.3
Mqo-Oro X Hu-Hohen	K47B121	T	T	1	0	0.3
Wasatch	11925	0	0	1	1	0.5
Mqo-Oro X Oro-Tk-Flo	K47B8	T	T	2	0	0.6
Turkey X Oro	12705	T	1	1	1	0.8
Mqo-Oro X Oro-Tk-Flo	N491160	T	0	3	0	0.8
Turkey X Oro	Mont. 205	T	T	1	4	1.3
Wich-H44-Mint^2 X Mt-Tq-Kh	FC1197	1	2	0	2	1.3
Mqo-Oro X Pawnee	K462666	0	0	5	0	1.3
Com X Blk-Hd Fed	43h2-187	1	0	5	0	1.5
Ridit X Kharkof	12521	1	2	4	4	2.8
Mqo-Oro X Oro-Tq	12406	1	T	13	0	3.6
Turkey X Cheyenne	12711	1	1	15	T	4.3
Mqo-Oro X Pawnee	K462681	T	T	18	0	4.6
Com X Blk-Hd Fed	12710	1	0	20	1	5.5
Mqo-Oro X Oro-Tk-Flo	MP48500	T	0	23	0	5.8
Hussar	4843	1	6	0	20	6.8
29-34-275 D. Cross	12511	3	T	25	1	7.3
Com X Blk-Hd Fed	12517	7	2	25	2	9.0
Quanah	12145	3	T	40	5	12.0
Mqo-Oro X Oro-Tq	K452033	6	1	40	1	12.0
Com X Chey-Blk	12708	3	T	45	1	12.3
Oro	8220	6	2	40	3	12.8
Relief	10082	10	17	0	25	13.0
E. Bl-Tq X Oro-Med-Hope	K471238	8	2	40	2	13.0
Blk-Oro X Pawnee	12709	3	0	50	0	13.2
Mqo-Oro X Comanche	K431646	1	1	55	T	14.3
Hung. Sel X Nebred	12507	8	T	50	1	14.8
Nebred X Mqo-Oro	N483642	1	T	60	T	15.4
Mqo-O-O-T X H44-Mint^2	FC1198	14	7	40	2	15.8
Mqo-Oro X Oro-Tq	K431413	7	T	60	T	16.9
Mqo-Oro X Comanche	K452363	10	2	60	2	18.5
Com X Chey-Blk	43h3-81	4	T	73	5	20.6
Cheyenne X Turkey	12142	5	5	70	4	21.0
Minturki	6155	9	11	55	18	23.3
H44 X Minturki^2	MII-40-56	48	8	25	20	25.3
Tk-Tq-Chey X Tk	12523	20	4	65	22	27.8
Mint-Io X H44-Mint^2	MII-40-54	65	12	60	30	41.8
Ponca	12128	60	30	35	65	47.5
Cheyenne	8885	80	15	50	70	53.8
Kharkof	1442	73	40	55	-	56.0
Iohardi	12510	73	30	65	70	59.5
Red Chief	12109	90	30	65	96	70.3
Station average	--	12.8	4.8	27.8	10.0	--

1/ Nurseries were sown also at Lincoln and North Platte, Nebraska, and at Denton, Texas but no results were obtained.

2/ Letters indicate the originating state: N and NP, Nebraska; FC, Colorado; K, Kansas h, Oklahoma; M, Minnestoa; Mont. Montana.

Table 24. Percentage of bunted heads in varieties and strains of hard winter wheat inoculated with tester races for dwarf bunt reaction, and the results obtained for some varieties under natural conditions of dwarf bunt infection. 1951.

Variety or cross	C. I. or Sel. No.	Average percent bunt: at Pullman with T-16	T-8	Hyb.119	at Spring Hill with dwarf bunt
Mqo.-Oro x Oro-Tk.-Flo.	K47B6	0	0	0	1.0
do	K47B5	0	0	1.5	2.3
do	K47B9	2.0	1.5	0	0.8
do	K47B4	0	0	2.5	0.5
do	K47B3	0	0	7.0	1.0
do	K47B8	0	0	0	T
do	NP48500	30.5	0	27.0	-
do	NP48505	3.0	0	1.0	-
do	N491160	24.5	0	34.0	-
Mqo.-Oro x Hus.-Hohen	K47B121	3.0	1.0	0	-
Oro x Oro.-Tk.-Flo.	N461333	3.0	0	1.5	-
do	K47B168	0	0	0	1.0
do	K47B167	4.5	0	0	0.8
Comanche x Oro-Tk.-Flo.	K47B139	0	0	1.5	0.8
do	K47B160	0	0	0	0.9
do	K47B123	24.0	0	1.0	-
Turkey x Oro	12705	0	0	0	0.8
do	Mont. 205	1.5	2.0	0	T
do	Mont. 201	0	2.0	0	-
do	Mont. 208	0	0	0	-
do	Mont. 216	2.0	0	1.5	2.0
Yogo x Wasatch	Mont. 3	0	0	0	T
do	Mont. 4	0	0	1.0	0
do	Mont. 6	1.0	23.5	2.5	0.5
do	Mont. 8	0	8.0	0	4.0
do	Mont. 9	0	0	0	0
do	Mont. 10	0	2.5	0	0
do	Mont. 11	0	5.5	0	T
Wasatch	11925	0	0	0	0
Yogo	8033	34.5	10.5	29.0	10.5
Cache	11599	4.5	3.5	0	-
29-34-275 D. Cross	12511	9.5	0	32.0	-
Marmin x H44-Minh.	12520	55.0	68.0	57.5	-
Marmin x H44-Mint.2	M 2794	43.0	16.5	35.5	-
Mqo.-Oro x Pawnee	K462666	7.0	0	22.0	-
Mqo. -Oro x Oro - Tq.	12406	48.5	0	44.5	-
Mqo.-Oro x Comanche	K431646	34.5	0	32.0	-
Ponca	12128	34.5	47.5	48.0	-
Kiowa	12133	71.5	0	66.5	-
Kharkof	1442	74.0	60.5	49.5	22.0