UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
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 1948

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By

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Division of Cereal Crops and Diseases

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1/ The writer expresses appreciation to Dorothy M. Wilson, Agent, Virgil A. Johnson, and Frank Loeffel for their assistance in preparing this report.

EXPERIMENTS IN 1948

This is the eighteenth annual report of research on improvement of hard red winter wheat conducted under the coordinated program. In November of 1928, about 200 research workers, farmers, administrators, and legislators met to consider how the winter wheat industry of the Plains might be improved. Other conferences in 1929 and 1930 led to a cooperative attack on wheat breeding problems known as the coordinated improvement program. By establishing a number of uniform tests to be grown at several appropriate stations, ferreting out weaknesses of new strains has far surpassed the machinery for creating new strains worthy of testing. Hence, there is a need for more effort at the breeding level and in basic research than ever before. This in no way detracts from the efforts and accomplishments of those doing the breeding work at present but rather points to a way wherein the regional program may get out of balance. Breeding for multiple goals of perfection in the heredity of the wheat plant is very consuming of manpower and funds because good selections come only when searched for diligently following hybridization among likely parents, and are not to be expected very often by chance. More attention to specific tests in early generations must be entered into by breeders and perhaps more regional testing of this material should be contemplated. Another conference of workers has been set tentatively for January of 1950 when this problem and many others may be discussed. Those cooperating in this program should begin to make plans for the conference.

The report for 1948 is similar in style to those which have preceded it and contains data on the uniform tests. Period summaries of yield and certain other data have been made.

Many workers and stations cooperate to make this work effective. Without them there would of course be no program. Very few workers are assigned full-time to wheat, hence many give only a small fraction of their time to collecting data for this report or in wheat improvement work. Numerous people in research agencies both public and private, Crop Improvement Associations, farmers, businessmen and others assist from time to time in the execution of various aspects of the work. All such help and interest is gratefully acknowledged. The stations and workers most closely associated with the program in 1948 are given in the following list. Among the new names are A. B. Erhart, Garden City; R. E. Atkins, Ames; Paul Ehlers, North Platte; Dale Bohmont, Laramie; T. J. Conlon, Dickinson; and E. R. Hehn, Bozeman. Former cooperators who have gone into other work include L. M. Sloan, Dayton Klingman, R. W. Smith, and R. H. Bamberg.

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 and Smut	C. O. Johnston, H. A. Rodenhiser
Milling and Baking	J. A. Shellenberger, Karl Finney, and Byron Miller

TEXAS AGRICULTURAL EXPERIMENT STATION:

Agronomy (Corn and Small Grains)		J. E. Adams
College Station	Agricultural Experiment Station	E. S. McFadden
Denton	Substation No. 6	I. M. Atkins
Chillicothe	Substation No. 12	J. R. Quinby, I. M. Atkins
Bushland	Amarillo Experiment Station	K. B. Porter

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Field Crops and Soils		H. F. Murphy
*Lawton	U. S. Dry Land Field Station 2/	W. M. Osborn
Stillwater	A. & M. College	A. M. Schlehuber, T. H. Johnston
Cherokee	Wheatland Conservation Station	A. M. Schlehuber, A. A. Garrett
*Woodward	Southern Great Plains Field Sta. 2/	A. M. Schlehuber, L. F. Locke
Goodwell	Panhandle Agr. Exp. Station	Marvin McKee, Raymond Peck

KANSAS AGRICULTURAL EXPERIMENT STATION:

Agronomy		H. E. Myers
Manhattan	Kansas State College	H. H. Laude, E. G. Heyne, and D. E. Weibel
Hays	Ft. Hays Branch Exp. Station	A. F. Swanson, L. H. Penny
Colby	Colby Branch Station	E. H. Coles, Don Crumbaker
Garden City	Garden City Agr. Exp. Station	A. E. Lowe, A. B. Erhart

COLORADO AGRICULTURAL EXPERIMENT STATION:

Agronomy		D. W. Robertson
*Akron	U. S. Dry Land Field Station 2/	J. F. Brandon, T. E. Haus
Fort Collins	State Agricultural College	T. E. Haus, D. W. Robertson
Hesperus	Fort Lewis Substation	D. W. Koonce

IOWA AGRICULTURAL EXPERIMENT STATION:

Ames	Iowa State College	L. C. Burnett, R. E. Atkins

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Agronomy		F. D. Keim
Crops Research		T. A. Kiesselbach
Lincoln	Agricultural Experiment Station	L. P. Reitz, O. J. Webster
North Platte	North Platte Substation	L. D. Zook, Paul Ehlers
Alliance	Box Butte Experiment Farm	Harold Chapman, L. P. Reitz

WYOMING AGRICULTURAL EXPERIMENT STATION:

Agronomy		A. F. Vass
Laramie	Agricultural Experiment Station	Dale Bohmont
*Sheridan	U. S. Dry Land Field Station 2/	C. R. Hills

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy		W. W. Worzella
Brookings	Agricultural Experiment Station	J. E. Grafius

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

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

2/ Cooperation with Division of Dry Land Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering, as well as with the State experiment stations.

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	R. H. Bamberg, E. R. Hehn
Moccasin	Judith Basin Branch Station	R. H. Bamberg, Ralph Williams
Havre	North Montana Branch Station	V. C. Hubbard, M. A. Bell

ACCESSION NUMBERS ASSIGNED

Cereal Investigation or C.I. numbers of the Division of Cereal Crops and Diseases were assigned this season to the strains of hard winter wheat listed at the end of this paragraph. Workers are invited to nominate other strains for such numbers and are urged to use them in publications and interstate correspondence.

C.I. No.	Name	State No.
12507	Hungarian Selection x Nebred	Nebr. 405304
12511	(Sel. 29-34-275 x Comanche) x (Sel. 29-34-275 x Fronteira)	Texas 172-43-205
12512	do	Texas 172-44-104
12513	Comanche x Mediterranean-Hope	Texas 157-44-112
12514	do	Texas 157-44-200
12515	Hard Federation Hybrid	Woodward.Okla.43h1-399
12516	Blackhull-Oro x Pawnee	Woodward.Okla.43h1-400
12517	Comanche x Blackhull-Hard Federation	Woodward.Okla.43h2-123
12518	Chiefkan x Oro-Tenmarq	Hays, Ks. 46-41
12519	H44 x Minturki3	Minn. 2782
12520	Marmin x H44-Min~~turki~~ hard	Minn. 2783
12521	Ridit x Kharkof	Huntley, Mont. 4a
12522	Orienta	Danne Sel. C29-5-12
12523	(Turkey x Tenmarq-Cheyenne) x Turkey	Nebr. 383134
12661	Minturki x T. timopheevi	Wis. 247 (H255-49-3-3-1)
12662	do	Wis. 248 (H255-49-5-1-4)
12675	Brevon x Relief - 105	Idaho
12676	Brevon x Relief - 106	Idaho

NEW VARIETIES

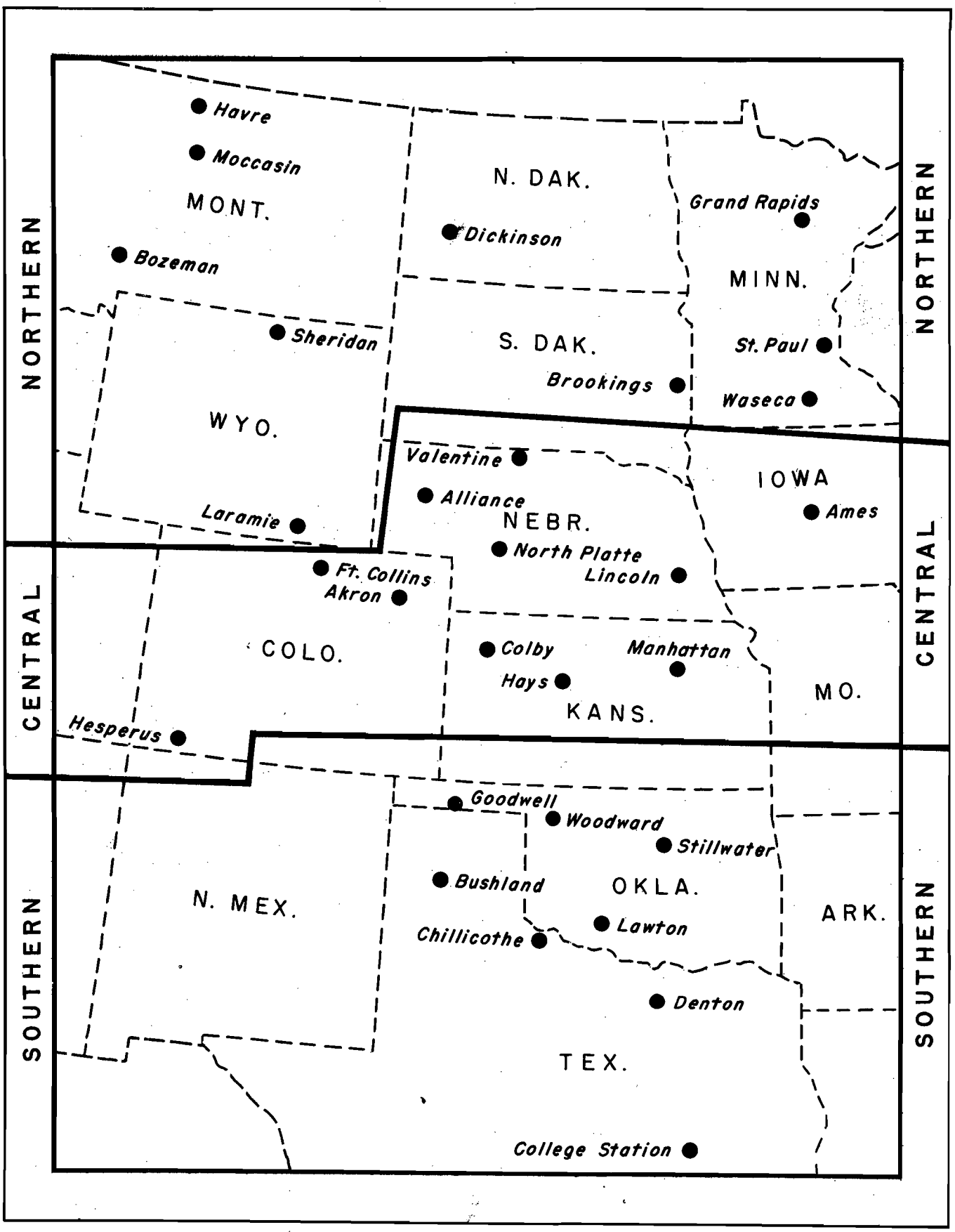
Action on several varieties was taken in a number of the states. Texas started seed multiplication of the Comanche Double cross (C.I. 12145). Resistance to rust and bunt along with rather acceptable agronomic and market factors typify this selection. No release date or name has been announced. Wichita was added to the list of recommended varieties in Oklahoma. On the basis of a number of quality tests, the Oklahoma group decided against the release or further increase of Cimarron (C.I. 12120). Joseph Danne, El Reno, Oklahoma named his selection C 29-5-12 Orienta and offered a little seed for sale. It has been tested at a few experiment stations and is in the 1949 uniform yield nursery. In Kansas, the Hays station offered seed of Chiefkan x Oro-Tenmarq (C.I. 12133) to neighboring

states for simultaneous seed multiplication in 1949 and is planning for further local increases of this strain. However, a decision to name and release the variety has not been reached. Iowa continued with its plan to release seed of Iohardi as announced in the 1947 regional report.

UNIFORM VARIETIES IN PLOTS

Uniform tests are planned by districts - southern, central, and northern as shown by the map which accompanies this report. Sometimes a test covers several districts or a district may be divided. In 1948 the uniform plot series of varieties was set up somewhat differently in each district and the northern district was divided into northeastern and northwestern sections. This plan met with approval and was continued in planning for tests in 1949. Uniform varieties for 1948 and 1949 are as follows:

Variety	C.I. No.	1948				1949			
		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				x		
Red Chief	12109	x	x			x	x		
Wichita	11952	x	x				x		
Westar	12110	x							
Triumph	12132	x				x			
Cimarron	12120	x	x			x	x		
Chiefkan x Oro-Tenq.	12133	x	x			x	x		
do	12148	x	x						
Kv. - Mgo. x Kv. - Tenq.	12128	x	x			x	x		
Conanche Doublecross	12145	x				x			
Minturki	6155			x	x			x	
Yogo	8033				x				x
Marmin	11502			x	x			x	x
Nebred	10094				x				
Mont. 36-Bel. x Kan.	12108				x				
Minter	12138			x	x			x	x
Marmin x H44-Mint.	12508			x				x	
Hope x Minturki^2	12506			x				x	
H44 x Minturki^2	12532			x				x	
H44 x Minturki^3	12519							x	
Marmin x 44-Minki	12520							x	
Iohardi	12510							x	
Ridit x Kharkof	12521								x
Martin x Tenmarq^3	11824								x


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

It will be noted that several varieties of commercial importance have been dropped along with several selections of experimental interest only. Several cooperators suggested that when strains pass into commercial production, after having been tested many years, there is no longer any justification for continuing them as uniform varieties except as check varieties. Local option therefore has been adopted as the basis for including certain named strains when not included in the list of uniform varieties. Permanent checks for the southern district are Kharkof, Tenmarq and Early Blackhull and for the central district are Kharkof, Tenmarq, and Pawnee. In the Northeast Minturki and in the northwest section Kharkof have been designated permanent checks. New varieties should be included in the uniform plot series of the district of expected adaptation foa a year or more before they are named and released. This provides an abundance of information on which final action relative to a strain can be based.

In this report, all varieties tested by each cooperator in the plot series are listed along with the uniform varieties, thus giving a complete view of those strains in advanced tests at each station.

PLOT DATA

Data from field plot experiments are included in this report for 21 stations distributed over eight states in the Great Plains. Each of the states included in the coordinated program supplied data from one or more stations except Minnesota and Iowa where winter killing destroyed the plantings. Peculiar distribution of the annual precipitation was an important element in crop and varietal response in the central and southern districts where dry surface soil greatly retarded fall emergence followed by heavy snows in January and February which benefited the wheat to a degree seldom observed. Rainfall was deficient over much of the region in late April and May when heading occurred followed by showers which rescued late maturing varieties after early and mid-season ones were beyond the stage when they could be aided. As a consequence, the rank in yield of varieties at several stations reverses the long-time average response.

The rusts were a minor problem this year, causing little damage except right at the end of the fruiting period. For the first time in many years leaf rust notes were scarcely worth taking at Denton. Stem and leaf rust became abundant at Manhattan, stem rust only at Fort Collins, and leaf rust only at Stillwater.

Grasshoppers were the most conspicuous of wheat insects this year, but very little damage was done to any of the experiments with winter wheat. The Hessian fly and green bug subsided this year, but remained rather widely dispersed. The Hessian fly was discovered in its heaviest intensity in Southeastern South Dakota. It was found in Nebraska mostly west of its usual area of distribution partly because the resistant variety Pawnee has become the leading variety in eastern Nebraska where this insect formerly was of greatest occurrence.

Table 1 shows the average of data taken on winter wheat varieties grown in plot tests at each of 21 stations. The strains are listed in order of declining yield for 1948 and all entries reported by each cooperator, whether uniform entries or not, are presented. Average yields for various periods along with a relative yield in per cent of Kharkof for the entire period of testing since 1930 also are given in the table. The standard error of a difference noted after the data from each station refers to the variety means for 1948. The number of plots, average

yields of all varieties, and standard errors of the yields at each station are presented in table 2. In the paragraphs which follow, a few comments are made about the experiment at each location but the data are self-explanatory for the most part.

The Denton experiment contained 30 entries of which 11 were soft wheats. Hard wheats occupied all of the 15 upper places except one; Cimarron, C.I. 12133 Clarkan and Blackhull were highest. Long-time records favor Comanche, Pawnee, Early Blackhull, Tenmarq and Westar. The prolonged drought reduced yields at this station, depressed the usual hazard of leaf rust and gave a somewhat unusual rank of varieties for yield.

Pawnee exceeded other varieties at Chillicothe but C.I. 12146, Westar, C.I. 12133, and Triumph were not far behind. Pawnee, Comanche and Westar have the best 5-year averages while good two-year averages also have been made by Cimmaron and C.I. 12503. Some relief from drought came at the end of May, a circumstance which probably prevented the late varieties from falling lower in rank than they did this year. C.I. 12145 gave evidence of high pasture yield.

The long drought reduced yields at the Bushland station and the first nine varieties probably did not differ significantly in yield. The best 2-year averages have been made by Blackhull, Pawnee, Red Chief and Westar. Westar, Comanche and Pawnee have the best records of five or more years.

In the Lawton test yields were above average with Pawnee, C.I. 12128, Reliant, and Wichita ranking highest. Foot rot thinned some plots of Comanche and was noted elsewhere in the test. The stands of Red Chief and Cheyenne were thin. Two-year averages favor Pawnee, Reliant and Cimarron whereas Comanche, Pawnee and Wichita have the best seven-year records.

Yields were about average although drought effects were evident at Stillwater in the very low test weights recorded. One soft and one hard wheat occupied the two highest positions this year. The rank in the current season was not consistent with that of last year. The best six-year averages have been made by Pawnee and Reliant whereas Cimarron and Westar rank highest in the two-year averages. Leaf rust resistance was most evident in Wester and C.I. 12145.

Yields and test weights were about average at Cherokee with Red Chief the highest ranking variety for both. Wichita, C.I. 12133, Early Blackhull and Triumph were rather outstanding also but Tenmarq, Pawnee and C.I. 12145 gave low yields. Triumph and Red Chief have the best three-year average yields.

The Woodward test was planted late and did not emerge until early in January. With the soil too dry to promote fall growth and one of the dryest April-May periods in the history of the station, yields of 23.1 for Pawnee to 28.9 for Reliant are remarkable. Precipitation in February and March made the crop by moistening the soil to a depth of six feet. Fallow plots averaged only one bushel per acre higher in yield than crop land plots. Pawnee and Wichita have the best long-time yield records.

High plot variability at Goodwell nullifies most of the yield differences this year but Westar and Comanche, well adapted varieties by results in previous years, ranked first and third in 1948. Tenmarq and Kharkof had a better year than usual for this locality.

Central district results begin with Manhattan. Yields ranged from 53.2 bushels per acre for Wichita to 24.5 for Kharkof. Late varieties in general gave the lowest yields and test weights. Pawnee, Cimarron and Comanche along with several hybrid lines exceeded 47 bushels to the acre. Lodging was pronounced with C.I. 12141, Westar, Ks. 2800, and Cimarron showing the strongest straw. Leaf and stem rust notes showed Ks. 2795 and 2801 had the greatest combined resistance. Red Chief had the heaviest weight per bushel. Nine varieties have been compared for 17 years during which time the yield of Kawvale has exceeded the Kharkof check by 20.5 per cent and Tenmarq has exceeded it by 18.6 per cent. Over an eleven-year period Pawnee has exceeded Kharkof by 60.3 per cent.

In the Garden City test grown on fallow, C.I. 12133 and Comanche were highest in yield. Comanche has a 10-year advantage over Turkey of 35 per cent while its rival Pawnee has an advantage of 29.7 per cent. A new hybrid, Marquillo-Oro X Pawnee, ranked third in 1948.

The rank of the varieties at Hays bears only a slight resemblance to that of 1947 and even less agreement with the long-time averages. Pawnee which ranks first in the 11-year averages ranked last in 1948 and fifth in 1947. C.I. 12101, C.I. 12148 and Cheyenne have the best two-year records. The sequence of weather variables this year appeared to make a pattern of effects of infrequent occurrence when viewed over a series of years by the response of varieties included in the tests. Threshing of the varieties on two dates separated by a rainy period affected the test weights but did not influence acre yields.

In the Colby test Turkey was the highest yielding variety this year but lowest in yield in 1947 and never before first since the cooperative program was started in 1931. C.I. 12133 was relatively high in rank both years. The Blackhull family of wheats ranked well toward the bottom this year along with C.I. 12141 and Wichita. Pawnee and Comanche were about midway. Test weights were high and useful lodging notes were recorded. Comanche has the highest relative yield for varieties tested nine years or more.

The Akron test was grown on fallow and after corn with results averaged for each variety on the two treatments. Fallow produced two and one-half times as much grain as the crop land but the rank of varieties was similar. Late maturing varieties such as Alton, Kharkof, Cheyenne and Minturki yielded most in contrast to the long-time trend which favors C.I. 11970, Early Blackhull and Comanche. Early varieties were damaged by frost at flowering time. A hail storm occurred after the plots were cut and shocked with late varieties, Red Chief and Cimarron showing the least external shock shattering.

Very high yields were recorded at Fort Collins. Four varieties exceeded 65 bushels to the acre. One of these, designated AI49, yielded 72 bushels to the acre and has a 3-year record of 28 per cent above Kharkof but it seems to have weak straw and is susceptible to stem rust. Wichita, C.I. 12133, Pawnee and Comanche have good records. Cimarron had the stiffest straw and highest test weight.

Stands in the fall at Lincoln were rather thin but tillering in the fall and spring enabled the varieties to make good yields. Two unnamed hybrid selections exceeded 50 bushels to the acre followed by Tenmarq, Nebred and Cheyenne which yielded over 48 bushels. Low yields were made by the very early varieties Wichita and Triumph and two unnamed selections. Some shattering occurred and three strains

lodged slightly. Test weights were good. Varieties with a high average yield covering six or more years include Pawnee, Red Chief, Comanche, C.I. 11972, and Cheyenne. They have yielded from 12 to 28 per cent more grain than Kharkof.

The North Platte test was planted on fallow and after corn. Fallow plots produced appreciably more grain than those on crop land. An extended drought beginning early in the spring was not broken in time to help early maturing varieties, however, late ones benefited from showers which fell the last week in May. Consequently, mid-season to late strains were in the upper half and mostly earlier strains were in the lower half according to the yield of grain. Test weights ranged from 55 to 58 pounds. Strains tested six or more years rank in yield in the following order: Wichita, Red Chief, Pawnee, Cheyenne, Turkey, Nebred, Comanche, Tenmarq, Kharkof.

The Alliance plantings were on fallow and good yields and test weights were produced. Five unnamed selections and Nebred occupied the top six places for yield. Red Chief and C.I. 12507 were lowest. The best six-year (or longer) records have been made by Cheyenne, Nebred, Comanche, Kharkof, and Pawnee in the order listed.

Tests in the northern district provided results from four stations. Winter-killing in Minnesota eliminated the tests in that state. At Brookings, 14 varieties were compared. Pawnee and Iowin were severely reduced in productiveness by winter-killing and it appears that this factor was the principal one affecting the yield differences since the five high yielding varieties were the ones which survived best and the three lowest ones had the poorest survival. Stem and leaf rust notes are of interest.

Good yields and test weights were produced in the test at Sheridan. Nebred and Kharkof were the highest yielding varieties followed by Yogo, Kanred, and Minter. Eight varieties have been compared 12 to 18 years with Cheyenne and Kanred at the top in yield followed by Nebred, Kharkof, Yogo and Karmont. Appreciably lower averaged have been made during this period by Marmin and Minturki.

All varieties at Moccasin except Wichita and Pawnee yielded more than 40 bushels to the acre. All test weights were in the range 62 to 65 pounds. Newturk, Karmont, and C.I. 11804 ranked highest in yield. Severe lodging occurred in Karmont, Kharkof, and C.I. 11744 although at several times after heading all varieties were lodged. Yogo has the highest average yield. C.I. 11804 and 11823 have good 4-year records. Other varieties of special merit are Newturk and Karmont.

At Havre yields, test weights and plant heights were low as a consequence of a long drought during the spring and summer. C.I. 11744 and Yogo had the best yields, Minturki and Nebred the poorest. Yogo has the best long-time average and has been widely adopted by farmers in the Havre--Great Falls--Lewistown area of Montana.

Table 1. Yield and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 21 stations in the hard red winter wheat region in 1948, with average yields for various periods.

Denton, Texas
(Ten plots; rod rows)

Variety	C.I. or Sel. no.	Date Headed	Date Ripe	Av. ht.	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		Apr.	May	Ins.	%	%	Lbs.	Bus.	Bus.	Bus.			
Cimarron	12120	22	27	23	5	T	63.0	26.5	26.0	---	2	113.0	8
Chiefk. x Oro-Tenq.	12133	22	26	24	4	2	61.5	26.2	---	---	1	106.1	16
Clarkan	8858	25	29	27	5	36	61.0	25.7	24.1	20.9	14	113.0	9
Blackhull	6251	25	30	25	11	8	62.0	25.6	23.3	19.9	17	109.7	11
Red Chief	12109	23	26	26	17	15	62.0	24.7	23.5	21.4	6	107.2	15
Kharkof	1442	26	30	24	11	18	59.0	24.7	23.0	20.0	17	100.0	22
Kaneed	5146	26	30	25	15	21	59.0	24.7	23.5	20.9	17	114.0	6
Comanche	11673	22	26	24	4	7	59.0	24.4	25.8	24.8	10	140.4	1
Chiefk. x Oro-Tenq.	12148	21	24	24	1	T	61.0	24.4	---	---	1	98.8	24
Wichita	11952	18	20	23	6	E	63.0	24.3	23.3	20.7	6	103.3	18
Triumph	12132	16	17	23	T	E	62.0	24.2	23.3	---	3	101.5	20
Tenmarq.	6936	25	30	25	8	13	60.0	24.2	21.5	19.8	17	120.0	4
29-34-275 Double Cr.	12503	20	24	25	0	0	59.0	23.9	26.2	---	2	113.9	7
Westar	12110	23	29	24	2	16	60.0	23.6	22.9	23.8	6	118.9	5
Early Blackhull	8856	17	19	23	4	E	63.0	23.4	26.6	23.2	15	124.8	3
Med.-Hope x Fulc.	114-41-3	24	26	24	0	0	60.0	23.2	---	---	1	93.9	26
Med.-Hope x Med.	97-38-7-2	23	27	25	T	0	59.0	22.3	25.7	---	2	111.8	10
Pawnee	11669	23	27	22	7	5	57.0	21.8	22.5	22.3	10	127.6	2
Denton	8265	25	30	27	T	55	57.0	21.3	21.6	20.1	17	107.7	13
Red May	7250-1	22	23	23	T	43	59.5	21.2	23.9	21.5	8	107.6	14
Kv.-Mqo. x Kv.-Tenq.	12128	24	29	23	1	8	59.0	21.2	---	---	1	85.8	27
Med.-Hope x Med.	98-40-118-5	22	25	24	0	0	61.0	20.9	---	---	1	84.6	28
29-34-275 Double Cr.	12504	22	27	25	T	0	60.0	20.8	---	---	1	84.2	29
Comanche Double Cr.	12145	22	26	23	T	0	60.0	20.5	23.1	---	2	100.7	21
Fulcaster	6471	24	27	25	5	36	57.0	20.4	18.7	18.4	17	99.8	23
Austin	12346	24	30	24	6	0	57.0	19.9	21.6	---	5	109.0	12
Clarkan-Hd.-Fed. x Med.-Hope	125-40-354-2	25	29	24	0	0	59.0	19.6	22.1	---	4	96.3	25
Mediterranean	3015-81	22	25	24	T	27	59.0	19.4	22.3	20.7	17	104.8	17
Med.-Hope x Fule.	114-40-166-2	24	28	23	0	0	57.0	18.1	20.5	---	4	101.9	19
Clarkan-Hd.-Fed. x Med.-Hope	125-40-374-4	26	30	24	0	0	58.0	18.1	18.9	---	2	82.1	30

Standard error of a difference = 1.60 bushels.

Chillicothe, Texas
(Ten plots; rod rows)

Variety	C.I. No.	Date head-ed	Top Growth Jan. 8	Weight Per Bushel	Average acre yield 1948	1947-1948	1944-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		Apr.	%	Lbs.	Bus.	Bus.	Bus.			
Pawnee	11669	27	100	61	39.6	39.2	29.4	11	123.4	6
Martin-Tenq. x Chiefk.	12146	26	100	61	39.2	37.7	---	3	127.3	3
Westar	12110	26	100	61	38.7	35.1	28.2	5	124.1	5
Chiefk. x Oro-Tenq.	12133	27	100	62	38.2	---	---	1	115.8	11
Triumph	12132	19	110	63	36.8	37.6	---	3	119.3	10
Red Chief	12109	27	100	63	36.6	36.0	26.0	7	115.4	12
Martin-Tenq. x Kharkof	12147	27	100	61	36.1	35.8	---	4	123.1	7
Wichita	11952	23	100	61	35.9	36.6	27.3	7	121.8	9
Comanche	11673	26	100	61	35.8	37.9	28.7	11	122.7	8
Kv.-Mqo. x Kv.-Tenq.	12128	26	100	60	35.4	---	---	1	107.3	17
Blackhull	6251	29	110	63	34.8	34.4	25.3	11	112.7	15
Cimarron	12120	23	100	63	34.8	39.9	---	2	138.1	1
Early Blackhull	8856	21	110	61	33.4	36.1	27.1	11	112.9	14
Kharkof	1442	30	100	61	33.0	28.9	22.7	11	100.0	19
Comanche D. Cr.	12145	26	120	62	32.2	36.3	---	2	125.4	4
Chiefk. x Oro-Tenq.	12148	23	100	61	31.1	---	---	1	94.2	20
Tenmarq.	6936	28	100	61	31.0	31.6	24.1	11	114.0	13
275 D. Cr.	12503	21	110	60	30.8	38.7	---	2	133.9	2
275 D. Cr.	12504	26	110	63	28.3	32.3	---	2	111.8	16
Kanred	5146	28	100	62	27.0	27.2	22.5	11	101.9	18

Standard error of a difference = 2.31 bushels.

Bushland, Texas
(Six plots; rod rows)

Variety	C.I. No.	Spring Survival	Date headed	Av. height	Weight per bushel	Average Acre Yield 1948	Average Acre Yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
		%	May	Ins.	Lbs.	Bus.	Bus.			
Chiefkan x Oro-Tenq.	12148	90	15	21	60.0	13.5	---	1	123.9	1
Martin-Tenq. x Chiefkan	12146	80	17	19	56.5	13.4	---	1	122.9	2
Red Chief	12109	88	18	20	61.0	13.3	18.3	5	109.9	8
Chiefkan x Oro-Tenq.	12133	90	17	20	60.0	13.3	---	1	122.0	3
Triumph	12132	88	12	19	60.0	13.3	16.1	2	90.0	17
Blackhull	6251	80	19	23	58.0	13.2	19.3	12	106.1	10
Martin-Tenq. x Kharkof	12147	88	18	21	58.0	13.0	---	1	119.3	4
Pawnee	11669	95	16	17	58.0	12.7	18.3	9	115.6	6
Comanche	11673	89	17	17	58.0	12.3	17.5	9	114.2	7
Kv. - Mgo. x Kv. - Tenq.	12128	89	17	18	58.0	11.6	---	1	106.4	9
Westar	12110	87	17	21	58.5	11.1	18.1	5	115.8	5
Wichita	11952	86	14	17	59.0	10.9	14.8	5	97.7	13
Early Blackhull	8856	63	12	20	59.0	10.9	14.6	11	94.2	16
Kharkof	1442	93	21	23	58.0	10.9	17.9	12	100.0	12
Comanche D. Cr.	12145	63	19	20	56.5	10.6	---	1	97.2	14
Tenmarq	6936	88	19	19	57.5	10.3	17.7	12	105.2	11
Cimarron	12120	56	15	18	60.0	9.5	17.2	2	95.8	15
275 D. Cr.	12503	80	19	19	56.5	9.5	---	1	87.2	18
275 D. Cr.	12504	50	20	23	57.5	9.1	---	1	83.5	19

Standard error of a difference = 1.26 bushels

Lawton, Oklahoma
(Three 1/68.8 acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Av. height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1941-1948	No. Yrs. Grown	Percent of Kharkof	Rank
				Ins.	Lbs.	Bus.	Bus.	Bus. 1/			
Pawnee	11669	4-28	5-30	29	58	32.5	28.4	28.1	8	121.4	3
Kv.-Mqo. x Kv.-Tenq.	12128	4-28	5-28	31	60	32.3	---	---	1	112.1	7
Reliant	12144	4-30	6-1	32	60	31.3	28.4	---	2	115.5	4
Wichita	11952	4-26	5-28	32	62	30.8	27.2	28.6	7	124.9	1
Tenmarq	6936	4-30	5-31	32	59	29.8	24.7	26.0	14	108.8	9
Blue Jacket	12502	4-28	5-31	34	61	29.1	---	---	1	101.0	12
Chiefkan x Oro-Tenq. 2/	12133	4-29	5-30	29	59	29.0	---	---	1	100.7	13
Kharkof	1442	5-1	6-1	30	59	28.8	24.6	22.9	14	100.0	14
Comanche D. Cr. 2/	12145	4-28	5-30	32	60	28.7	---	---	1	99.7	15
Triumph	12132	4-24	5-28	29	60	28.2	27.0	---	2	110.0	8
Cimarron	12120	4-28	5-30	29	61	26.6	28.2	---	2	114.7	5
Chiefkan x Oro-Tenq. 2/	12148	4-28	5-30	29	59	26.5	---	---	1	92.0	17
Cheyenne	8885	5-1	6-3	28	59	26.1	24.0	25.0	14	104.9	11
Early Blackhull 3/	8856	4-24	5-31	33	60	25.4	26.1	25.9	13	105.1	10
Westar	12110	4-29	5-31	30	57	24.8	25.9	---	4	114.3	6
Comanche	11673	4-29	5-31	30	58	23.9	27.0	29.0	8	124.8	2
Red Chief	12109	5-1	6-2	31	58	21.8	20.9	---	6	93.7	16

Standard error of a difference = 1.84 bushels.

1/ No yields in 1946.

2/ One percent loose smut.

3/ Lodged 5 percent. Not grown in 1945.

Stillwater, Oklahoma

(Four 1/68 acre plots; sown Oct. 22, emerged Nov. 1)

Variety	C.I. No.	Date Headed	Date Ripe	Av. height	Leaf rust 1/ P	Leaf rust 1/ S	Septoria 2/	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	%		Lbs.	Bus.	Bus.	Bus.			
Clark's 40-169R	12556	7	11	29	81	16	3.0	56.9	24.5	22.9	---	2	100.0	16
Chiefkan x Oro-Tenq.	12133	1	7	26	60	14	3.1	55.2	24.0	---	---	1	116.5	2
Clarkan	8858	6	10	28	50	12	2.8	55.9	22.6	21.2	21.5	12	103.1	13
Denton	8265	7	8	29	48	3	2.8	54.4	22.4	25.2	23.6 3/	15	103.5	11
Cimarron	12120	1	7	25	41	18	3.0	57.4	22.3	26.1	---	2	114.0	5
Red Chief	12109	3	11	28	64	11	2.8	58.7	22.2	22.8	22.3	6	108.4	8
Early Blackhull	8856	4-26	4	28	30	15	2.8	56.6	22.1	22.7	22.7	16	79.6	24
Chiefkan x Oro-Tenq.	12148	4-30	7	26	48	11	2.8	55.6	22.1	---	---	1	107.3	10
Westar	12110	4	8	27	23	1	4.0	55.1	21.9	25.9	---	3	112.4	6
Wichita	11952	4-28	4	27	80	13	3.4	54.3	21.4	21.0	---	4	93.8	21
Tenmarq	6936	5	8	27	49	13	3.3	53.9	21.3	22.4	19.9	16	99.0	17
Turkey	1558	8	9	25	39	11	3.4	53.9	21.1	23.0	19.7 3/	15	95.2	19
Triumph	12132	4-24	4	23	76	16	2.6	54.4	21.1	23.4	22.1	6	107.7	9
Reliant	12144	4	9	27	38	2	2.3	55.9	21.0	23.7	23.6	6	114.8	4
Cheyenne	8885	7	9	24	44	6	3.3	55.1	21.0	23.1	22.9	16	103.2	12
Kharkof	1442	8	8	25	36	8	2.9	54.5	20.6	22.9	20.6	16	100.0	15
Austin	12346	8	9	29	33	2	3.1	51.7	20.6	---	---	2	119.6	1
Blue Jacket	12502	4	8	27	75	3	2.5	56.1	20.3	23.6	---	2	102.8	14
Comanche	11673	2	7	26	38	3	2.8	54.0	20.2	23.0	22.9	8	111.8	7
Comanche D. Cr.	12145	2	7	24	3	1	1.5	55.5	19.6	---	---	1	95.1	20
Pawnee	11669	3	7	25	70	10	3.5	52.3	19.3	21.9	23.9	8	115.9	3
Kv.-Mqo. x Kv.-Tenq.	12128	3	7	25	25	6	3.4	54.4	18.4	---	---	1	89.3	23
Fulcaster	6471	6	8	29	71	16	3.3	53.2	18.0	21.8	---	11	92.3	22
Kawvale	8180	7	8	27	28	6	3.8	51.6	16.6	20.6	20.6	16	98.3	18

Standard error of a difference = 1.83 bushels

1/ P = prevalence, S = severity; p = pustule type-was CS.
2/ Degree of susceptibility 0 to 4.
3/ Not grown in 1946.

Cherokee, Oklahoma
(Four plots, rod rows)
(Sown Oct. 25, emerged Nov. 5)

Variety	C.I. No.	Maturity: Headed May 12	Maturity: Ripe June 10	Av. height	Weight Per Bushel	Average acre yield: 1948	Average acre yield: 1947-1948	Average acre yield: 1946-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		%	%	Ins.	Lbs.	Bus.	Bus.	Bus.			
Red Chief	12109	10	75	27	62.2	32.2	30.6	30.4	3	126.6	2
Wichita	11952	75	100	26	61.7	29.9	30.7	28.7	3	119.3	5
Chiefkan x Oro-Tenq.	12133	25	90	25	59.3	29.0	---	---	1	110.3	11
Early Blackhull	8856	75	100	27	61.2	28.9	28.4	29.4	3	122.3	3
Triumph	12132	100	100	26	58.5	28.7	28.4	30.6	3	127.3	1
Reliant	12144	T	25	25	60.3	28.2	27.7	29.3	3	121.9	4
Blue Jacket	12502	10	90	28	61.4	28.0	28.5	---	2	107.6	12
Cheyenne	8885	0	25	23	59.3	27.3	28.6	27.6	3	114.8	7
Cimarron	12120	10	90	26	61.7	27.2	30.2	---	2	114.2	8
Chiefkan x Oro-Tenq.	12148	50	90	25	59.6	26.4	---	---	1	100.4	15
Kharkof	1442	T	50	24	58.9	26.3	26.5	24.0	3	100.0	16
Kv.-Mqo. x Kv.-Tenq.	12128	10	90	24	58.3	26.3	---	---	1	100.0	17
Comanche	11673	25	90	26	58.2	25.4	28.0	26.7	3	111.2	10
Westar	12110	10	25	25	59.2	25.4	25.8	28.6	3	119.0	6
Turkey	1558	0	10	24	58.6	25.2	26.6	24.3	3	101.1	14
Tenmarq	6936	10	50	25	58.2	24.5	26.3	24.6	3	102.5	13
Pawnee	11669	25	95	25	58.8	24.4	28.5	27.4	3	114.1	9
Comanche D. Cr.	12145	T	50	23	59.3	19.4	---	---	1	73.8	18

Standard error of a difference = 1.91 bushels.

Woodward, Oklahoma
(Four 1/51 acre plots; sown Nov. 6, emerged Jan. 5)
(Two on fallow, two on cropped land)

Variety	C.I. No.	Date Headed	Date Ripe	Av. height	Weight per bushel	Average Acre Yield 1948	1947-1948	1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Reliant	12144	10	13	27	58.0	28.9	27.7	---	2	119.9	3
Red Chief	12109	10	13	28	60.8	27.6	25.8	33.5	7	116.2	5
Wichita	11952	2	7	28	59.3	27.1	26.7	32.8	7	120.7	2
Chiefkan x Oro-Tenq.	12148	4	10	28	57.4	26.4	---	---	1	108.6	8
Cimarron	12120	6	10	28	59.8	26.1	27.7	32.3	6	113.1	6
Westar	12110	10	14	28	58.0	25.7	23.9	---	5	108.2	9
Blue Jacket	12502	12	15	29	59.8	25.4	24.0	---	2	103.9	12
Early Blackhull	8856	1	6	29	58.3	25.4	25.3	28.7	17	97.9	17
Cheyenne	8885	14	17	25	57.6	25.3	25.0	32.3	17	107.6	10
Chiefkan x Oro-Tenq.	12133	9	13	27	58.6	24.8	---	---	1	102.1	13
Tenmarq	6936	11	15	28	57.0	24.7	24.2	30.0	17	107.1	11
Triumph	12132	4-29	5	26	57.9	24.6	24.3	---	4	112.2	7
Kharkof	1442	12	16	26	57.4	24.3	23.1	28.5	17	100.0	14
Comanche D. Cr.	12145	11	15	25	57.0	24.0	---	---	1	98.8	16
Kv.-Mqo. x Kv.-Tenq.	12128	11	13	26	57.9	23.7	---	---	1	97.5	18
Turkey	1558	14	17	27	57.4	23.6	22.8	---	14	99.4	15
Comanche	11673	9	12	27	57.0	23.5	24.2	31.5	11	118.4	4
Pawnee	11669	9	12	27	57.5	23.1	25.2	32.4	11	125.5	1

Standard error of a difference = 1.47 bushels.

Goodwell, Oklahoma
(Five plots, rod rows; sown Oct. 18, emerged Nov. 5)

Variety	C.I. No.	Weight per bushel	Average acre yield			No. Yrs. Grown	Percent of Kharkof	Rank
			1948	1947-1948	1944-1948			
		Lbs.	Bus.	Bus.	Bus.			
Westar	12110	59.5	34.3	28.3	26.4	5	125.9	2
Tenmarq	6936	59.3	33.3	25.7	22.6	11	97.2	14
Comanche	11673	58.8	32.8	28.1	26.8	7	124.4	3
Cimarron	12120	61.8	32.0	30.2	---	2	123.6	4
Kharkof	1442	60.3	31.8	24.4	21.0	11	100.0	11
Blue Jacket	12502	61.8	31.6	---	---	1	99.4	12
Kv.-Mgo. x Kv.-Tenq.	12128	59.0	31.3	25.3	---	2	103.5	8
Chiefkan x Oro-Tenq.	12133	59.8	31.2	---	---	1	98.1	13
Pawnee	11669	58.5	30.6	21.1	23.0	7	109.5	6
Red Chief	12109	62.5	30.4	24.6	24.9	5	118.5	5
Reliant	12144	60.5	30.1	25.7	---	2	105.3	7
Chiefkan x Oro-Tenq.	12148	59.5	29.9	---	---	1	94.0	15
Early Blackhull	8856	59.0	29.9	23.9	22.3	11	88.9	17
Cheyenne	8885	60.3	29.5	25.0	25.1	10	103.1	9
Wichita	11952	59.0	29.4	27.1	27.6	5	131.6	1
Turkey	1558	59.8	27.4	22.6	---	2	92.4	16
Comanche D. Cr.	12145	59.5	27.3	---	---	1	85.8	18
Triumph	12132	57.8	27.1	25.5	---	3	100.7	10

Standard error of a difference = 2.83 bushels.

Manhattan, Kansas
(Three 1/56 acre plots)

Variety	C.I. or Ks. No.	Date Headed	Date Ripe	Av. height	Lodging	Wt. 100 culms 1/	No. culms per A	Rust Leaf	Rust Stem	Wt. per bu.	Average Acre Yield 1948	Average Acre Yield 1947-1948	Average Acre Yield 1941-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	8.	0000	%	%	Lbs.	Bus.	Bus.	Bus.			
Wichita	11952	11	24	36	28	7.52	223	25	0	59.7	53.2	45.6	34.6	9	144.5	17
Kv. Tenq. x Comanche	2799	17	28	38	33	7.30	247	25	T	60.0	49.3	---	---	1	201.2	1
Pawnee	11669	16	27	37	23	7.21	270	25	T	59.1	48.6	45.4	38.2	11	160.3	10
Chiefk. x Oro-Tenq.	12133	16	28	38	23	7.40	253	40	T	60.3	48.4	41.5	---	3	159.5	11
Cimarron	12120	16	27	35	17	7.46	247	40	12	61.7	47.9	---	---	1	195.5	2
Blackhull x Chey.	12101	18	28	37	20	6.55	272	40	40	59.2	47.9	42.7	---	4	146.7	16
Mqo.-Oro x Oro-Tenq.	2795	17	27	37	32	7.80	258	T	T	59.4	47.8	44.8	---	2	176.7	4
Comanche	11673	18	28	39	30	7.13	257	15	1	59.1	47.2	41.1	33.7	11	141.6	18
Kv.-Tenq. x Comanche	2798	16	27	37	33	7.68	242	3	1	59.5	47.0	44.7	---	2	176.3	5
Kv.-Mqo. x Kv.-Tenq.	12128	19	28	37	28	7.11	254	T	2	60.6	46.0	43.5	---	4	159.0	12
Med.-Hope x Pawnee	2800	17	27	35	17	7.32	255	5	T	57.7	45.9	---	---	1	187.3	3
Tenmarq	6936	19	28	41	23	7.64	251	25	18	58.9	45.9	38.4	30.9	17	118.6	22
Westar	12110	18	28	40	17	7.92	248	T	28	58.5	45.2	44.3	---	4	157.2	13
Early Blackhull	8856	8	24	37	43	7.09	234	5	0	60.9	44.1	37.4	29.1	17	112.7	25
Red Chief	12109	18	28	39	30	7.33	240	40	27	62.8	43.7	37.3	29.4	8	124.7	20
Clark's 40-169R	12556	20	29	45	38	8.88	226	50	37	62.1	43.7	38.8	---	2	153.1	15
Blue Jacket	12502	20	29	43	30	9.82	236	45	8	62.3	43.1	40.8	---	2	160.7	9
Comanche x Med.-Hope	2801	19	28	37	25	7.69	230	T	T	58.8	42.8	---	---	1	174.7	6
Triumph	12132	8	24	33	37	7.91	194	10	0	59.5	42.7	41.2	---	3	157.1	14
Med.-Hope x Pawnee	12141	19	28	35	13	8.01	248	5	T	59.2	42.6	42.8	---	3	161.4	8
Kv.-Tenq. x Comanche	12149	19	28	39	37	8.22	208	5	T	60.5	42.4	41.2	---	2	162.5	7
Kawvale x Oakley	12386	20	28	43	33	9.70	209	20	33	58.4	42.1	38.3	---	4	134.9	19
Clarkan	8858	21	29	46	35	10.61	200	50	50	60.2	39.1	35.5	29.3	17	116.1	23
Kawvale	8180	24	29	43	35	8.87	198	25	13	57.4	34.6	32.6	30.2	17	120.5	21
Blackhull	6251	23	30	42	63	7.19	258	40	37	60.2	33.0	27.6	26.3	17	109.8	26
Kanred	5146	23	30	42	57	7.39	251	20	50	57.4	32.3	28.8	24.5	17	103.4	27
Turkey	1558	24	30	43	80	6.66	250	40	70	56.5	29.3	27.7	23.4	17	102.3	28
Cheyenne	8885	24	30	41	33	8.02	251	60	67	55.5	27.1	28.7	28.6	17	114.9	24
Kharkof	1442	25	30	44	57	7.38	254	50	73	55.8	24.5	25.4	23.6	17	100.0	29

1/ A section 10 cm. long.

Standard error of a difference = 1.51 bushels.

Garden City, Kansas
(Three 1/45 acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Av. height	Wt. per bu.	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1941-1948	No. Yrs. Grown	Percent of Turkey	Rank
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Chiefkan x Oro-Tenmarq	12133	17	19	30	59.8	37.9	39.5	---	3	121.7	3
Comanche	11673	17	19	31	59.1	37.0	38.0	31.5	10	135.0	1
Mqo.-Oro x Pawnee	12505	18	20	28	59.4	35.4	---	---	1	120.0	5
Westar	12110	18	20	31	59.0	35.0	35.6	---	3	102.9	12
Tenmarq	6936	19	21	31	58.4	34.6	34.3	28.3	10	121.0	4
Kv.-Mqo. x Kv.-Tenq.	12128	18	20	29	59.9	33.1	36.3	---	2	118.1	6
Cimarron	12120	15	18	29	60.9	31.4	---	---	1	106.4	11
Pawnee	11669	17	19	30	58.5	30.1	33.8	30.8	10	129.7	2
Blue Jacket	12502	20	22	35	59.1	30.1	31.4	---	2	102.1	13
Turkey	1558	22	24	32	57.6	29.5	30.7	23.3	10	100.0	14
Blackhull	6251	20	22	33	58.7	29.4	29.8	26.6	10	115.2	8
Red Chief	12109	20	22	35	60.4	27.7	28.1	---	7	115.6	7
Chiefkan x Oro-Tenmarq	12148	15	18	30	60.2	27.4	---	---	1	92.9	16
Wichita	11952	14	17	30	59.7	25.6	29.6	25.9	8	111.1	10
Early Blackhull	8856	12	15	30	59.2	25.1	28.1	25.5	10	113.5	9
Med.-Hope x Pawnee	12141	18	20	29	57.8	24.6	---	---	1	83.4	17
Triumph	12132	11	15	27	58.8	24.4	30.5	---	3	95.4	15

Standard error of a difference = 1.57 bushels.

Hays, Kansas
(Four 1/50 acre plots, two on fallow, two on cropped land;
Sown Oct. 27, emerged Jan. 1)

Variety	C.I. No.	Date Headed	Date Ripe	Av. Height	Weight per Bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1941-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Blackhull x Cheyenne	12101	22	26	28	56.0	37.8	39.7	---	5	120.9	3
Kharkof	1442	25	27	31	57.3	36.8	36.7	22.8	17	100.0	17
Chiefkan x Oro-Tenq.	12134	21	22	31	57.3	35.9	37.4	---	4	107.5	14
Cheyenne	8885	26	27	27	58.3	35.8	38.7	25.3	17	111.8	10
Westar	12110	22	26	29	57.5	35.2	37.5	---	3	98.1	18
Chiefkan x Oro-Tenq.	12133	21	21	29	57.3	35.2	36.9	---	4	112.4	8
Kanred	5146	25	27	30	58.3	34.5	34.7	22.8	16	104.2	15
Blue Jacket	12502	22	27	35	58.0	34.4	35.6	---	2	96.9	19
Chiefkan x Oro-Tenq.	12148	19	19	28	58.5	34.0	39.6	---	2	107.8	13
Turkey	1558	24	27	30	57.0	34.0	35.8	22.5	17	100.8	16
Red Chief	12109	20	26	32	59.3	33.5	35.3	26.9	8	117.8	6
Chiefkan x Oro-Tenq.	HC46-52	19	19	28	57.5	33.3	---	---	1	90.5	22
Cimarron	12120	20	26	27	58.5	32.5	---	---	1	88.3	23
Chiefkan 1/	11754	21	26	35	61.5	31.7	36.2	28.3	13	125.9	2
Chiefkan x Oro-Tenq.	HC46-53	19	19	28	58.5	31.0	---	---	1	84.2	24
Med.-Hope x Pawnee	12141	22	26	28	57.0	29.9	---	---	1	81.3	25
Chey. x Ea. Blackhull	12122	18	20	27	59.3	29.4	34.7	---	5	112.0	9
Kv.-Mqo. x Kv.-Tenq. 1/	12128	23	25	31	61.5	29.2	34.2	---	3	92.5	20
Tenmarq 1/	6936	23	26	33	61.3	28.2	33.0	25.2	17	115.6	7
Blackhull 1/	6251	22	26	34	62.0	27.7	30.9	23.3	17	108.7	12
Wichita 1/	11952	18	22	32	61.3	27.1	32.6	25.3	8	110.9	11
Triumph 1/	12132	15	16	29	60.8	26.7	33.1	---	3	91.3	21
Comanche 1/	11673	21	25	30	61.0	25.9	32.2	26.5	12	117.8	5
Early Blackhull 1/	8856	17	19	31	61.0	25.6	32.9	26.9	17	118.5	4
Pawnee 1/	11669	21	25	30	61.5	24.3	32.3	27.4	11	127.7	1

Standard error of a difference = 1.82 bushels

1/ Threshed before an extended rainy period.

Colby, Kansas
(Three 1/50 acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Av. Height	Lodging 1/	Wt. per bu.	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1942-1948	No. Yrs. Grown	Percent of Turkey	Rank
		May	July	Ins.		Lbs.	Bus.	Bus.	Bus.			
Turkey	1558	29	14	34	10	62.0	40.8	32.7	39.9	12	100.0	14
Cimarron	12120	24	10	30	0	64.0	40.3	---	---	1	98.8	17
Chiefk. x Oro-Tenq.	12133	26	12	32	5	62.5	39.6	40.0	---	3	123.0	1
do	12148	24	11	34	5	62.0	37.1	---	---	1	90.9	18
Kanred	5146	29	14	33	10	61.5	36.0	34.2	41.8	12	103.6	12
Tenmarq	6936	27	13	34	5	61.5	35.6	32.7	43.3	11	111.0	7
Cheyenne	8885	6-1	16	32	0	62.0	35.4	34.5	43.7	12	109.2	9
Triumph	12132	21	3	29	5	61.0	34.5	32.5	---	3	115.3	3
Blue Jacket	12502	26	15	38	5	63.5	34.0	32.4	---	2	99.1	16
Pawnee	11669	25	12	33	5	61.5	32.6	34.4	47.7	8	119.9	2
Kv.-Moo. x Kv.-Tenq.	12128	27	14	32	5	61.5	32.5	34.1	---	3	114.1	5
Comanche	11673	26	12	33	5	62.0	31.7	32.1	46.0	9	114.7	4
Chiefkan	11754	25	13	37	5	63.0	30.0	30.1	43.2	9	109.5	8
Westar	12110	27	14	35	5	61.5	29.9	31.7	---	3	99.1	15
Early Blackhull	8856	22	6	34	15	61.0	29.4	29.3	41.7	12	101.7	13
Wichita	11952	23	7	32	10	62.0	28.8	32.8	45.4	8	113.6	6
Red Chief	12109	25	11	36	5	63.0	28.6	29.7	43.5	7	109.0	10
Med.-Hope x Pawnee	12141	26	13	32	0	61.0	27.7	---	---	1	67.9	19
Blackhull	6251	25	13	35	15	62.0	27.5	27.8	41.2	12	105.0	11

Standard error of a difference = 2.72 bushels

1/ 0 = No lodging 5 = good straw 10 = Fair 15 = Poor

Akron, Colorado
(Four 1/41 acre plots, two on fallow, two after corn)

Variety	C.I. No.	Frost Damage %	Weight per Bushel Lbs.	Average acre yield 1948 Bus.	1947-1948 Bus.	1943-1948 Bus.	No. Yrs. Grown	Percent of Kharkof	Rank
Alton	1438	0	59.3	24.8	16.4	16.3	17	81.7	14
Kharkof	1442	0	59.0	24.6	22.8	20.7	17	100.0	10
Cheyenne	8885	0	59.5	24.2	22.9	22.2	17	108.4	5
Minturki	6155	0	57.5	24.0	22.6	19.0	17	93.2	11
Tenmarq	6936	0	58.5	22.7	19.7	19.9	17	110.5	4
Red Chief	12109	0	60.5	22.1	23.9	20.4	7	106.7	7
Kv.-Mqo. x Kv.-Tenq.	12128	0	57.8	21.7	---	---	1	88.2	12
Kan.-Hd. Fed x Mint.-Minh.	11970	4	58.5	20.3	21.6	20.6	10	113.2	1
Cimarron	12120	14	60.0	20.1	---	---	1	81.7	13
Comanche	11673	3	58.5	19.3	20.5	20.5	10	111.2	3
Chiefkan x Oro-Tenq.	12133	5	58.0	19.2	23.5	---	2	103.1	9
Wichita	11952	25	58.0	17.3	18.6	18.9	8	106.2	8
Pawnee	11669	5	58.3	17.0	24.0	19.2	10	108.3	6
Chiefkan x Oro-Tenq.	12148	15	58.0	17.0	---	---	1	69.1	15
Early Blackhull	8856	25	57.8	17.0	20.7	19.3	17	111.8	2

Standard error of a difference = 2.33 bushels.

Ft. Collins, Colorado
(Seven plots, rod rows)

Variety	C.I. or Col. No.	Date Headed	Date Ripe	Av. Height	Lodging	Stem rust 1/ P	Stem rust 1/ S	Stem rust 1/ R	Wt. per bu.	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1944-1948	No. Yrs. Grown	Percent of Kharkof 2/	Rank
		May	July	Ins.	%	%	%		Lbs.	Bus.	Bus.	Bus.			
Eureka x Minturki-Kanred	A149	26	20	39	70	100	10	4	62.6	72.0	54.0	---	3	128.2	1
Wichita	11952	23	11	35	50	T	T	4	63.4	68.8	44.6	37.8	5	105.6	6
Chiefkan x Oro-Tenmarq	12133	26	19	37	46	100	T	4	63.6	65.7	48.8	---	2	108.6	4
Hd. Fed. x Marquis^2 x Kanred	A340	25	17	35	67	100	T	4	63.3	65.5	44.3	---	3	93.8	19
Cheyenne x E. Blackhull	12122	24	15	35	71	25	T	4	63.6	64.8	42.9	---	4	101.7	11
Chiefkan x Oro-Tenmarq	12148	24	14	34	41	100	T	1	64.4	64.3	---	---	1	103.2	8
Kanred x Hope-Hd. Fed.	12135	27	17	38	56	10	T	3	62.1	63.8	43.1	---	3	94.4	17
Pawnee	11669	25	14	35	68	100	T	4	63.0	63.6	47.6	40.3	5	112.6	2
Comanche	11673	26	15	36	57	100	1	3-4	63.3	62.5	42.3	37.3	5	104.1	7
Kharkof	1442	31	21	39	90	100	2	4	61.1	62.3	44.9	---	3	100.0	12
Mutant 348	A910	27	20	39	60	100	2	2-3	62.0	62.1	45.1	---	3	103.1	9
Tenmarq	6936	28	20	39	64	100	3	4	62.0	60.7	45.4	36.7	5	102.6	10
Cimarron	12120	25	16	32	1	T	T	3	65.2	60.7	---	---	1	97.4	15
Cheyenne x Tenmarq	11972	30	19	37	53	50	T	4	63.4	60.2	48.4	40.1	5	111.9	3
Cheyenne	8885	31	20	37	61	100	T	4	61.9	59.1	51.5	38.3	5	106.8	5
Kv.-Mqo. x Kv.-Tenq.	12128	26	16	35	54	50	T	3	63.3	57.5	---	---	1	92.3	21
E. Blk.-Marmin x Hope-Med.	-76	27	16	38	76	T	T	2	61.8	57.1	45.2	---	3	99.4	13
do	-73	27	17	38	72	T	T	2	60.6	56.6	41.8	---	3	97.2	16
do	-25	27	16	39	66	50	T	4	62.7	56.1	36.3	---	3	89.8	22
Red Chief	12109	26	20	41	37	100	T	4	64.2	54.0	42.1	---	4	97.7	14
E. Blk.-Marmin x Hope-Med.	-10	28	16	42	80	T	T	2	61.8	52.3	40.8	---	3	93.3	20
Kanred	5146	31	19	40	86	100	10	4	61.7	52.0	39.8	33.8	5	94.2	18
E. Blk.-Marmin x Hope-Med.	-15	28	20	41	86	50	T	3	62.6	50.5	30.5	---	3	77.7	24
do	-5	27	15	40	77	T	T	2	61.2	44.3	28.6	---	3	79.1	23

Standard error of a difference = 4.01 bushels.

1/ P = prevalence, S = severity, R = pustule type. 2/ Based on Kanred in 1944, 1945.

Lincoln, Nebraska
(Five 1/77.73 acre plots)

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Av. Ht.	Shattering 7/3	Wt. per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	In.	0/0	Lbs.	Bus.	Bus.	Bus. 1/			
Compound Hybrid 2/	12501	25	28	38	T	60.4	50.7	43.7	---	3	119.9	3
Chey. x Tenmarq	11972	23	28	37	0	59.3	50.3	38.6	36.7	7	113.3	8
Tenmarq	6936	22	28	40	0	59.3	48.9	40.8	35.1	17	106.6	14
Nebred	10094	24	26	36	0	60.2	48.8	42.4	34.7	17	106.0	16
Cheyenne	8885	24	28	38	T	60.1	48.2	42.1	36.8	17	112.1	9
Chiefkan x Oro-Tenq.	12133	20	27	36	0	59.9	46.8	---	---	1	106.1	15
Red Chief	12109	21	28	41	0	63.1	46.7	50.8	38.6	6	116.4	5
Hung. Sel. x Nebred	12507	23	28	39	0	59.9	46.6	45.8	---	2	128.2	2
Chev. x Hung. Sel.	Sel. 403858	22	26	38	T	59.0	46.5	42.3	---	2	118.5	4
Comanche	11673	20	27	36	0	58.2	44.5	43.6	36.0	10	113.8	7
Kharkof 2/	1442	26	28	42	0	59.8	44.1	35.7	31.3	17	100.0	20
Chiefkan x Oro-Tenq.	12148	18	26	36	0	59.4	43.2	---	---	1	98.0	22
Mqo. x Oro	Ks. 383464	25	28	39	0	59.1	43.1	42.0	---	3	114.9	6
Blackhull	6251	22	28	40	0	60.9	42.9	38.2	33.8	17	100.8	19
Turkey x Chey. 2/	12142	22	26	37	3	59.7	42.7	35.1	---	3	103.4	17
Kv.-Mqo. x Kv.-Tenq.	12125	21	26	34	T	58.3	41.9	---	---	1	95.0	23
Pawnee	11669	21	25	36	0	58.5	41.1	42.5	41.0	12	128.8	1
Turkey	12137	25	28	41	0	60.0	40.9	36.0	31.8	17	99.0	21
Cimarron	12120	21	26	34	0	61.7	40.7	---	---	1	92.3	24
Nebr. #60 x Med.-Hope	12500	21	26	36	0	58.7	40.1	39.9	---	2	111.8	10
Wichita	11952	18	25	38	T	58.1	38.8	38.6	35.9	6	110.5	12
Triumph	12132	17	25	35	0	59.1	38.5	40.1	---	3	107.3	13
Turk.-Tenq.-Chey. x Turk.	12523	22	26	37	4	60.5	37.4	39.8	---	2	111.3	11
Turk. x Turk.-Chey.	Sel. 383130	22	28	39	3	60.7	36.3	36.5	---	2	102.1	18

Standard error of a difference = 2.29 bushels.

1/ No yields in 1945. 2/ Lodged 2%.

North Platte, Nebraska
(Four plots; two on fallow, two after corn)

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Cheyenne x Tenmarq	11972	24	29	24	57	32.8	32.4	41.4	5	120.9	1
Nebred	10094	23	29	26	58	30.6	30.5	36.5	14	107.0	7
Cheyenne	8885	24	30	26	57	30.0	32.4	37.7	16	108.9	5
Cheyenne x Turkey	12142	24	29	25	57	29.6	---	---	1	106.9	8
North Platte Turkey	12143	23	30	25	58	28.8	31.4	39.5	16	108.8	6
Compound Hybrid	12501	25	30	25	--	28.7	---	---	1	103.6	10
Hungarian Sel. x Nebred	12507	22	29	26	55	28.2	---	---	1	101.8	11
Nebr. 60 x Med.-Hope	12500	21	27	23	57	28.0	---	---	1	101.1	13
Tenmarq	6936	24	28	26	57	28.0	29.4	36.4	16	101.3	12
Kharkof	1442	25	29	27	57	27.7	28.5	34.2	16	100.0	15
Turkey-Tenq.-Chey. x Turkey	12523	22	28	25	57	27.3	---	---	1	98.6	16
Turkey x Turkey-Chey.	383130	25	28	25	57	27.1	---	---	1	97.8	17
Chiefkan x Oro-Tenq.	12133	20	27	23	58	26.2	28.7	---	2	100.7	14
Comanche	11673	21	27	24	57	26.3	27.4	35.9	10	105.7	9
Red Chief	12109	24	29	26	58	26.0	27.7	36.3	6	114.4	3
Pawnee	11669	21	27	23	57	26.0	31.0	38.2	10	112.3	4
Cimarron	12120	21	28	24	58	25.3	---	---	1	91.3	18
Kv.-Mqo. x Kv.-Tenq.	12128	20	27	24	56	25.3	---	---	1	91.3	19
Chiefkan x Oro.-Tenq.	12148	18	27	24	57	25.2	---	---	1	91.0	20
Wichita	11952	18	26	23	57	22.3	27.6	39.1	6	115.2	2

Standard error of a difference = 1.87 bushels.

Alliance, Nebraska
(Six plots, rod rows)

Variety	C.I. or Sel. No.	Date Headed	Av. Height	Weight per bushel	Average acre yield 1948	1947-1948	1945-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Chiefkan x Oro-Tenq.	12148	1	39	59.3	47.6	---	---	1	124.9	1
Turkey-Tenq.-Chey. x Turkey	12523	2	41	59.1	46.4	---	---	1	121.8	2
Kv.-Mqo. x Kv.-Tenq.	12128	2	40	59.3	46.2	---	---	1	121.3	3
Nebred	10094	4	39	60.1	46.1	40.5	36.2	9	103.1	8
Cheyenne x Turkey	12142	4	41	59.5	45.9	47.5	40.9	4	112.7	6
Compound Hybrid	12501	4	40	60.1	44.6	45.7	---	3	113.3	5
Pawnee	11669	3	40	58.6	43.2	38.1	34.0	8	98.7	14
Comanche	11673	3	39	59.1	43.0	39.0	35.2	8	100.0	11
Cheyenne x Hung. Sel.	403858	3	39	57.7	42.3	38.8	---	3	98.2	15
Chiefkan x Cheyenne	422123	4	40	59.5	41.7	47.4	---	2	115.8	4
Cheyenne	8885	4	39	59.6	41.6	40.0	37.1	11	108.0	7
Cheyenne x Tenmarq	11972	5	39	59.7	40.9	34.1	33.7	5	95.6	17
Blackhull	6251	2	40	58.8	40.0	37.8	34.3	11	95.3	18
Wichita	11952	3	38	59.7	40.0	38.4	34.7	6	93.3	19
Marquillo x Oro	383464	3	38	59.5	39.1	35.6	33.2	4	91.3	21
Turkey x Turkey-Chey.	383130	3	40	58.9	39.0	34.3	---	2	83.7	24
Tenmarq	6936	5	46	50.9	38.6	29.2	31.1	11	91.9	20
Chiefkan x Oro-Tenq.	12133	2	36	59.3	38.5	41.8	---	2	102.1	9
Nebr. 60 x Med.-Hope	12500	4	39	58.8	38.4	---	---	1	100.8	10
Kharkof	1442	4	41	60.1	38.1	40.9	36.3	11	100.0	12
Turkey	12137	4	40	60.0	37.9	---	---	1	99.5	13
Cimarron	12120	3	38	61.8	37.0	---	---	1	97.1	16
Hungarian Sel. x Nebred	12507	4	39	58.4	35.3	34.1	---	3	84.1	23
Red Chief	12109	3	40	61.9	32.8	34.0	30.7	6	84.7	22

Standard error of a difference = 3.92 bushels.

Brookings, South Dakota
(Two 1/50 acre plots)

Variety	C.I. or Sel. No.	Spring Surviv-al	Date Headed	Date Ripe	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield
		%	June	July	%	%	Lbs.	Bus.
H44 x Minturki[3]	Minn. 2784	70	10	15	35	T	57.0	40.3
Hope x Minturki[2]	12506	68	9	13	20	T	59.0	40.2
H44 x Minturki[3]	Minn. 2785	68	9	13	40	1	57.0	40.2
H44 x Minturki[3]	12519	78	9	13	30	1	57.5	40.2
Marmin x H44-Minh.	12520	72	10	13	35	T	58.5	39.3
Minturki	6155	60	9	14	40	10	56.0	37.4
Marmin x H44-Minh.	12508	55	9	14	50	1	58.0	37.3
H44 x Minturki[4]	12532	65	10	14	20	T	57.0	37.2
Nebred	10094	45	7	12	60	20	55.5	36.4
Marmin	11502	60	8	12	50	20	56.5	36.3
Minter	12138	55	9	13	15	T	59.0	35.5
H44-Minh. x Marmin	12509	40	9	14	40	1	57.5	32.5
Iowin	10017	30	8	14	10	5	57.0	25.0
Pawnee	11669	4	---	---	---	---	---	---

Standard error of a difference between yields = 2.5 bushels.

Sheridan, Wyoming
(Three 1/55 acre plots, sown Oct. 10, emerged Oct. 24)

Variety	C.I. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1937-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		June	July	Ins.	Lbs.	Bus.	Bus.	Bus.			
Nebred	10094	8	25	33	59.7	47.5	41.2	37.5	12	100.6	3
Kharkof	1442	8	25	35	59.0	44.5	38.9	37.3	18	100.0	4
Yogo	8033	10	26	40	60.3	40.1	36.6	36.4	18	99.7	5
Kanred	5146	7	23	33	60.0	40.0	38.8	38.5	18	104.7	2
Minter	12138	10	25	41	59.7	40.0	35.5	---	4	91.0	10
Minturki	6155	10	26	40	59.7	38.8	36.8	34.3	18	91.6	9
Karmont	6700	8	25	35	60.3	37.6	37.6	35.3	18	96.9	7
Mont. 36-Bel. x Kan.	12108	10	23	35	61.3	37.3	35.4	---	7	97.8	6
Marmin	11502	7	25	40	58.7	35.6	36.3	34.5	13	92.8	8
Cheyenne	8885	8	25	31	60.0	33.5	38.3	39.1	14	106.9	1
H44 x Minturki^2	12139	8	26	40	60.0	32.0	31.7	---	4	86.5	11

Standard error of a difference = 4.82 bushels.

Moccasin, Montana
(Five plots; rod rows)

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Av. height	Lodging	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1941-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		June	Aug.	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
Newturk	6935	22	4	47	0	63	50.7	33.7	32.9 1/	14	104.4	3
Karmont	6700	21	5	48	19	63	49.7	33.9	32.7	15	102.4	6
Martin x Tenmarq^3	11804	20	4	47	0	62	49.4	33.1	---	4	106.1	2
Ridit x Kharkof (4A)	12521	22	4	49	0	62	49.0	32.0	---	3	95.4	14
Martin x Tenmarq^3	11823	21	5	48	0	62	48.9	32.0	---	4	104.2	4
Minter	12138	23	3	50	0	64	48.4	31.7	---	4	97.7	13
Kharkof	1442	21	5	49	12	63	48.0	33.1	31.9	15	100.0	7
Mont. 36 x Belog.-Kan.	12108	22	4	49	3	63	47.9	33.3	32.6	7	104.2	5
Nebred	10094	21	4	46	1	64	47.3	31.5	32.4	10	98.2	11
Multiple Hyb. (32-33)	11744	21	5	50	26	63	46.8	31.5	31.1	7	98.6	10
Yogo	8033	23	4	51	0	64	46.4	33.2	32.1	15	106.2	1
H44 x Minturki^2	12139	23	4	51	0	62	46.3	31.1	---	4	99.3	9
Wasatch	11925	22	5	50	0	64	45.3	31.4	---	2	94.9	15
Minturki	6155	22	3	51	1	63	44.6	30.2	31.1	15	98.0	12
Yogo x Orc Mont. 5	---	24	4	50	5	63	44.2	30.9	31.3	7	99.9	8
Comanche	11673	19	3	44	0	62	44.2	28.2	---	2	85.2	19
Cache	11599	22	5	46	0	63	43.3	30.2	---	2	91.2	18
Martin x Tenmarq^3	11824	20	4	46	0	62	42.9	28.3	---	4	94.0	16
Marmin	11502	21	4	50	0	63	42.0	30.3	29.4	8	91.6	17
Wichita	11952	18	7-29	47	0	65	39.8	26.9	---	2	81.3	20
Pawnee	11669	19	7-30	44	0	64	35.9	25.5	---	2	76.9	21

1/ Not grown in 1945.

Standard error of a difference = 2.95 bushels.

Havre, Montana
(Four 1/50 acre plots; sown Sept. 16, emerged Sept. 28)

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-1948	Average acre yield 1943-1948	No. Yrs. Grown	Percent of Kharkof	Rank
		June	July	Ins.	Lbs.	Bus.	Bus.	Bus.			
Multiple Hybrid (32-33)	11744	6	23	24	56.1	15.9	1/14.6	---	2	106.6	2
Yogo	8033	8	22	26	55.4	14.2	16.3	19.4	16	112.7	1
Karmont	6700	8	22	23	55.3	13.1	1/16.9	17.9	16	105.3	4
Mont. 36-Bel. x Kan.	12108	6	22	23	57.2	13.1	14.7	18.1	7	105.7	3
H44 x Minturki[2]	12139	7	23	25	54.7	13.1	12.7	---	5	99.4	11
Minter	12138	8	24	25	57.0	12.7	13.4	---	5	98.6	12
Yogo x Oro Mont. Sel.	5	8	23	24	55.0	12.3	13.9	---	4	104.5	6
Marmin	11502	6	22	25	56.5	11.9	1/13.5	15.8	11	86.9	15
Martin x Tenq.[3]	11804	6	23	21	56.6	11.9	11.6	---	4	105.0	5
do	11823	6	24	21	56.5	11.7	---	---	1	102.6	8
Ridit x Kharkof (4A)	12521	6	23	22	56.2	11.5	13.9	---	3	103.4	7
Kharkof	1442	7	22	22	55.7	11.4	1/13.7	17.0	16	100.0	10
Martin x Tenq.[3]	11824	5	25	20	57.2	11.1	10.7	---	4	90.5	13
Nebred	10094	8	23	21	57.3	10.3	1/13.4	15.7	11	90.1	14
Minturki	6155	7	22	24	55.7	9.7	1/12.7	17.2	16	102.5	9

1/ Three replications.

Standard error of a difference = 1.30 bushels; calculated on the basis of three replications.

Table 2.-- Number of plots, average yield, and standard errors for the variety test at each cooperating station, 1948.

State and Station	No. of plots	Average yield all varieties	Standard error of a Single plot	Standard error of a Difference between means	Standard error of a Mean in Bushels	Standard error of a Mean in Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton	10*	22.64	3.59	1.60	1.13	4.99
Chillicothe	10*	34.45	5.16	2.31	1.63	4.73
Bushland	6*	11.71	2.17	1.26	0.89	7.60
Oklahoma:						
Lawton	3	27.95	2.25	1.84	1.30	4.65
Stillwater	4	21.01	2.59	1.83	1.29	6.14
Cherokee	4*	26.80	2.69	1.91	1.35	5.04
Woodward	4	25.23	2.08	1.47	1.04	4.12
Goodwell	5*	30.56	4.48	2.83	2.00	6.54
Kansas:						
Manhattan	3	42.36	1.85	1.51	1.07	2.52
Garden City	3	30.49	1.92	1.57	1.11	3.64
Hays	4	31.54	2.57	1.82	1.29	4.09
Colby	3	33.26	3.33	2.72	1.92	5.77
Colorado:						
Akron	4	30.38	3.30	2.34	1.65	5.43
Ft. Collins	8*	59.85	7.50	4.01	2.83	4.73
Nebraska:						
Lincoln	5	43.75	3.62	2.29	1.62	3.70
North Platte	4	27.45	2.64	1.87	1.32	4.81
Alliance	6*	41.01	6.80	3.92	2.78	6.75
Wyoming:						
Sheridan	3	38.81	5.90	4.82	3.41	8.79
Montana:						
Moccasin	5*	45.76	4.66	2.95	2.09	4.57
Havre	3	12.15	1.59	1.30	0.92	7.57

* Rod-row nursery plots

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 shows 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 1948 and the recent two-year period appear in sections which follow along with an average of other agronomic data for 1948.

Yields by Districts

Yields in the southern district were secured uniformly on 14 varieties at 8 stations as shown in table 3. C.I. 12133, Wichita, Red Chief, Westar and Cimarron were the most productive on the average while Comanche and C.I. 12145 ranked lowest. In the 2-year period averages based on 16 station-years Cimarron, Comanche and Pawnee rank at the top and Tenmarq and Kharkof at the bottom among 10 varieties (table 4).

Table 3.—Summary of average yields of winter wheat varieties grown uniformly in plot tests at 8 stations in the southern district, 1948.

Variety	C. I. No.	Average yield in bushels per acre at: Denton	Chillicothe	Bushland	Lewton	Stillwater	Cherokee	Woodward	Goodwell	Av.
Chiefkan x Oro-Tenq.	12133	26.2	38.2	13.3	29.0	24.0	29.0	24.8	31.2	27.0
Wichita	11952	24.3	35.9	10.9	30.8	21.4	29.9	27.1	29.4	26.2
Red Chief	12109	24.7	36.6	13.3	21.8	22.2	32.2	27.6	30.4	26.1
Westar	12110	23.6	38.7	11.1	24.8	21.9	25.4	25.7	34.3	25.7
Cimarron	12120	26.5	34.8	9.5	26.6	22.3	27.2	26.1	32.0	25.6
Pawnee	11669	21.8	39.6	12.7	32.5	19.3	24.4	23.1	30.6	25.5
Triumph	12132	24.2	36.8	13.3	28.2	21.1	28.7	24.6	27.1	25.5
Kharkof	1442	24.7	33.0	10.9	28.8	20.6	26.3	24.3	31.8	25.1
Kv-Mqo-x Kv.-Tenq.	12128	21.2	35.4	11.6	32.3	18.4	26.3	23.7	31.3	25.0
Chiefkan x Oro-Tenq.	12148	24.4	31.1	13.5	26.5	22.1	26.4	26.4	29.9	25.0
Tenmarq	6936	24.2	31.0	10.3	29.8	21.3	24.5	24.7	33.3	24.9
Early Blackhull	8856	23.4	33.4	10.9	25.4	22.1	28.9	25.4	29.9	24.9
Comanche	11673	24.4	35.8	12.3	23.9	20.2	25.4	23.5	32.8	24.8
Comanche Double Cr.	12145	20.5	32.2	10.6	28.7	19.6	19.4	24.0	27.3	22.8

Table 4.--Summary of varietal yields from plot tests at 9 stations in the southern district for all or part of the period 1947-48.

Variety	C. I. No.	Denton	Iowa Park	Chillicothe	Bushland	Lawton	Stillwater	Cherokee	Woodward	Goodwell	Av.
	Average yield in bushels per acre at										
No. years grown		2	1	2	2	2	2	2	2	1	16
Cimarron	12120	26.0	25.4	39.9	17.2	28.2	26.1	30.2	27.7	32.0	28.0
Comanche	11673	25.8	27.6	37.9	17.5	27.0	23.0	28.0	24.2	32.8	26.7
Pawnee	11669	22.5	26.7	39.2	18.3	28.4	21.9	28.5	25.2	30.6	26.6
Wichita	11952	23.3	26.7	36.6	14.8	27.2	21.0	30.7	26.7	29.4	26.0
Westar	12110	22.9	27.2	35.1	18.1	25.9	25.9	25.8	23.9	34.3	26.0
Early Blackhull	8856	26.6	24.8	36.1	14.6	26.1	22.7	28.4	25.3	29.9	25.9
Triumph	12132	23.3	21.7	37.6	16.1	27.0	23.4	28.4	24.3	27.1	25.6
Red Chief	12109	23.5	17.4	36.0	18.3	20.9	22.8	30.6	25.8	30.4	25.2
Tenmarq	6936	21.5	22.7	31.6	17.7	24.7	22.4	26.3	24.2	33.3	24.6
Kharkof	1442	23.0	21.1	28.9	17.9	24.6	22.9	26.5	23.1	31.8	24.2

Eleven varieties were compared in the central district at nine stations as shown in table 5. C.I. 12133 was highest in average yield followed by Tenmarq, Cheyenne and Comanche. Wichita and Red Chief ranked last. In the 2-year averages shown in table 6, C.I. 12133 ranked first and Pawnee second with Kharkof last.

Table 5.--Summary of average yields of the uniform varieties grown in plot tests at 9 stations in the central district, 1948.

Variety	C. I. No.	Manhattan	Garden City	Hays	Colby	Akron	Ft. Collins	Lincoln	North Platte	All-iance	Av.
	Average yield in bushels per acre at										
Chiefk. x Oro-Ten.	12133	48.4	37.9	35.2	39.6	19.2	65.7	46.8	26.2	38.5	39.7
Tenmarq	6936	45.9	34.6	28.2	35.6	22.7	60.7	48.9	28.0	38.6	38.1
Cheyenne	8885	27.1		35.8	35.4	24.2	59.1	48.2	30.0	41.6	37.7 1/
Comanche	11673	47.2	37.0	25.9	31.7	19.3	62.5	44.5	26.3	43.0	37.5
Cimarron	12120	47.9	31.4	32.5	40.3	20.1	60.7	40.7	25.3	37.0	37.3
Kv.-Mqo. xKv.-Ten	12128	46.0	33.1	29.2	32.5	21.7	57.5	41.9	25.3	46.2	37.0
Chiefk. x Oro-Ten.	12148		27.4	34.0	37.1	17.0	64.3	43.2	25.2	47.6	37.0 1/
Kharkof	1442	24.5	29.5 2/	36.8	40.8 2/	24.6	62.3	44.1	27.7	38.1	36.5
Pawnee	11669	48.6	30.1	24.3	32.6	17.0	63.6	41.1	26.0	43.2	36.3
Wichita	11952	53.2	25.6	27.1	28.8	17.3	68.8	38.8	22.3	40.0	35.8
Red Chief	12109	43.7	27.7	33.5	28.6	22.1	54.0	46.7	26.0	32.8	35.0

1/ Eight station average.

2/ Turkey C.I. 1558.

Table 6.--Summary of varietal yields from plot tests at 9 stations in the central district for the period 1947-48.

Variety	C. I. No.	Manhattan	Garden City	Hays	Colby	Akron	Ft. Collins	Lincoln	North Platte	Alliance	Av.
		Average yield in bushels per acre at:									
No. years grown		2	2	2	2	2	2	2	2	2	18
Chiefk.xOro-Ten	12133	41.5	39.5	36.9	40.0	23.5	48.8	46.8 1/	28.7	41.8	38.1
Pawnee	11669	45.4	33.8	32.3	34.4	24.0	47.6	42.5	31.0	38.1	36.6
Comanche	11673	41.1	38.0	32.2	32.1	20.5	42.3	43.6	27.4	39.0	35.1
Wichita	11952	45.6	29.6	32.6	32.8	18.6	44.6	38.6	27.6	38.4	34.3
Red Chief	12109	37.3	28.1	35.3	29.7	23.9	42.1	50.8	27.7	34.0	34.3
Tenmarq	6936	38.4	34.3	33.0	32.7	19.7	45.4	40.8	29.4	29.2	33.7
Kharkof	1442	25.4	30.7 2/	36.7	32.7	2/ 22.8	44.9	35.7	28.5	40.9	33.1

1/ 1948 yield only
2/ Turkey C. I. 1558

The northwestern district results are shown in table 7 where data on 9 varieties are available from 3 stations. Nebred and Kharkof ranked first and second in 1948 with Minter, Yogo and Karmont close behind. C.I. 12139 and Marmin ranked last. The best 2-year averages at these stations were made by Karmont, Nebred, Kharkof, and Yogo while the four Minnesota strains as a group were lowest in yield.

Table 7.--Summary of average yields of varieties grown uniformly in plot tests at 3 stations in the northwestern district, 1948 and for the two year period 1947-48.

Variety	C. I. No.	Average yield in bushels per acre in 1948: Sheridan	Mocassin	Havre	1 yr. Av.	in 1947-48: Sheridan	Mocassin	Havre	2 yr. Av.
Nebred	10094	47.5	47.3	10.3	35.0	41.2	31.5	13.4	28.7
Kharkof	1442	44.5	48.0	11.4	34.6	38.9	33.1	13.7	28.6
Minter	12138	40.0	48.4	12.7	33.7	35.5	31.7	13.4	26.9
Yogo	8033	40.1	46.4	14.2	33.6	36.6	33.2	16.3	28.7
Karmont	6700	37.6	49.7	13.1	33.5	37.6	33.9	16.9	29.5
Mont. 36 x Belog.-Kan.	12108	37.3	47.9	13.1	32.8	35.4	33.3	14.7	27.8
Minturki	6155	38.8	44.6	9.7	31.0	36.8	30.2	12.7	26.6
H44 x Minturki2	12139	32.0	46.3	13.1	30.5	31.7	31.1	12.7	25.2
Marmin	11502	35.6	42.0	11.9	29.8	36.3	30.3	13.5	26.7

Yields by States

In states where two or more stations reported data, a state summary has been prepared. Such averages based upon geographical boundaries frequently are of little practical significance from the ecological standpoint, hence a word of caution in their use is in order. Averages for Texas are in table 8. C.I. 12133, Triumph, Red Chief, and Pawnee occupied the high four positions for 1948 but Cimarron,

Comanche, Pawnee, and Triumph exceeded other varieties in the 2-year period. In Oklahoma, Reliant, Wichita, and C. I. 12133 were outstanding in 1948, with Cimarron, Reliant, Wichita, and Comanche high in rank for the 2-year period (table 9). Averages for Kansas (table 10) show C. I. 12133, Cimarron, Westar, and Tenmarq to be the best in 1948 and C. I. 12133, Westar, C. I. 12128, and Pawnee best in the 2-year period. In Colorado, Kharkof and Wichita averaged highest in 1948 but both varieties give way to Cheyenne and C. I. 12133 in the 2-year period as shown in table 11. The Nebraska averages in table 12 show that the best statewide performance in 1948 was made by Nebred, C. I. 11972, C. I. 12501, and Cheyenne. Two-year averages favor Cheyenne, Nebred, and C. I. 12133. Table 13 shows the results in Montana where Karmont, C. I. 11744, C. I. 11804, and Minter had the highest averages in 1948 and Karmont, C. I. 12521, Yogo, and Nebred were best for the 2-year period.

Table 8.--Average yield in bushels per acre of varieties grown in plot tests in Texas in 1948 and for the period 1947-48.

Variety	C. I. No.	Average, bushels per acre: 1948 (3 stations)	Average, bushels per acre: 1947-48 (6 sta. yrs.)	Rank of 2-yr. Av.
Chiefk. x Oro-Tenq.	12133	25.9	—	—
Red Chief	12109	24.9	25.9	4
Triumph	12132	24.8	25.7	7
Pawnee	11669	24.7	26.7	3
Blackhull	6251	24.5	25.7	6
Westar	12110	24.5	25.4	8
Comanche	11673	24.2	27.1	2
Wichita	11952	23.7	24.9	9
Cimarron	12120	23.6	27.7	1
Chiefk. x Oro-Tenq.	12148	23.0	—	—
Kharkof	1442	22.9	23.3	11
Kv.-Mqo. x Kv.-Tenq.	12128	22.7	—	—
Early Blackhull	8856	22.6	25.8	5
Tenmarq.	6936	21.8	23.6	10
275 D. Cr.	12503	21.4	—	—
Comanche D. Cr.	12145	21.1	—	—
275 D. Cr.	12504	19.4	—	—

Table 9.--Average yield in bushels per acre of varieties grown in plot tests in Oklahoma in 1948 and for the period 1947-48.

Variety	C. I. No.	Average, bushels per acre 1948 (5 stations)	1947-48 (10 sta. yrs.)	Rank of 2 - year Averages
Reliant	12144	27.9	26.6	2
Wichita	11952	27.7	26.5	3
Chiefk. x Oro - Tenq.	12133	27.6	--	--
Blue Jacket	12502	26.9	--	--
Red Chief	12109	26.8	24.9	10
Cimarron	12120	26.8	28.5	1
Tenmarq.	6936	26.7	24.7	11
Kharkof	1442	26.4	24.3	12
Westar	12110	26.4	26.0	5
Kv.-Mqo. x Kv.-Tenq.	12128	26.4	--	--
Early Blackhull	8856	26.3	25.3	7
Chiefk. x Oro - Tenq.	12148	26.3	--	--
Pawnee	11669	26.0	25.0	9
Triumph	12132	25.9	25.7	6
Cheyenne	8885	25.8	25.1	8
Comanche	11673	25.2	26.1	4
Comanche D. Cr.	12145	23.8	--	--

Table 10.--Average yield in bushels per acre of varieties grown in plot tests in Kansas in 1948 and for the period 1947-48.

Variety	C. I. No.	Average, bushels per acre 1948 (4 stations)	1947-48 (8 sta. yrs.)	Rank of 2 - year Averages
Chiefk. x Oro - Tenq.	12133	40.3	39.5	1
Cimarron	12120	38.0	--	-
Westar	12110	36.3	37.3	2
Tenmarq	6936	36.1	34.6	8
Comanche	11673	35.5	35.9	5
Blue Jacket	12502	35.4	35.1	7
Kv.-Mqo. x Kv.-Tenq.	12128	35.2	37.0	3
Pawnee	11669	33.9	36.5	4
Wichita	11952	33.7	35.2	6
Red Chief	12109	33.4	32.6	10
Kharkof	1442	32.9 1/	31.4 1/	12
Triumph	12132	32.1	34.3	9
Med. - Hope x Paw.	12141	31.2	--	-
Early Blackhull	8856	31.1	31.9	11
Blackhull	6251	29.4	29.0	13

1/ Turkey C.I. 1558 at two stations instead of Kharkof.

Table 11.--Average yield in bushels per acre of varieties in plot tests in Colorado in 1948 and for the period 1947-48.

Variety	C. I. No.	Average, bushels per acre 1948 (2 stations)	Average, bushels per acre 1947-48 (4 sta. yrs.)	Rank of 2 - year Averages
Kharkof	1442	43.5	33.9	4
Wichita	11952	43.1	31.6	7
Chiefk. x Oro-Tenq.	12133	42.5	36.2	2
Cheyenne	8885	41.7	37.2	1
Tenmarq.	6936	41.7	32.6	6
Commanche	11673	40.9	31.4	8
Chiefk. x Oro-Tenq.	12148	40.7	—	-
Cimarron	12120	40.4	—	-
Pawnee	11669	40.3	35.8	3
Kv.-Mqo. x Kv.-Tenq.	12128	39.6	—	-
Red Chief	12109	38.1	33.0	5

Table 12.--Average yield in bushels per acre of varieties grown in plot tests in Nebraska in 1948 and for the period 1947-48.

Variety	C. I. No.	Average, bushels per acre 1948 (3 stations)	Average, bushels per acre 1947-48 (6 sta. yrs.)	Rank of 2 - year Averages
Nebred	10094	41.8	37.8	2
Chey. x Tenq.	11972	41.3	35.0	8
Comp. Hybrid	12501	41.3	—	-
Cheyenne	8885	39.9	38.2	1
Turkey x Chey.	12142	39.4	—	-
Chiefk. x Oro-Tenq.	12148	38.7	—	-
Tenmarq.	6936	38.5	33.1	10
Comanche	11673	37.9	36.7	6
Kv.-Mqo. x Kv.-Tenq.	12128	37.8	—	-
Chiefk. x Oro-Tenq.	12133	37.2	37.6 1/	3
Tk.-Tenq.Chey. x Tk.	12523	37.0	—	-
Pawnee	11669	36.8	37.2	5
Hung. Sel. x Nebred	12507	36.7	—	-
Kharkof	1442	36.6	35.0	7
Nebr. 60 x Med.-Hope	12500	35.5	—	-
Red Chief	12109	35.2	37.5	4
Cimarron	12120	34.3	—	-
Tk. x Tk.-Chey.	Sel. 383130	34.1	—	-
Wichita	11952	33.7	34.9	9

1/ Only five station-years

Table 13.--Average yield in bushels per acre of varieties grown in plot tests in Montana in 1948 and for the period 1947-48.

Variety	C. I. No.	Average bushels per acre 1948 (2 stations)	Average bushels per acre 1947-48 (5 sta. yrs.)	Rank of 2 - year Averages
Karmont	6700	31.4	33.3	1
Multiple Hybrid	11744	31.4	29.4	11
Martin x Tenq.3	11804	30.7	30.1	7
Minter	12138	30.6	30.7	5
Mont. 36 - Beloq. x Kan.	12108	30.5	30.3	6
Yogo	8033	30.3	31.9	3
Martin x Tenq.3	11823	30.3	35.9 1/	-
Ridit x Kharkof (4A)	12521	30.3	33.1	2
Kharkof	1442	29.7	30.1	8
H44 x Minturki2	12139	29.7	29.7	9
Nebred	10094	28.8	31.7	4
Yogo x Oro	Mont. Sel.5	28.3	29.5	10
Minturki	6155	27.2	28.7	14
Marmin	11502	27.0	29.3	12
Martin x Tenq.3	11824	27.0	29.2	13

1/ Four station years. Comparable four-year average of C.I. 11804 = 34.8 bushels and if C.I. 11824 = 34.0 bushels

Summary of Agronomic Data

Agronomic data other than yield are summarized in tables 14, 15, and 16 for uniform varieties grown respectively in the southern, central, and northwestern districts. In the southern district Triumph, Early Blackhull, and Wichita were the early group in maturity with Kharkof and Tenmarq about a week later. Pawnee and Triumph were the shortest in plant height being 3 inches under the average for Red Chief and Early Blackhull, the tallest varieties. Leaf rust resistance was most evident in C.I. 12145 and Westar. Cimarron and Red Chief averaged 61 pounds per bushel in test weight exceeding all other varieties by from 1.1 to 3.4 pounds.

Among the uniform varieties compared in the central district Wichita and C.I. 12148 were earliest in maturity; Kharkof and Cheyenne were the latest. Cimarron was the shortest or 5 inches under the height attained by Tenmarq, Kharkof, and Red Chief. Cimarron had the stiffest straw and Kharkof the weakest. Bushel weight was greatest for Red Chief and Cimarron while Tenmarq had the lowest average.

In the northwestern district Marmin was the earliest variety to head but all varieties ripened at about the same time. Nebred had the shortest straw, averaging 6 inches under the average for Yogo, Minter, and C.I. 12139. In test weight Nebred, Minter, and C.I. 12108 surpassed 60 pounds and only one entry (C.I. 12139) fell below 59.

Table 14.--Summary of agronomic data other than yield for varieties grown in the southern district in 1948.

Variety	C.I. No.	Date Headed	Date Ripe	Av. Ht.	Leaf rust	Weight per bushel
		May	June	Ins.	%	Lbs.
Number of stations	.....	6	4	6	2	8
Chiefk. x Oro-Tenq.	12133	3	4	25	9	59.4
Wichita	11952	4-29	5-30	26	10	59.9
Red Chief	12109	4	5	27	14	61.0
Westar	12110	3	5	26	2	58.5
Cimarron	12120	1	3	25	12	61.0
Pawnee	11669	3	4	24	9	57.6
Triumph	12132	4-26	5-29	24	8	59.2
Kharkof	1442	6	6	25	10	58.5
Kv.-Mqo. x Kv-Tenq.	12128	3	4	25	4	58.3
Chiefk. x Oro-Tenq.	12148	4-30	2	26	6	59.1
Tenmarq	6936	5	6	26	11	58.2
E. Blackhull	8856	4-27	5-31	27	10	59.8
Commanche	11673	3	4	25	4	58.0
Commanche D. Cr.	12145	3	4	25	1	58.7

Table 15.--Summary of agronomic data other than yield for varieties grown in the central district in 1948.

Variety	C. I. No.	Date Headed	Date Ripe	Av. Ht.	Lodging	Weight per bushel
		May	June	Ins.	%	Lbs.
Number of stations	.....	8	7	8	2	9
Chief. x Oro-Tenq.	12133	22	30	33	35	59.9
Tenmarq	6936	25	7-2	36	44	58.6
Cheyenne 2/	8885	28	7-5	34	47	59.2
Comanche	11673	23	30	34	44	59.7
Cimarron	12120	22	30	31	9	61.3
Kv.-Mqo. x Kv.-Tenq.	12128	23	7-1	33	41	59.8
Chiefk. x Oro-Tenq. 3/	12148	21	29	32	41	59.9
Kharkof	1442	27 1/	7-3 1/	36 1/	74	58.9 1/
Pawnee	11669	23	30	33	46	59.6
Wichita	11952	20	27	33	39	59.9
Red Chief	12109	24	7-2	36	34	61.5

1/ Turkey C. I. 1558 at two stations

2/ One less station than indicated except for lodging

3/ One less station than indicated

Table 16.--Summary of agronomic data other than yield for varieties grown in the northwestern district in 1948.

Variety	C. I. No.	Date Headed	Date Ripe	Av. Ht.	Weight per bushel
		June	July	Ins.	Lbs.
Number of stations	.....	3	3	3	3
Nebred	10094	12	28	33	60.3
Kharkof	1442	12	28	35	59.2
Minter	12138	14	28	39	60.2
Yogo	8033	14	28	39	59.9
Karmont	6700	12	28	35	59.5
Mont36 x Belog - Kan	12108	13	27	36	60.5
Minturki	6155	13	27	38	59.5
H44 x Minturki^2	12139	13	28	39	58.9
Marmin	11502	11	27	38	59.4

UNIFORM YIELD NURSERY

The uniform yield nursery was grown to maturity at 15 stations in the central and southern districts in 1948 and the results obtained appear in the following pages. Only one nursery failed, the Ames test, where winterkilling destroyed the entire planting. Most of the tests were arranged as randomized 4-row plots of 16 square feet each with three or more replications. The entries in 1948 were the following:

No.	Variety or cross	State No.	C. I. No.
1	Kharkof	....	1442
2	Blackhull	....	6251
3	Early Blackhull	....	8856
4	Pawnee	Nebr. 1086	11669
5	Comanche	Kans. 2729	11673
6	Blackhull x Cheyenne	Hays Cereal 40-102	12101
7	Westar	Amarillo 25-34-116	12110
8	Cimarron	Woodward 36h769-150	12120
9	Kawvale-Marquillo x Kawvale-Tenmarq	Kans. 2775	12128
10	Triumph	Danne	12132
11	Chiefkan x Oro-Tenmarq	Hays Cereal 43-112	12133
12	Kanred x Hope-Hard Federation	Akron 536	12135
13	Oro x Mediterranean-Hope	Okla. 21	12140
14	Mediterranean-Hope x Pawnee	Kans. 2789	12141
15	Cheyenne x Turkey	North Platte 40410	12142
16	(Comanche x Honor-Fwd.) x (Hope-Medit. x Comanche)	Denton 171-43-29	12145
17	Martin-Tenmarq x Chiefkan	Denton 160-42-333	12146
18	Martin-Tenmarq x Kharkof	Denton 43-2142	12147
19	Chiefkan x Oro-Tenmarq	Hays Cereal 45-51	12148
20	Kawvale-Tenmarq x Comanche	Kans. 2791	12149
21	Colorado Turkey	Ft. Collins	12150
22	Nebr. 60 x Mediterranean-Hope	Nebr. 366-26	12500
23	Compound Hybrid	Nebr. 422186	12501
24	Blue Jacket	Clark	12502
25	(29-34-275 x Fronteira) x (29-34-275 x Comanche)	Denton 172-43-67	12503
26	(29-34-275 x Fronteira) x (29-34-275 x Comanche)	Denton 172-43-210	12504
27	Marquillo-Oro x Oro-Tenmarq	Kan. 431420	12406
28	Marquillo-Oro x Pawnee	Kans. 45R2023	12505

The five strains listed last were new in the test this year whereas the other 23 were tested one or more years previously. Most strains are kept in this test at least two years. Kharkof, Blackhull and Early Blackhull have been designated permanent checks but Pawnee and Comanche have been in for so many years that they too are so classified. In addition to checks, several duplications with uniform "plot" varieties exist; however, most of these have been eliminated from the list for 1949.

DATA OBTAINED

Table 17 contains the average data recorded on the uniform yield nursery at 15 stations with average yields for 1947-48 and a relative yield in per cent of the Kharkof check for each strain. Seasonal conditions as discussed for plot tests apply in general to the nursery except as may be mentioned in the discussion of results at each station.

Three nurseries were grown in Texas. At Denton C.I. 12146, C.I. 12133, C.I. 12501, Comanche and Cimarron yielded more than 27 bushels to the acre. Test weights were good and useful, but low, rust readings were recorded. During 11 years, Comanche has produced 54.2 per cent more grain than Kharkof. In the Chillicothe test, plot variability was relatively great but C.I. 12135, Pawnee, Triumph, and Westar were high in yield. Four varieties had test weights of 63 pounds and C.I. 12145 was rated best for grazing purposes. Two-year average yields favor Cimarron and C.I. 12133. During the last 10 years Comanche has exceeded Kharkof 32.1 per cent and Pawnee has exceeded it 28.5 per cent. Some winterkilling occurred at Bushland and this coupled with the drought resulted in low yields. The average yields did not differ greatly and the analysis showed non-significant differences among most of them. The best relative yields, based on five or more years of data, have been made by C.I. 12101, Pawnee, Westar, Blackhull, and Comanche. These varieties have exceeded Kharkof by as much as 27.3 per cent.

There were nurseries in Oklahoma at three points. Turkey and Blackhull, rather late maturing strains, were the high yielding varieties at Stillwater in 1948. Rather complete data were recorded on characters other than yield. C.I.12128 and Triumph have the highest 2-year averages and the 4-year record of these strains shows they have exceeded Kharkof by 49.3 and 33.1 per cent, respectively. Westar, Cimarron, and Pawnee have good records also. Yields at Cherokee ranged from 23.7 to 33.9 bushels without much relationship to maturity class. The best 2-year records have been made by Triumph, Cimarron, Turkey and C.I. 12133. At Woodward C.I. 12101, C.I. 12503, C.I. 12133 and Triumph gave the high yields although several others were not significantly lower than this group. Cimarron had the highest test weight with Early Blackhull a close second. High 2-year averages were made by Cimarron, Triumph, and C.I. 12101. The latter strain has an eight-year record of production 27.7 per cent above Kharkof. C.I. 12128 has a four-year record of 26.2 per cent above the check.

In the Kansas tests C.I. 12503, Westar and C.I. 12101 yielded over 61 bushels to the acre at Manhattan. Test weights were only fair. Pronounced lodging occurred with C.I. 12148, C.I. 12502, and C.I. 12141 least affected. Yellow mosaic was severe in the four varieties with lowest yield and some others. The best 2-year averages were made by Westar, C.I. 12133 and C.I. 12148. Westar and Pawnee have exceeded Kharkof by 43.8 and 36.5 per cent in 7 and 14-year tests, respectively. Somehow at Hays, Turkey and Kharkof ranked second and third in yield this year whereas they have occupied lower positions in most years. C.I. 12133 ranked first. High plot variability made the standard error relatively high. Good two-year

averages have been made by C.I. 12133, C.I. 12128, and C.I. 12147. Records of seven or more years duration show that Pawnee, Westar and C.I. 12101 have produced at a rate about one-fourth greater than Kharkof, and Comanche one-fifth more. Colby is growing the uniform nursery again after a lapse of many years. C.I. 12133, Kharkof, C.I. 12101, and Turkey exceeded 40 bushels to the acre, test weights were good and differential lodging and other notes were recorded.

The Colorado stations had high yields. At Akron Kharkof, Turkey, and C.I. 12101 made the highest yields and it was the late maturing strains which seemed to be favored. The last two years have favored C.I. 12101, Kharkof, C.I. 12501, and C.I. 12133 while records covering seven or more years reveal that Early Blackhull is first in rank followed in order by C.I. 12101, Pawnee, Blackhull, Comanche, and Kharkof. At Fort Collins C.I. 12146, C.I. 12142 and four other unnamed strains were in the high yield group producing over 70 bushels to the acre. Test weights were very high with the lowest 62.2 and the highest (Cimarron) 65.6 pounds. Ten strains have 2-year averages above 50 bushels to the acre with C.I. 12133 first among them. Records on five strains tested 12 or more years show that Pawnee and Comanche have produced 5.1 and 4.2 per cent more grain than Kharkof while Blackhull and Early Blackhull have produced 1.8 and 5.8 per cent less grain respectively than the check. The Hesperus test was irrigated. Good yields and test weights, differential lodging and other notes of value were recorded. C.I. 12146 and C.I. 12505 tied for first rank in yield but many other strains produced nearly as much grain. Two-year averages favor C.I. 12148, C.I. 12142, C.I. 12101. Ten-year averages show Comanche has produced 24.6 per cent and Blackhull 19.4 per cent more grain than Kharkof.

In Nebraska the Lincoln test resulted in yields of more than 40 bushels to the acre for all varieties except Kharkof. Westar and Pawnee were the most productive strains followed in order by C.I. 12101, C.I. 12142, C.I. 12146 and C.I. 12503. Good test weights were the rule although only one exceeded 62 pounds. Lodging notes showed five strains with no lodging while one lodged 50 per cent. Shattering in border rows became excessive in several strains; even Blackhull shattered. Best 5-year or longer average yields have been made by Pawnee, Cimarron, and Early Blackhull. In 14 seasons Pawnee has averaged 36 per cent more grain than Kharkof. North Platte yields above 40 bushels to the acre were made by C.I. 12147, C.I. 12146, C.I. 12505, Turkey, and C.I. 12406. Test weights were good. The best 2-year average yields were made by C.I. 12147, Turkey, and C.I. 12142. C.I. 12101 and Pawnee rank first and second in relative yields based on 5 and 10-year records respectively. Most of the differences in yield at Alliance were not significant this year. Winterkilling reduced the stand on one strain. Relative yields based on six or more years of data show that C.I. 12101 and Westar are the only strains more productive than Kharkof at this location; however several strains have better two to four-year averages than the check.

Table 17. Yield and other data for the varieties grown in the uniform yield nursery in cooperative experiments at 15 stations in the hard red winter wheat region in 1948, and yield summaries for various periods.

Denton, Texas
(Four plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	Apr.	May	In.	%	%	Lbs.	Bus.	Bus.			
12146	21	24	26	5	T	61.0	29.4	28.6	2	116.3	8
12133	22	26	24	4	2	61.5	28.0	25.8	4	110.8	12
12501	26	29	24	25	8	59.0	27.6	24.5	2	99.6	18
11673	22	26	24	4	7	59.0	27.4	28.0	11	154.2	1
12120	22	27	23	5	T	63.0	27.2	15.8	5	119.1	6
12406	22	28	23	T	1	58.0	26.9	---	1	104.7	14
6251	25	30	25	11	8	62.0	26.6	24.3	15	114.7	9
8856	17	19	23	4	1	63.0	26.5	30.4	15	143.2	3
12110	23	29	24	2	16	60.0	26.4	24.7	6	124.1	4
12148	21	24	24	1	T	61.0	26.0	28.7	2	116.9	7
12150	27	29	24	10	15	60.0	25.7	23.6	2	95.9	20
1442	26	30	24	11	18	59.0	25.7	24.6	13	100.0	16
12503	20	24	25	0	0	59.0	25.7	---	1	100.0	17
11669	23	27	22	7	5	57.0	25.1	25.5	12	143.5	2
12147	24	29	24	6	31	58.0	24.4	27.7	2	112.8	11
12101	26	29	23	6	11	60.0	24.2	24.4	7	120.0	5
12142	25	27	23	11	6	58.0	24.2	21.4	3	85.2	24
12132	16	17	23	T	-	62.0	24.1	23.1	4	93.6	21
12140	24	29	26	1	1	57.5	24.0	23.5	3	103.6	15
12141	23	26	23	1	0	59.0	23.0	24.3	3	110.3	13
12500	22	26	24	1	7	59.0	22.8	24.2	2	98.4	19
12128	24	29	23	1	8	59.0	21.8	23.3	4	113.6	10
12502	25	29	27	11	10	61.5	21.5	---	1	83.7	25
12149	22	27	25	T	1	58.0	21.2	22.5	2	91.6	22
12135	23	29	23	10	5	57.0	21.2	19.6	4	82.4	26
12145	22	26	23	T	0	60.0	21.0	22.4	2	91.2	23
12505	23	27	21	T	1	58.0	20.8	---	1	80.9	27
12504	22	27	25	T	0	60.0	20.6	---	1	80.2	28

Standard error of a difference = 2.89 bushels.

Table 17.--(Continued)

Chillicothe, Texas

(Four plots)

C. I. No.	Date headed	Top Growth Jan. 8	Wt. per bushel	Average acre yield 1948	Average acre yield 1947-48	No. yrs. Grown	Per cent of Kharkof	Rank
	Apr.	%	Lbs.	Bus.	Bus.			
12135	28	100	59	41.0	35.3	4	121.3	19
11669	27	100	61	39.9	38.7	10	128.5	12
12132	19	110	63	38.6	39.5	4	138.2	8
12110	26	100	61	37.4	32.7	6	126.5	15
12133	23	100	62	34.9	40.7	4	144.3	3
12146	26	100	61	34.7	37.0	2	143.8	4
12150	28	100	61	33.8	32.6	2	126.7	13
12505	26	110	61	33.1	—	1	130.3	11
12149	26	100	59	33.1	36.5	2	142.0	5
12101	27	100	62	32.6	34.2	7	125.7	16
12141	26	100	60	32.5	38.9	3	139.1	7
12120	23	100	63	32.4	40.2	5	137.5	9
8856	21	110	61	32.0	35.3	10	120.1	21
12406	25	100	61	31.5	—	1	124.0	17
12140	27	100	60	31.3	32.6	3	122.3	18
12128	26	100	60	31.1	37.9	4	147.0	1
6251	29	110	63	30.4	31.9	10	115.2	22
11673	26	100	61	30.4	33.4	10	132.1	10
12500	27	100	60	30.2	36.2	2	140.9	6
12501	30	90	60	29.5	26.7	2	103.7	23
12147	27	100	61	29.0	31.0	2	120.4	20
12142	30	90	61	27.2	25.2	3	98.6	27
12503	21	110	60	26.3	—	1	103.5	24
12145	26	120	62	26.1	32.6	2	126.7	14
12148	24	100	61	25.4	37.6	2	146.1	2
12504	26	110	63	25.4	—	1	100.0	26
1442	30	100	61	25.4	25.7	10	100.0	25
12502	27	110	62	21.8	—	1	85.8	28

Standard error of a difference = 4.32 bushels

Table 17. (Continued)

Bushland, Texas
(Six plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Spring Survival	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No Yrs. Grown	Percent of Kharkof	Rank
	May		In.	%	Lbs.	Bus.	Bus.			
12505	18		17	89	59.0	13.8	---	1	126.6	2
12101	19		21	88	60.0	13.8	23.5	6	127.3	1
12148	15		21	90	60.0	13.5	20.5	2	109.4	12
12146	17		19	80	56.5	13.4	21.3	2	113.9	7
12132	12		19	88	60.0	13.3	17.7	2	94.4	23
12133	17		20	90	60.0	13.3	18.8	2	100.3	16
6251	19		23	80	58.0	13.2	20.0	10	115.1	6
12142	19		22	80	57.5	13.1	21.1	2	112.6	10
12147	18		21	88	58.0	13.0	21.2	2	113.4	8
11669	16		17	95	58.0	12.7	19.7	10	120.6	3
12141	16		17	88	57.5	12.4	16.7	2	89.0	26
11673	17		17	89	58.0	12.3	19.1	10	112.3	11
12502	19		24	87	60.0	12.3	---	1	112.8	9
12150	21		21	88	58.0	11.8	21.8	2	116.6	5
12128	17		18	89	58.0	11.6	18.8	2	100.5	15
12501	20		22	88	57.0	11.4	20.3	2	108.6	13
12110	17		21	87	58.5	11.1	19.5	5	120.4	4
8856	16		17	63	58.0	10.9	15.0	10	98.6	19
1442	21		23	93	58.0	10.9	18.7	10	100.0	17
12145	19		20	63	56.5	10.6	17.7	2	94.7	21
12135	18		19	88	56.5	10.6	18.5	2	98.7	18
12406	17		17	92	57.5	10.3	---	1	94.5	22
12140	18		19	89	57.5	10.1	17.8	2	95.2	20
12503	19		19	80	56.5	9.5	---	1	87.2	27
12120	15		18	56	60.0	9.5	18.7	3	108.2	14
12149	16		17	90	58.0	9.2	17.1	2	91.2	24
12504	20		23	50	57.5	9.1	---	1	83.5	28
12500	16		19	88	57.0	8.9	17.1	2	91.2	25

Standard error of a difference = 1.29 bushels.

Table 17. (Continued)

Stillwater, Oklahoma
(Four plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Leaf rust 1/ P	Leaf rust 1/ S	Leaf rust 1/ R	Septoria 2/	No. culms per A.	Seeds per head	Weight per bushel	Av. acre yield 1948	Av. acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	%	%			000	No.	Lbs.	Bus.	Bus.			
12150	10	10	25	40	9	CS	3.4	1490	20.2	58.5	28.0	29.3	2	97.7	23
6251	8	10	23	35	8	CS	3.3	1459	21.1	58.8	27.8	30.2	15	108.5	14
12146	3	7	23	30	5	CS	3.4	1180	21.8	57.5	27.4	32.5	2	108.2	15
12501	10	19	22	34	9	CS	3.3	1668	19.0	57.8	27.2	30.3	2	101.0	21
12505	5	9	20	7	6	CS	3.6	1316	21.9	58.5	27.0	---	1	103.8	19
12128	4	7	22	8	4	S-CS	3.3	1494	18.2	58.3	26.8	34.0	4	149.3	1
12120	3	6	21	8	9	CS	3.0	1255	20.1	60.0	26.6	33.1	4	137.2	3
12149	3	8	22	15	2	S-CS	3.3	1141	22.8	57.8	26.4	33.5	2	111.7	11
1442	9	10	22	30	8	I-CS	3.1	1512	20.5	57.5	26.0	30.0	15	100.0	22
12133	4	7	22	39	5	CS	3.3	1285	20.9	58.8	25.7	32.5	4	119.2	7
12147	7	7	20	6	3	S-CS	3.6	1407	20.4	56.3	25.7	30.8	2	102.5	20
12142	6	10	21	40	6	CS	3.1	1568	23.8	56.5	25.6	28.7	3	113.0	10
12132	4-28	1	20	15	9	CS	3.8	1167	18.1	60.3	25.5	33.8	4	133.1	4
12148	3	7	22	6	3	S-CS	3.3	1355	20.2	58.8	25.5	32.8	2	109.2	13
12101	9	9	21	40	5	S-CS	3.3	1316	18.7	58.3	25.1	29.4	6	115.3	9
12145	4	9	22	13	3	S-CS	2.9	1342	23.0	57.5	24.9	31.3	2	104.2	18
12503	2	8	23	1	1	MR-CS	3.5	1115	19.8	57.0	24.9	---	1	95.8	24
12502	6	9	24	16	15	CS	3.3	1359	19.1	60.3	24.7	---	1	95.0	25
12504	5	10	22	1	1	S-CS	3.5	1207	21.5	58.0	24.5	---	1	94.2	26
12110	5	9	22	1	3	S-CS	3.8	1359	21.0	57.5	24.4	30.7	6	139.0	2
12500	3	9	21	8	3	S-CS	3.4	1433	20.3	57.8	24.3	31.5	2	104.8	17
12406	4	9	20	3	1	MR-S	2.9	1416	17.6	58.0	24.3	---	1	93.5	27
8856	4-30	4	25	41	8	CS	3.6	1211	20.7	59.5	23.8	29.1	15	110.2	12
12140	8	9	21	1	1	R-CS	3.5	1568	21.7	57.0	23.2	29.2	3	105.7	16
11669	4	4	21	5	6	CS	3.4	1538	19.0	57.3	22.5	29.8	12	128.1	5
11673	4	7	21	8	5	CS	3.6	1237	19.8	56.5	22.3	30.2	10	118.6	8
12135	5	9	21	15	7	CS	3.5	1573	17.9	56.3	21.3	23.4	4	87.9	28
12141	5	7	20	T	T	CS	3.3	1285	18.2	56.3	20.3	28.6	3	120.2	6

1/ Prevalence, severity, and response (Resistant to completely susceptible).

2/ Degree of susceptibility 0 to 4. Disease notes from Dept. of Botany and Plant Pathology.

Standard error of a difference = 1.82 bushels.

Table 17.--(Continued)

Cherokee, Oklahoma

(Four plots)

C. I. No.	Maturity June 10	Av. Ht.	Wt. per bushel	Average acre yield 1948	Average acre yield 1947-48	No. yrs. Grown	Per cent of Kharkof	Rank
	%	Ins.	Lbs.	Bus.	Bus.			
12406	60	25	59.3	33.9	—	1	124.2	1
12132	100	25	59.8	33.0	32.7	2	122.7	2
12150	10	26	59.8	32.3	32.0	2	120.1	4
6251	60	25	60.5	32.1	29.5	2	110.7	13
8856	100	27	61.5	31.0	28.0	2	104.9	20
12505	75	23	59.3	30.8	—	1	112.8	10
12148	100	25	60.5	30.6	31.0	2	116.3	6
12147	25	26	59.3	30.0	29.7	2	111.3	12
12101	75	23	61.0	29.9	30.8	2	115.4	7
12110	75	26	60.0	29.9	29.8	2	111.8	11
12502	75	29	61.5	29.6	—	1	108.4	17
12133	90	25	61.8	29.6	31.5	2	118.2	5
12140	50	25	59.3	29.2	27.5	2	103.2	24
12501	10	24	58.8	28.9	28.9	2	108.2	18
12120	90	25	62.0	28.7	32.2	2	120.8	3
12128	100	24	59.8	28.7	30.4	2	114.1	8
12146	75	26	58.5	28.6	27.9	2	104.5	21
11669	100	25	58.8	28.3	29.5	2	110.5	14
12503	75	26	57.5	28.3	—	1	103.7	23
12149	60	25	59.5	27.7	29.3	2	109.8	15
1442	50	26	59.8	27.3	26.7	2	100.0	25
11673	90	25	58.8	27.3	30.1	2	112.9	9
12142	50	24	59.0	26.9	27.7	2	103.8	22
12145	25	24	60.0	26.6	28.9	2	108.4	16
12135	25	24	57.5	26.3	26.5	2	99.2	27
12141	60	24	58.3	25.0	28.0	2	104.9	19
12504	50	24	59.3	24.3	—	1	89.0	28
12500	25	23	58.8	23.7	26.5	2	99.4	26

Standard error os a difference = 2.51 bushels

Table 17. - - (Continued)

Woodward, Oklahoma

(Four plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	Lbs.	Bus.	Bus.			
12101	17	17	28	59.8	34.3	27.0	8	127.7	1
12503	15	15	30	57.3	34.3	---	1	112.1	13
12133	13	14	28	59.8	33.5	25.8	4	108.9	15
12132	7	7	26	60.0	33.3	27.7	4	122.7	4
12148	13	14	29	59.5	33.0	26.1	2	120.3	5
12146	13	13	28	56.8	32.9	25.1	2	115.7	8
12505	15	15	27	59.3	32.8	---	1	107.2	16
12149	15	15	29	59.0	32.7	25.4	2	117.1	7
12120	13	13	28	62.0	32.6	27.8	5	114.6	10
12406	14	14	28	58.5	32.4	---	1	105.9	19
12145	17	17	28	59.0	32.2	25.0	2	115.2	9
6251	17	17	29	60.0	32.0	25.3	17	104.5	22
12110	16	16	29	59.3	31.7	24.1	7	114.0	11
12128	17	16	28	58.8	31.7	25.5	4	126.2	2
11669	16	16	29	58.8	31.0	26.4	14	126.0	3
1442	19	19	30	58.3	30.6	21.7	17	100.0	23
12147	18	18	28	58.5	30.4	24.6	2	113.1	12
12502	16	17	31	61.0	30.4	---	1	99.3	25
11673	15	15	29	58.5	30.3	24.7	12	118.7	6
12150	20	21	28	57.8	29.9	22.8	2	105.1	20
8856	9	9	30	61.8	29.7	24.9	17	106.2	18
12140	19	19	29	57.5	29.4	22.1	3	106.7	17
12142	20	20	28	56.5	28.6	24.6	3	109.5	14
12141	17	17	28	58.0	28.3	22.7	3	105.0	21
12504	18	19	27	58.0	28.1	---	1	91.8	28
12500	14	15	27	58.0	28.0	21.6	2	99.3	26
12135	16	16	27	56.0	27.7	20.6	4	99.5	24
12501	20	20	26	57.0	26.4	21.2	2	97.5	27

Standard error of a difference = 2.00 bushels.

Table 17. - - (Continued)

Manhattan, Kansas

(Four plots)

C.I. No.	Date Headed	Date Ripe	Lodging	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	%	Ins.	Lbs.	Bus.	Bus.			
12503	12	24	44	40	58.4	64.3	---	1	118.0	9
12110	15	24	21	40	57.8	61.6	52.5	7	143.8	1
12101	16	24	28	38	58.2	61.5	48.0	8	121.3	6
12133 1/	14	24	21	38	58.6	60.5	49.2	4	128.0	3
12148	11	23	9	38	59.9	59.3	49.6	2	125.3	5
12501	19	25	35	39	57.9	59.2	42.5	2	107.3	20
8856	8	21	28	39	59.7	58.9	47.3	17	117.0	10
12505	15	25	18	38	58.7	58.9	---	1	108.1	19
12142	18	25	38	38	57.7	57.8	41.6	3	108.7	18
12502 1/	16	26	8	43	60.6	57.6	---	1	105.7	21
12120	14	24	23	36	60.4	57.0	41.0	5	111.1	16
11669	15	23	23	38	58.2	56.9	48.1	14	136.5	2
6251 1/	17	25	25	41	59.5	56.8	43.0	17	110.7	17
11673	14	24	33	38	57.1	56.1	41.0	12	115.9	11
12150	19	25	40	42	58.4	55.8	38.4	2	96.5	26
12406	14	24	30	38	57.7	55.4	---	1	101.7	23
12140 2/	18	25	23	40	58.1	55.3	42.6	3	119.0	7
12146	14	24	41	38	57.0	55.0	45.3	2	114.4	12
1442	19	26	23	40	57.9	54.5	39.6	17	100.0	24
12500 2/	12	24	30	38	58.4	54.2	44.7	2	113.0	14
12132	7	20	25	35	59.8	53.2	45.0	4	118.3	8
12149	14	24	23	38	59.2	53.2	44.3	2	111.9	15
12128	14	24	24	38	59.4	53.1	40.5	4	126.8	4
12147	17	24	30	39	56.4	52.7	41.7	2	105.4	22
12145 2/	14	24	23	37	57.2	50.4	39.0	2	98.6	25
12135 2/	16	24	35	37	56.8	48.8	36.1	4	92.6	27
12504 2/	17	25	40	40	57.6	46.7	---	1	85.7	28
12141 2/	15	25	13	37	57.4	44.2	38.6	3	113.2	13

1/ Yellow mosaic light; 12502 showed the least;

2/ Yellow mosaic infection severe; 12145 and 12504 showed the most.

Standard error of a difference = 3.69 bushels.

Table 17. - - (Continued)

Hays, Kansas

(Three plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May		Ins.	Lbs.	Bus.	Bus.			
12133	25	6-30	27	59	42.2	50.1	4	120.7	5
12150	31	7-2	33	59	39.3	40.8	2	89.4	26
1442	6-1	7-2	32	58	39.3	45.6	16	100.0	16
12147	28	7-2	30	57	38.9	48.5	2	106.4	10
12110	26	7-2	30	57	38.6	46.6	7	123.1	3
12148	22	6-30	27	58	38.4	45.9	2	100.5	15
12128	27	6-30	30	59	37.8	49.1	4	116.5	6
12505	25	7-2	29	58	37.6	---	1	95.7	18
12501	30	7-2	30	57	37.3	43.0	2	94.2	21
12503	26	7-4	32	56	37.2	---	1	94.7	19
12502	26	7-2	34	59	37.1	---	1	94.4	20
12142	29	7-2	29	58	36.6	40.6	3	89.9	25
12101	27	7-2	30	59	36.3	45.7	8	124.5	2
12406	26	7-2	30	58	36.1	---	1	91.9	23
6251	28	7-2	32	59	35.7	40.2	16	109.1	9
12146	23	6-30	27	56	35.1	46.0	2	100.8	14
11673	25	7-1	29	58	34.6	44.3	12	120.9	4
11669	25	6-30	28	58	32.3	43.8	13	127.3	1
12140	29	7-3	32	58	31.6	40.7	3	90.1	24
12120	25	7-2	28	60	31.6	42.9	5	115.0	7
8856	21	6-29	28	57	31.4	44.3	16	111.8	8
12149	25	7-2	30	58	31.3	46.5	2	101.9	11
12141	26	7-2	30	57	30.3	44.5	3	100.8	13
12135	29	7-3	31	56	29.5	35.0	4	80.6	27
12145	28	7-3	30	58	29.5	43.9	2	96.2	17
12504	29	7-4	32	56	29.3	---	1	74.6	28
12132	19	6-22	24	58	26.8	40.9	4	101.6	12
12500	26	7-2	27	58	26.5	42.8	2	93.9	22

Standard error of a difference = 4.02 bushels.

Table 17.--(Continued)

Colby, Kansas

(Three plots)

C. I. No.	Date Headed	Date Ripe	Av. height	Lodging 1/	Wt. per bushel	Average acre yield 1948	Per cent of Kharkof
	May	July	Ins.		Lbs.	Bus.	
12133	28	8	32	5	61.0	45.4	108.1
1442	30	11	33	5	60.5	42.0	100.0
12101	29	11	33	10	60.5	41.2	98.1
12150	31	12	33	15	61.0	41.2	98.1
12120	25	6	31	0	62.5	39.4	93.8
12501	31	11	30	0	60.0	39.4	93.8
12147	29	9	33	10	61.0	38.6	91.9
12505	29	9	31	5	61.5	38.6	91.9
12135	28	8	31	10	60.0	37.4	89.1
12148	25	6	32	5	59.0	37.4	89.1
12146	26	7	32	10	59.0	37.2	88.6
11673	28	8	33	10	60.5	37.1	88.3
11669	27	7	30	10	59.5	36.9	87.9
6251	29	10	33	10	60.5	36.2	86.2
12145	29	9	31	5	61.5	36.0	85.7
12140	29	10	33	5	61.0	35.7	85.0
12504	29	10	32	0	60.5	35.3	84.0
12502	29	9	34	5	62.0	34.9	83.1
12142	30	11	30	5	61.0	34.4	81.9
12132	22	3	27	5	60.0	34.2	81.4
12128	28	9	31	5	61.0	33.2	79.1
8856	23	6	31	15	60.0	33.1	78.8
12406	27	7	32	5	60.0	32.9	78.3
12503	28	8	34	5	60.0	32.8	78.1
12110	29	11	33	10	60.0	32.8	78.1
12141	27	7	31	0	58.0	30.2	71.9
12500	28	7	30	10	60.0	30.0	71.4
12149	27	7	31	10	59.0	26.7	63.6

1/ Lodging Notes taken on basis 0 = Very good. No Lodging, 5 = good straw, 10 = Fair, 15 = poor

Standard error of a difference = 2.89 bushels

Table 17. - - (Continued)

Akron, Colorado

(Five plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Lodging	Shattering	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	July	Ins.	%	%	Bus.	Bus.			
1442	28	7	28	45	T	49.2	37.4	14	100.0	9
12150	28	8	28	30	T	48.6	36.9	2	98.7	12
12101	26	7	26	30	T	46.9	38.2	8	110.2	2
12505	25	8	26	15	1	46.2	---	1	93.9	18
12501	28	8	28	20	2	46.1	37.2	2	99.5	11
6251	25	5	28	35	1	45.3	35.5	14	108.4	5
12142	26	7	27	25	1	44.3	35.4	3	94.6	15
12147	26	6	27	50	0	43.6	35.3	2	94.4	16
12135	24	7	27	50	0	43.0	36.3	4	108.6	4
12406	23	8	27	15	5	42.0	---	1	85.4	23
12146	23	5	26	50	T	41.8	35.3	2	94.4	17
12110	23	7	29	20	3	40.4	33.0	7	96.6	13
12141	24	7	28	20	T	40.3	33.9	3	90.5	21
12120	23	7	23	10	0	40.1	36.1	5	106.4	7
12133	23	6	26	15	T	40.0	37.2	4	107.4	6
12140	27	8	27	25	T	39.6	35.4	3	96.4	14
12504	27	8	27	20	0	37.6	---	1	76.4	26
12500	24	6	26	20	T	37.4	31.9	2	85.4	22
11669	25	5	26	30	5	37.3	31.5	12	109.8	3
12128	25	6	27	20	T	37.2	32.0	4	93.1	20
12503	24	8	26	20	1	37.1	---	1	75.4	27
12502	27	9	29	10	T	36.9	---	1	75.0	28
11673	24	6	26	35	T	36.6	32.9	11	105.7	8
12132	23	6	20	20	0	33.4	35.5	4	99.5	10
12145	27	6	26	30	T	30.7	29.1	2	77.9	25
12149	24	5	27	20	20	29.5	29.2	2	78.0	24
12148	24	5	24	10	10	29.0	34.9	2	93.4	19
8856	23	5	26	30	2	28.2	30.0	14	111.0	1

Standard error of a difference = 3.11 bushels.

Table 17. - - (Continued)

Ft. Collins, Colorado

(Five plots)

C.I. No.	Date Headed	Date Ripe	Av. height	Lodging	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
		July	Ins.	%	Lbs.	Bus.	Bus.			
12146	5-28	18	37	24	63.3	80.6	51.8	2	111.8	7
12142	6-1	22	40	27	62.3	76.2	58.1	3	122.6	3
12145	5-31	21	37	14	63.3	74.7	57.7	2	124.4	2
12135	5-31	20	39	37	64.3	74.2	55.7	4	107.0	12
12133	5-29	19	36	9	63.7	73.8	59.4	4	112.5	5
12505	5-29	20	34	8	63.6	71.4	---	1	129.8	1
12120	5-27	18	33	0	65.6	68.7	49.9	5	107.4	11
11673	5-30	19	37	25	63.6	68.4	43.8	12	104.2	16
12148	5-28	18	36	0	64.2	66.1	41.9	2	90.3	27
12128	5-30	18	35	4	63.8	65.5	52.4	4	104.8	14
12140	6-1	18	40	19	63.2	65.4	49.9	3	104.7	15
12141	5-29	18	36	3	62.8	65.1	51.9	3	103.2	18
12101	6-1	20	36	2	63.5	63.9	52.9	8	103.8	17
12150	6-4	22	41	46	62.6	63.5	50.7	2	109.3	8
12503	5-28	22	30	19	62.2	62.5	---	1	113.6	4
12132	5-24	14	32	15	64.0	62.2	47.8	4	95.8	23
12504	6-1	20	38	20	63.0	61.9	---	1	112.5	6
12501	6-4	23	39	16	62.2	61.8	46.6	2	100.4	19
12110	5-30	20	37	0	63.3	61.4	46.3	7	92.4	26
12500	5-30	19	35	7	63.5	61.2	44.6	2	96.1	22
12147	6-1	19	38	49	63.3	60.6	50.1	2	108.0	9
12406	5-27	19	36	8	63.0	59.4	---	1	108.0	10
8856	5-24	17	45	46	63.8	58.6	40.0	16	94.2	25
11669	5-29	17	36	2	63.8	56.2	43.4	14	105.1	13
12149	5-29	19	37	3	63.3	55.5	38.8	2	83.6	28
1442	6-3	20	38	27	62.5	55.0	46.4	16	100.0	20
6251	5-29	19	39	42	63.4	54.7	41.5	16	98.2	21
12502	6-1	23	41	0	63.5	52.4	---	1	95.3	24

Standard error of a difference = 5.82 bushels

Leaf rust 25% on 12133, 20% on 12149, others 0 to 5. Stem rust 15% on 12135, 10% on 1442 and 6251, others T to 5.

Table 17. - - (Continued) Hesperus, Colorado

(Five plots; irrigated 5-14, 6-13)

C.I. No.	Date Headed	Date Ripe	Av. Height	Lodging	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	June	July	Ins.	%	Lbs.	Bus.	Bus.			
12146	13	29	45	18	63.0	61.7	41.6	2	120.4	9
12505	17	8-2	42	10	61.5	61.7	---	1	171.4	1
12148	12	28	42	26	63.0	60.0	46.3	2	134.2	5
12101	17	28	46	0	63.0	55.9	44.0	7	120.0	11
12132	13	28	43	28	63.0	54.8	33.1	3	100.7	23
12133	13	28	41	28	63.0	54.7	39.3	3	104.0	21
12128	16	28	42	24	62.0	54.2	40.1	3	119.9	12
12141	13	28	42	14	62.0	54.1	35.9	3	99.8	25
12504	19	8-2	43	44	62.0	53.8	---	1	149.4	2
12120	12	28	47	0	63.5	53.6	40.6	4	117.4	15
12149	15	29	45	32	62.0	52.7	33.9	2	98.3	26
12145	19	8-2	39	12	61.0	52.3	41.5	2	120.3	10
12503	17	29	45	26	61.0	51.7	---	1	143.6	3
12110	15	28	47	0	62.0	51.6	40.1	6	118.9	14
11669	15	28	40	0	63.0	51.1	38.2	10	110.1	18
8856	8	28	42	0	62.0	51.1	36.3	10	106.0	20
12406	17	8-2	42	16	62.0	51.0	---	1	141.7	4
11673	16	27	47	0	62.5	49.7	38.7	10	124.6	7
12140	16	28	46	26	62.0	48.4	39.9	3	114.2	16
12142	18	8-1	40	56	61.5	48.3	44.1	3	124.0	8
12502	16	30	44	28	62.0	46.1	---	1	128.1	6
12500	17	29	44	20	62.0	45.7	31.3	2	90.7	28
6251	13	28	45	4	62.0	43.9	35.0	10	119.4	13
12147	16	28	45	20	62.0	43.7	38.2	2	110.6	17
12135	16	29	30	16	61.0	41.4	33.5	3	94.9	27
12501	19	29	44	22	61.0	40.5	37.9	2	109.7	19
1442	17	28	44	20	61.0	36.0	34.5	10	100.0	24
12150	20	28	42	22	62.0	34.7	35.0	2	101.3	22

Standard error of a difference = 5.20 bushels.

Table 17. - - (Continued)

Lincoln, Nebraska

(Five plots)

C.I. No.	Date Headed	Date Ripe	Av. height	Lodging 1/	Shattering 1/	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	%	%	Lbs.	Bus.	Bus.			
12110	21	25	45	10	5	61.4	57.3	48.3	7	123.7	18
11669	20	24	42	10	30	61.0	55.6	41.1	14	136.0	5
12101	21	25	43	20	5	61.4	55.6	41.7	8	124.3	17
12142	22	26	42	10	50	59.2	55.4	40.4	3	123.4	19
12146	19	24	43	30	5	59.8	54.5	41.8	2	131.4	10
12503	19	24	44	5	T	59.8	54.0	---	1	136.4	4
12500	19	24	41	5	0	60.9	53.9	42.4	2	133.2	8
12128	21	25	42	10	15	60.9	53.7	46.9	4	147.2	1
12149	19	24	43	25	5	61.4	53.2	42.7	2	134.1	6
12147	22	25	42	25	T	59.5	53.0	41.4	2	130.2	11
12505	22	25	39	0	T	60.9	52.9	---	1	133.6	7
12145	22	25	44	5	5	59.8	52.2	45.6	2	143.2	2
12148	19	23	41	0	15	61.4	51.7	45.4	2	142.6	3
12501	24	26	44	10	15	59.5	51.1	36.5	2	114.8	22
11673	21	24	42	20	5	60.6	50.5	41.6	12	114.1	24
12133	20	25	43	0	T	61.0	50.5	41.5	4	126.8	14
12120	19	24	39	0	5	63.4	50.4	40.3	5	131.8	9
12502	21	25	47	0	0	61.6	50.3	---	1	127.0	13
8856	18	23	44	10	20	60.6	49.7	36.5	17	125.8	15
12406	21	25	42	5	5	60.2	49.7	---	1	125.5	16
12504	23	25	43	10	T	59.1	48.0	---	1	121.2	21
12132	18	23	42	0	5	61.7	47.8	39.6	4	122.9	20
12141	19	25	41	0	5	60.3	47.4	41.9	3	130.1	12
12150	26	26	44	50	5	58.8	45.4	34.2	2	107.4	26
12140	22	26	44	5	5	60.1	45.0	35.1	3	114.5	23
12135	21	26	42	10	T	59.0	44.1	33.9	4	106.7	27
6251	24	26	46	10	15	60.4	40.8	34.2	17	111.8	25
1442	24	26	45	25	5	59.2	39.6	31.8	17	100.0	28

1/ Lodging notes taken at ripe stage; shattering notes taken July 12.

Standard error of a difference = 2.89 bushels.

Table 17. - - (Continued)

North Platte, Nebraska

(Three plots)

C.I. No.	Date Headed	Date Ripe	Av. Height	Weight per bushel	Average acre yield 1948	Average acre yield 1947-48	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	Lbs.	Bus.	Bus.			
12147	22	26	30	58.6	44.0	44.5	2	115.3	8
12146	21	26	30	58.6	42.8	41.9	2	108.6	14
12505	22	25	28	58.8	42.1	---	1	121.7	4
12150	24	29	32	58.3	40.3	43.2	2	111.9	10
12406	22	26	29	59.5	40.3	---	1	116.5	7
12149	22	24	31	59.4	39.8	34.0	2	88.2	27
11669	22	24	29	58.2	39.7	35.8	10	125.5	2
12101	22	26	30	60.0	38.7	40.5	5	126.8	1
8856	21	24	32	59.6	38.0	30.2	11	104.2	16
12502	22	26	33	60.5	37.9	---	1	109.5	13
11673	22	26	30	59.2	37.6	39.6	8	118.2	6
12128	22	24	30	58.3	37.5	38.7	4	119.2	5
12133	22	24	30	59.6	37.5	37.2	4	114.7	9
12148	21	24	31	60.3	36.8	35.6	2	92.2	24
6251	23	28	32	59.5	36.7	38.7	11	101.8	19
12500	22	27	28	58.5	36.4	34.6	2	89.6	25
12503	21	26	32	57.9	35.8	---	1	103.5	18
12142	23	27	28	57.6	35.4	42.7	3	124.4	3
12135	22	26	29	57.4	34.8	36.2	4	110.9	11
1442	23	28	32	58.9	34.6	38.6	11	100.0	20
12145	22	27	29	58.8	34.5	36.9	2	95.6	22
12120	21	24	31	61.2	34.0	34.1	5	110.7	12
12140	22	27	30	59.1	33.7	36.3	3	103.9	17
12504	22	25	30	58.3	33.3	---	1	96.2	21
12110	22	26	31	58.5	32.7	35.0	5	106.4	15
12501	24	28	30	57.4	31.8	35.8	2	92.7	23
12132	22	24	31	57.9	30.8	26.8	4	82.4	28
12141	21	24	28	57.9	30.6	34.7	3	88.2	26

Standard error of a difference = 3.82 bushels.

Table 17.--(Continued)

Alliance, Nebraska

(Three plots)

C.I. No.	Date Headed	Av. Ht.	Wt. per bushel	Average acre yield 1948	Average acre yield 1947-48	No. yrs. Grown	Per cent of Kharkof	Rank
	June	Ins.	Lbs.	Bus.	Bus.			
12146	2	39	58.0	45.8	31.8	2	86.6	23
12132	5-31	36	57.8	45.6	30.6	4	90.1	21
12147	3	40	57.7	43.2	37.4	2	101.8	10
12142	3	37	59.5	43.2	42.7	3	111.6	3
12149	1	41	58.5	43.1	37.1	2	101.1	11
12128	2	36	59.3	43.1	37.1	4	107.4	6
12141	1	36	57.2	42.6	37.4	3	95.0	17
12101	3	36	58.2	42.4	39.9	7	106.6	7
12110	1	40	58.1	41.2	35.8	6	106.1	9
12501	4	37	60.1	41.0	40.4	2	109.9	4
12150	5	40	59.8	40.0	30.6	2	83.2	26
12406	2	38	58.4	39.8	---	1	125.9	1
12148	5-31	34	59.3	39.5	36.1	2	98.2	15
11669	2	36	58.6	38.9	34.4	10	100.1	13
12145	2	38	59.4	38.0	25.1	2	68.4	28
12135	2	38	57.7	37.4	29.8	4	90.6	19
12140	3	40	58.9	37.4	32.8	3	90.3	20
12500	3	37	58.8	37.1	37.0	2	100.8	12
11673	2	37	59.1	37.0	33.9	10	96.7	16
12120	1	34	61.8	34.8	26.8	4	87.5	22
12502	3	41	61.3	34.0	---	1	107.6	5
12505	2	33	58.4	33.6	---	1	106.3	8
6251	1	37	58.8	33.0	31.3	13	92.8	18
8856	5-31	36	55.9	32.1	31.5	13	85.4	24
1442	5	39	60.1	31.6	36.7	13	100.0	14
12133	2	33	59.3	29.3	42.0	4	113.6	2
12504	5	34	59.7	26.5	---	1	83.9	25
12503 1/	5-31	34	58.0	25.5	---	1	80.7	27

1/ Spring survival 70%

Standard error of a difference = 8.81 bushels.

STANDARD ERRORS

A summary of the numbers of plots, average yields and standard errors for the uniform yield nursery is given in table 18. The procedure for calculating errors in the nursery tests was the same as that described for the plot series.

Table 18.--Number of plots, average yield, and standard errors for the uniform yield nursery at the various stations in 1948.

State and Station	No. of Plots	Av. yield all entries	Standard error of a Single plot	Diff. between means	Mean in Bushels	Mean in Per cent
		Bus.	Bus.	Bus.		
Texas:						
Denton	4	24.58	4.00	2.83	2.00	8.14
Chillicothe	4	31.32	6.12	4.32	3.06	9.76
Bushland	6	11.63	2.22	1.29	0.91	7.82
Oklahoma:						
Stillwater	4	25.04	2.58	1.82	1.29	5.15
Cherokee	4	28.86	3.55	2.51	1.78	6.17
Woodward	4	30.99	2.82	2.00	1.41	4.55
Kansas:						
Manhattan	4	55.66	5.21	3.69	2.61	4.69
Hays	3	34.58	4.93	4.02	2.85	8.24
Colby	3	36.08	3.54	2.89	2.04	5.65
Colorado:						
Akron	5	40.04	4.91	3.11	2.20	5.49
Ft. Collins	5	64.31	9.20	5.82	4.11	6.39
Hesperus	5	50.15	8.22	5.20	3.68	7.34
Nebraska:						
Lincoln	5	50.48	4.57	2.89	2.04	4.04
North Platte	3	36.71	4.68	3.82	2.70	7.35
Alliance	3	37.75	10.79	8.81	6.23	16.50

SUMMARY OF NURSERY YIELDS

Yields by stations with state and regional averages are summarized for 1948 in Table 19. Three stations in each of five states supplied data. The varieties are listed in order of declining average yield based on all 15 stations. Martin-Tenmarq x Chiefkan (C.I. 12146) had the highest 15-station average followed by Blackhull x Cheyenne (C.I. 12101), Marquillo-Oro x Pawnee (C.I. 12505) and Chiefkan x Oro-Tenmarq (C.I. 12133). Last year these strains, except C.I. 12505 which was not grown, ranked twentieth, sixth, and first, respectively. In Texas, Pawnee, C.I. 12146, C.I. 12133, and Triumph as a group ranked highest. In Oklahoma, Triumph and Blackhull yielded most followed by C.I. 12505 and C.I. 12406. The better averages in Kansas were made by C.I. 12133, C.I. 12101, and Turkey. C.I. 12146 topped the list in Colorado with C.I. 12505 and C.I. 12142 next in order. In Nebraska C.I. 12146, C.I. 12147, C.I. 12101, and C.I. 12149 comprised the highest yielding group of varieties. Correlation coefficients among the stations have not been calculated yet on these yields but observations suggest that the values will be low.

Table 19. Summary of the average yields in bushels per acre of the 28 varieties grown as uniform yield nurseries at 15 stations in the hard red winter wheat region in 1948 with state averages.

Variety	C.I. No.	Texas					Oklahoma					Kansas				
		Denton	Chillicothe	Bushland	Av.	Rank	Stillwater	Cherokee	Woodward	Av.	Rank	Manhattan	Hays	Colby	Av.	Rank
Martin-Tenq. x Chiefk.	12146	29.4	34.7	13.4	25.8	2	27.4	28.6	32.9	29.6	8	55.0	35.1	37.2	42.4	16
Blackhull x Chey.	12101	24.2	32.6	13.8	23.5	8	25.1	29.9	34.3	29.8	6	61.5	36.3	41.2	46.3	2
Mqo.-Oro x Pawnee	12505	20.8	33.1	13.8	22.6	15	27.0	30.8	32.8	30.2	3	58.9	37.6	38.6	45.0	6
Chiefk. x Oro-Tenq.	12133	28.0	34.9	13.3	25.4	3	25.7	29.6	33.5	29.6	9	60.5	42.2	45.4	49.4	1
Westar	12110	26.4	37.4	11.1	25.0	5	24.4	29.9	31.7	28.7	14	61.6	38.6	32.8	44.3	9
Chey. x Turkey	12142	24.2	27.2	13.1	21.5	20	25.6	26.9	28.6	27.0	23	57.8	36.6	34.4	42.9	12
Chiefk. x Oro-Tenq.	12148	26.0	25.4	13.5	21.6	19	25.5	30.6	33.0	29.7	7	59.3	38.4	37.4	45.0	7
Martin-Tenq. x Kharkof	12147	24.4	29.0	13.0	22.1	17	25.7	30.0	30.4	28.7	15	52.7	38.9	38.6	43.4	10
Colorado Turkey	12150	25.7	33.8	11.8	23.8	7	28.0	32.3	29.9	30.1	5	55.8	39.3	41.2	45.4	3
Kv.-Mqo. x Kv.-Tenq.	12128	21.8	31.1	11.6	21.5	21	26.8	28.7	31.7	29.1	12	53.1	37.8	33.2	41.4	19
Cimarron	12120	27.2	32.4	9.5	23.0	12	26.6	28.7	32.6	29.3	10	57.0	31.6	39.4	42.7	14
Mqo.-Oro x Oro-Tenq.	12406	26.9	31.5	10.3	22.9	13	24.3	33.9	32.4	30.2	4	55.4	36.1	32.9	41.5	18
Pawnee	11669	25.1	39.9	12.7	25.9	1	22.5	28.3	31.0	27.3	21	56.9	32.3	36.9	42.0	17
Compound Hybrid	12501	27.6	29.5	11.4	22.8	14	27.2	28.9	26.4	27.5	20	59.2	37.3	39.4	45.3	4
Comanche	11673	27.4	30.4	12.3	23.4	9	22.3	27.3	30.3	26.6	25	56.1	34.6	37.1	42.6	15
Triumph	12132	24.1	38.6	13.3	25.3	4	25.5	33.0	33.3	30.6	1	53.2	26.8	34.2	38.1	24
275 Double Cross	12503	25.7	26.3	9.5	20.5	25	24.9	28.3	34.3	29.2	11	64.3	37.2	32.8	44.8	8
Blackhull	6251	26.6	30.4	13.2	23.4	10	27.8	32.1	32.0	30.6	2	56.8	35.7	36.2	42.9	13
Comanche D. Cr.	12145	21.0	26.1	10.6	19.2	26	24.9	26.6	32.2	27.9	19	50.4	29.5	36.0	38.6	22
Oro x Med.-Hope	12140	24.0	31.3	10.1	21.8	18	23.2	29.2	29.4	27.3	22	55.3	31.6	35.7	40.9	21
Kan. x Hope-Hd. Fed.	12135	21.2	41.0	10.6	24.3	6	21.3	26.3	27.7	25.1	27	48.8	29.5	37.4	38.6	23
Kv.-Tenq. x Comanche	12149	21.2	33.1	9.2	21.2	22	26.4	27.7	32.7	28.9	13	53.2	31.3	26.7	37.1	25
Early Blackhull	8856	26.5	32.0	10.9	23.1	11	23.8	31.0	29.7	28.2	16	58.9	31.4	33.1	41.1	20
Kharkof	1442	25.7	25.4	10.9	20.7	23	26.0	27.3	30.6	28.0	18	54.5	39.3	42.0	45.3	5
Blue Jacket	12502	21.5	21.8	12.3	18.5	27	24.7	29.6	30.4	28.2	17	57.6	37.1	34.9	43.2	11
Med.-Hope x Pawnee	12141	23.0	32.5	12.4	22.6	16	20.3	25.0	28.3	24.5	28	44.2	30.3	30.2	34.9	28
Nebr. 60 x Med.-Hope	12500	22.8	30.2	8.9	20.6	24	24.3	23.7	28.0	25.3	26	54.2	26.5	30.0	36.9	27
275 Double Cross	12504	20.6	25.4	9.1	18.4	28	24.5	24.3	28.1	25.6	24	46.7	29.3	35.3	37.1	26

Table 19. - - (Concluded)

Variety	C.I. No.	Colorado					Nebraska					Average at 15 Stations
		Akron	Ft. Collins	Hes-perus	Av.	Rank	Lin-coln	North Platte	Alli-ance	Av.	Rank	
Martin-Tenq. x Chiefk.	12146	41.8	80.6	61.7	61.4	1	54.5	42.8	45.8	47.7	1	41.4
Blackhull x Chey.	12101	46.9	63.9	55.9	55.6	5	55.6	38.7	42.4	45.6	3	40.2
Mqo-Oro x Pawnee	12505	46.2	71.4	61.7	59.8	2	52.9	42.1	33.6	42.9	10	40.1
Chiefk. x Oro-Tenq.	12133	40.0	73.8	54.7	56.2	4	50.5	37.5	29.3	39.1	22	39.9
Westar	12110	40.4	61.4	51.6	51.1	13	57.3	32.7	41.2	43.7	8	38.6
Chey. x Turkey	12142	44.3	76.2	48.3	56.3	3	55.4	35.4	43.2	44.7	6	38.5
Chiefk. x Oro-Tenq.	12148	29.0	66.1	60.0	51.7	11	51.7	36.8	39.5	42.7	11	38.1
Martin-Tenq. x Kharkof	12147	43.6	60.6	43.7	49.3	20	53.0	44.0	43.2	46.7	2	38.1
Colorado Turkey	12150	48.6	63.5	34.7	48.9	21	45.4	40.3	40.0	41.9	13	38.0
Kv.-Mqo. x Kv.-Tenq.	12128	37.2	65.5	54.2	52.3	10	53.7	37.5	43.1	44.8	5	37.8
Cimarron	12120	40.1	68.7	53.6	54.1	6	50.4	34.0	34.8	39.7	21	37.8
Mqo.-Oro x Oro-Tenq.	12406	42.0	59.4	51.0	50.8	16	49.7	40.3	39.8	43.3	9	37.7
Pawnee	11669	37.3	56.2	51.1	48.2	22	55.6	39.7	38.9	44.7	7	37.6
Compound Hybrid	12501	46.1	61.8	40.5	49.5	19	51.1	31.8	41.0	41.3	17	37.3
Comanche	11673	36.6	68.4	49.7	51.6	12	50.5	37.6	37.0	41.7	14	37.2
Triumph	12132	33.4	62.2	54.8	50.1	18	47.8	30.8	45.6	41.4	16	37.1
275 Double Cross	12503	37.1	62.5	51.7	50.4	17	54.0	35.8	25.5	38.4	25	36.7
Blackhull	6251	45.3	54.7	43.9	48.0	24	40.8	36.7	33.0	36.8	26	36.3
Comanche D. Cr.	12145	30.7	74.7	52.3	52.6	9	52.2	34.5	38.0	41.6	15	36.0
Oro x Med.-Hope	12140	39.6	65.4	48.4	51.1	14	45.0	33.7	37.4	38.7	24	36.0
Kan. x Hope-Hd. Fed.	12135	43.0	74.2	41.4	52.9	8	44.1	34.8	37.4	38.8	23	35.9
Kv.-Tenq. x Comanche	12149	29.5	55.5	52.7	45.9	27	53.2	39.8	43.1	45.4	4	35.7
Early Blackhull	8856	28.2	58.6	51.1	46.0	26	49.7	38.0	32.1	39.9	20	35.7
Kharkof	1442	49.2	55.0	36.0	46.7	25	39.6	34.6	31.6	35.3	28	35.2
Blue Jacket	12502	36.9	52.4	46.1	45.1	28	50.3	37.9	34.0	40.7	18	35.2
Med.-Hope x Pawnee	12141	40.3	65.1	54.1	53.2	7	47.4	30.6	42.6	40.2	19	35.1
Nebr. 60 x Med.-Hope	12500	37.4	61.2	45.7	48.1	23	53.9	36.4	37.1	42.5	12	34.7
275 Double Cross	12504	37.6	61.9	53.8	51.1	15	48.0	33.3	26.5	35.9	27	33.6

Table 20 shows the yield summary of averages based on results in 1947 and 1948. The higher ranking entries by states are: Texas, C.I. 12146, C.I. 12148, and C.I. 12133; Oklahoma, Triumph, Cimarron, and C.I. 12128; Kansas, C.I. 12133 and Westar; Colorado, C.I. 12142, C.I. 12133, and C.I. 12101; Nebraska, C.I. 12142, C.I. 12147, and C.I. 12128. In the averages of the 14 stations, Chiefkan x Oro-Tenmarq (C.I. 12133) ranks first in yield for the 2-year period followed by Blackhull x Cheyenne (C.I. 12101), C.I. 12148, and Martin-Tenmarq x Chiefkan (C.I. 12146). Lowest average yields were registered for Early Blackhull, Kharkof, and C.I. 12135.

Table 20. Summary of 2-year average yields in bushels per acre for varieties grown in uniform yield nurseries at 14 stations in 1947 and 1948.

Variety	C.I. No.	Texas					Oklahoma					Kansas			
		Denton	Chillicothe	Bushland	Av.	Rank	Stillwater	Cherokee	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank
Chiefk. x Oro-Tenq.	12133	25.8	40.7	18.8	28.4	3	32.5	31.5	25.8	29.9	5	49.2	50.1	49.7	1
Blackh. x Cheyenne	12101	24.4	34.2	23.5	27.4	6	29.4	30.8	27.0	29.1	7	48.0	45.7	46.9	4
Chiefk. x Oro-Tenq.	12148	28.7	37.6	20.5	28.9	2	32.8	31.0	26.1	30.0	4	49.6	45.9	47.8	3
Mart.-Tq. x Chiefk.	12146	28.6	37.0	21.3	29.0	1	32.5	27.9	25.1	28.5	9	45.3	46.0	45.7	7
Kv.-Mqo. x Kv.-Tenq.	12128	23.3	37.9	18.8	26.7	10	34.0	30.4	25.5	30.0	3	40.5	49.1	44.8	10
Mart.-Tq. x Kharkof	12147	27.7	31.0	21.2	26.6	12	30.8	29.7	24.6	28.4	10	41.7	48.5	45.1	9
Westar	12110	24.7	32.7	19.5	25.6	15	30.7	29.8	24.1	28.2	14	52.5	46.6	49.6	2
Chey. x Turkey	12142	21.4	25.2	21.1	22.6	23	28.7	27.7	24.6	27.0	17	41.6	40.6	41.1	21
Cimarron	12120	25.8	40.2	18.7	28.2	4	33.1	32.2	27.8	31.0	2	41.0	42.9	42.0	16
Pawnee	11669	25.5	38.7	19.7	28.0	5	29.8	29.5	26.4	28.6	8	48.1	43.8	46.0	5
Comanche	11673	28.0	33.4	19.1	26.8	8	30.2	30.1	24.7	28.3	12	41.0	44.3	42.7	14
Med.-Hope x Pawnee	12141	24.3	38.9	16.7	26.6	11	28.6	28.0	22.7	26.4	20	38.6	44.5	41.6	19
Comanche D. Cr.	12145	22.4	32.6	17.7	24.2	20	31.3	28.9	25.0	28.4	11	39.0	43.9	41.5	20
Triumph	12132	23.1	39.5	17.7	26.8	9	33.8	32.7	27.7	31.4	1	45.0	40.9	43.0	12
Compound Hyb.	12501	24.5	26.7	20.3	23.8	21	30.3	28.9	21.2	26.8	18	42.5	43.0	42.8	13
Col. Turkey	12150	23.6	32.6	21.8	26.0	13	29.3	32.0	22.8	28.0	15	38.4	40.8	39.6	22
Kv.-Tq. x Comanche	12149	22.5	36.5	17.1	25.4	17	33.5	29.3	25.4	29.4	6	44.3	46.5	45.4	8
Nebr. 60 x Med.-Hope	12500	24.2	36.2	17.1	25.8	14	31.5	26.5	21.6	26.5	19	44.7	42.8	43.8	11
Oro x Med.-Hope	12140	23.5	32.6	17.8	24.6	18	29.2	27.5	22.1	26.3	21	42.6	40.7	41.7	17
Blackhull	6251	24.3	31.9	20.0	25.4	16	30.2	29.5	25.3	28.3	13	43.0	40.2	41.6	18
Early Blackhull	8856	30.4	35.3	15.0	26.9	7	29.1	28.0	24.9	27.3	16	47.3	44.3	45.8	6
Kharkof	1442	24.6	25.7	18.7	23.0	22	30.0	26.7	21.7	26.1	22	39.6	45.6	42.6	15
Kan. x Hope-Hd. Fed.	12135	19.6	35.3	18.5	24.5	19	23.4	26.5	20.6	23.5	23	36.1	35.0	35.6	23

Table 20. (Concluded)

Variety	C.I. No.	Colorado					Nebraska					Average of 14 Stations
		Akron	Ft. Collins	Hes-perus	Av.	Rank	Lin-coln	North Platte	Alli-ance	Av.	Rank	
Chiefk. x Oro-Tenq.	12133	37.2	59.4	39.3	45.3	2	41.5	37.2	42.0	40.2	5	37.9
Blackh. x Cheyenne	12101	38.2	52.9	44.0	45.0	3	41.7	40.5	39.9	40.7	4	37.2
Chiefk. x Oro-Tenq.	12148	34.9	41.9	46.3	41.0	11	45.4	35.6	36.1	39.0	7	36.6
Mart.-Tq. x Chiefk.	12146	35.3	51.8	41.6	42.9	4	41.8	41.9	31.8	38.5	8	36.3
Kv.-Mqo. x Kv.-Tenq.	12128	32.0	52.4	40.1	41.5	9	46.9	38.7	37.1	40.9	3	36.2
Mart.-Tq. x Kharkof	12147	35.3	50.1	38.2	41.2	10	41.4	44.5	37.4	41.1	2	35.9
Westar	12110	33.0	46.3	40.1	39.8	15	48.3	35.0	35.8	39.7	6	35.7
Chey. x Turkey	12142	35.4	58.1	44.1	45.9	1	40.4	42.7	42.7	41.9	1	35.3
Cimarron	12120	36.1	49.9	40.6	42.2	6	40.3	34.1	26.8	33.7	20	35.0
Pawnee	11669	31.5	43.4	38.2	37.7	19	41.1	35.8	34.4	37.1	14	34.7
Comanche	11673	32.9	43.8	38.7	38.5	18	41.6	39.6	33.9	38.4	9	34.4
Med.-Hope x Pawnee	12141	33.9	51.9	35.9	40.6	14	41.9	34.7	37.4	38.0	10	34.1
Comanche D. Cr.	12145	29.1	57.7	41.5	42.8	5	45.6	36.9	25.1	35.9	16	34.1
Triumph	12132	35.5	47.8	33.1	38.8	17	39.6	26.8	30.6	32.3	23	33.8
Compound Hyb.	12501	37.2	46.6	37.9	40.6	13	36.5	35.8	40.4	37.6	13	33.7
Col. Turkey	12150	36.9	50.7	35.0	40.9	12	34.2	43.2	30.6	36.0	15	33.7
Kv.-Tq. x Comanche	12149	29.2	38.8	33.9	34.0	23	42.7	34.0	37.1	37.9	12	33.6
Nebr. 60 x Med.-Hope	12500	31.9	44.6	31.3	35.9	21	42.4	34.6	37.0	38.0	11	33.3
Oro x Med.-Hope	12140	35.4	49.9	39.9	41.7	8	35.1	36.3	32.8	34.7	19	33.2
Blackhull	6251	35.5	41.5	35.0	37.3	20	34.2	38.7	31.3	34.7	18	32.9
Early Blackhull	8856	30.0	40.0	36.3	35.4	22	36.5	30.2	31.5	32.7	22	32.8
Kharkof	1442	37.4	46.4	34.5	39.4	16	31.8	38.6	36.7	35.7	17	32.7
Kan. x Hope-Hd. Fed.	12135	36.3	55.7	33.5	41.8	7	33.9	36.2	29.8	33.3	21	31.5

HOPE HYBRIDS

Several Hope hybrids have been grown during the last three years. Their average performance is compared with that for all strains in Table 21. The Hope derivatives included for the three years were Mediterranean-Hope x Pawnee (C.I.12141) from Kansas, Oro x Mediterranean - Hope (C.I. 12140) from Oklahoma, and Kanred x Hope-Hard Federation (C.I. 12135) from Colorado. Grown two years were Kanred x Hope-Hard Federation (C.I. 12136) from Colorado, Nebraska 60 x Mediterranean-Hope (C.I. 12500) from Nebraska, and Comanche-Honor-Forward x Hope-Mediterranean-Comanche (C.I. 12145) from Texas. In general, these strains failed by 1.49 bushels to the acre to produce as well as the average of all strains tested. The only stations with exceptions to this trend were Chillicothe, Lincoln, and Ft. Collins, and the latter was the only one where a consistent advantage for Hope hybrids was shown. Eight stations reported mild stem rust damage during the three-year period but when analyzed alone, the average of the deriviations at these stations was found to be -0.57 bushels. No results are available under a severe epiphytotic.

The obvious conclusion from these data is that the present Hope derivatives are deficient in yielding power in the six-state region where the uniform yield nursery has been grown. A more serious implication is the gloomy prospect that other first and second cycle derivatives will be no better. It will be a pleasure to see these conclusions reversed by the new strains with Hope rust resistance being developed at several stations. It seems timely to urge greater use of the backcross and more careful evaluation of strains for yield factors early in the breeding program. Possibly other sources of stem rust resistance would prove better parents than Hope in the transmission of desirable agronomic characteristics.

Table 21. Average yield of Hope derivatives compared with all entries included in the uniform yield nursery in 1946, 1947 and 1948.

Station	1946 28 entries				1947 30 entries				1948 28 entries				Average of deviations
	All	Four Hope	Deviation	High Hope	All	Six Hope	Deviation	High Hope	All	Five Hope	Deviation	High Hope	
	Bus.	Bus.	Bus.	Rank	Bus.	Bus.	Bus.	Rank	Bus.	Bus.	Bus.	Rank	Bus.
Denton	25.23	26.52	+1.29	1	24.82 1/	23.13	-1.69	11	24.58 1/	22.40	-2.18	19	-0.86
Chillicothe	17.34	17.55	+0.21	4	36.86	36.32	-0.54	5	31.32	32.22	+0.90	1	+0.19
Bushland	---	---	---	-	26.19	24.00	-2.19	15	11.63	10.52	-1.11	11	-1.65
Stillwater	17.48	15.20	-2.28	2	36.45	34.12	-2.33	11	25.04	22.80	-2.24	16	-2.28
Cherokee	---	---	---	-	30.02	28.53	-1.49	11	28.86	26.16	-2.70	13	-2.10
Woodward	38.44	36.78	-1.66	14	18.14	15.43	-2.71	19	30.99	29.12	-1.87	11	-2.08
Manhattan	39.25	40.03	+0.78	2	31.76	29.05	-2.71	11	55.66	50.58	-5.08	17	-2.34
Hays	21.36	21.13	-0.23	2	53.76	53.22	-0.54	3	34.58	29.48	-5.10	19	-1.96
Colby	---	---	---	-	---	---	---	--	36.08	33.86	-2.22	9	---
Akron	22.25	22.90	+0.65	1	29.22 1/	28.37	-0.85	8	40.04	38.20	-1.84	9	-0.68
Ft. Collins	47.47	49.23	+1.76	5	32.34 1/	33.33	+0.99	4	64.31 1/	68.12	+3.81	3	+2.19
Hesperus	56.88	46.78	-10.10	18	26.86	23.73	-3.13	10	50.15	48.38	-1.77	8	-5.00
Ames	36.70	1/37.43	+0.73	4	32.24	29.02	-3.22	17	---	---	---	--	-1.25
Lincoln	44.44	45.93	+1.49	3	29.37 1/	30.10	+0.73	4	50.48	48.52	-1.96	7	+0.09
North Platte	38.70	35.33	-3.37	12	37.37	36.13	-1.24	13	36.71	34.00	-2.71	16	-2.44
Alliance	20.40	19.28	-1.12	12	30.85 1/	24.72	-6.13	8	37.75	38.50	+0.75	7	-2.17
Av. of items	32.76	31.85	-0.91	6	31.75	29.95	-1.80	10	37.21	35.52	-1.69	11	-1.49

1/ Stem rust present.

SUMMARY OF AGRONOMIC DATA

A summary of agronomic data other than yield for 1948 appears in table 22. The earliest varieties to head and ripen were Triumph and Early Blackhull. These entries were earlier than Kharkof and Turkey by a full week. Most of the varieties fell in about the middle of the range. The tallest variety was Blue Jacket which averaged 34.4 inches and the shortest one was Triumph which averaged 28.8. Other varieties under 30 inches were Pawnee, Cimarron, C.I. 12135, and C.I. 12505. Lodging averages revealed that Cimarron, C.I. 12148, and Blue Jacket had the strongest straw. This grouping bears no relationship to height. Weakest straw appeared in Turkey, C.I. 12147, and C.I. 12146. Shattering at two stations was high on Pawnee, C.I. 12142, C.I. 12148, and C.I. 12149. Leaf rust readings at two stations were low with Hope, Fronteira, and Marquillo hybrids, as a group, having the best resistance. Weight per bushel averages of 60 pounds or higher were registered by eight varieties. The heaviest entry was Cimarron, followed closely by Blue Jacket. The lowest average was 58.2 pounds for C.I. 12135 with C.I. 12503 and C.I. 12141 nearly as low. The total range from low to high covered 3.8 pounds per bushel. The same varieties occupied the extremes of the range in test weight in 1947 but the difference between them was 5 pounds.

Table 22.—Summary of agronomic data other than yield for the varieties grown in the uniform yield nursery in the hard red winter wheat region in 1948.

Variety	C.I. No.	Date Headed May	Date Ripe June	Av. Ht. Ins.	Lodging %	Shattering %	Leaf rust %	Weight per bushel Lbs.
Kharkof	1442	23	30	32.6	28	3	10	59.4
Blackhull	6251	20	29	32.7	23	8	10	60.4
Ea. Blackhull	8856	15	25	31.8	23	11	6	60.2
Pawnee	11669	19	27	29.9	13	18	7	59.4
Comanche	11673	19	27	31.1	23	3	5	59.5
Blackhull x Chey.	12101	21	29	31.0	16	3	6	60.4
Westar	12110	19	29	32.4	10	4	3	59.6
Cimarron	12120	17	27	29.8	7	3	7	62.0
Kv.-Mqo. x Kv.-Tq.	12128	20	28	30.4	16	8	3	59.8
Triumph	12132	14	23	28.8	18	3	5	60.5
Chiefk. x Oro-Tenq.	12133	18	27	30.4	15	T	5	60.7
Kan. x Hope-H.Fed.	12135	20	29	29.9	30	T	9	58.2
Oro x Med.-Hope	12140	21	29	32.3	20	3	1	59.2
Med.-Hope x Pawnee	12141	19	28	30.1	10	3	1	58.7
Chey. x Turkey	12142	22	30	30.6	31	26	9	59.0
Comanche D. Cr.	12145	20	29	30.6	17	3	2	59.6
Martin-Tq. x Chiefk.	12146	18	27	31.4	33	3	5	59.0
Martin-Tq. x Khar.	12147	21	28	31.6	35	T	5	59.0
Chiefk. x Oro-Tq.	12148	17	26	30.4	9	13	2	60.4
Kv.-Tenq. x Com.	12149	19	28	31.5	21	13	1	59.4
Col. Turkey	12150	23	30	32.8	38	3	10	59.6
Nebr. 60 x Med.-Hope	12500	19	28	30.0	16	T	2	59.3
Compound Hyb.	12501	23	30	31.4	21	9	17	58.9
Blue Jacket	12502	20	29	34.4	9	T	13	61.2
275 D. Cr.	12503	18	28	31.4	23	1	1	58.6
275 D. Cr.	12504	21	29	31.4	27	T	1	59.4
Mqo.-Oro x Oro-Tq.	12406	19	29	30.5	15	5	1	59.4
Mqo.-Oro x Pawnee	12505	20	29	29.1	10	1	3	59.8

UNIFORM WINTERHARDINESS NURSERY

The data of special interest reported on the uniform winterhardiness nursery have been brought together in Table 23. Complete winterkilling destroyed the nursery at St. Paul and unfavorable seedbed conditions at Dickinson prevented sowing the nursery at that station. Permission to use survival data taken at the Alberta, Canada, station is gratefully acknowledged.

Winterkilling most clearly differentiated the varieties at Brookings. Marmin and Minturki hybrids were the most hardy. These were the only ones worth harvesting but any differences in yield probably are not statistically significant. At Laramie the survivals ranged from 19 to 98 per cent with Minnesota strains comprising the most hardy group. Very little winterkilling occurred at Lethbridge, Alberta, none at Alliance and only a few per cent at Havre. Yields at Alliance were quite variable among the replications and have little or no value. At the Havre station, yields ranged from 8.7 to 19.4 bushels to the acre where Minturki ranked first followed by Kharkof, Minhardi, Yogo x Oro, H44 x Minturki^3 (Minn. 2784), Minter, and C.I. 12108.

The supplementary winterhardiness nursery of 100 strains was planted in single 8-foot rows at 6 stations with differential data recorded at Alliance and Moccasin. No results are tabulated here.

Table 23. Summary of data for the Uniform Winterhardiness Nursery grown in the Northern district in 1948. (Three plots of rod rows at each station).

Variety or Cross	C.I. or Sel. No.	Av. Wt. per Bushel	Average survival at				Average acre yield at		
			Brook-ings	Lar-amie	Leth-bridge	All Sta.	Brook-ings	All-iance	Havre
		Lbs.	%	%	%	%	Bu.	Bu.	Bu.
Number of stations - - - - - - - - - -		2	-	-	-	3	-	-	-
Minturki	6155	59.2	29	89	100	73	29.8	31.2	19.4
Kharkof	1442	60.5	1	68	100	56	---	38.1	17.2
Minhardi	5149	58.7	57	97	100	85	19.8	33.6	17.0
Minter	12138	60.1	39	76	100	72	30.7	28.6	16.5
Yogo	8033	59.1	23	96	100	73	31.9	32.4	14.5
Nebred	10094	60.5	18	79	100	66	31.2	46.1	13.7
Turkey x Turkey-Chey.	N.383130	59.6	21	74	99	65	23.2	39.1	12.1
Cheyenne x Turkey	12142	59.5	2	83	100	62	---	45.9	12.5
Chey. x Hung. Sel.	N.403858	59.6	3	89	100	64	---	42.3	14.3
Hung. Sel. x Nebred	12507	59.0	2	61	97	53	---	35.3	11.9
Mqo. x Oro	K.383464	59.5	1	79	94	58	---	39.1	11.1
Chiefk. x Chey.	N.422123	59.5	26	86	100	71	24.4	41.7	15.4
do	N.422121	60.4	12	79	100	64	---	33.5	15.3
Compound Hybrid	12501	59.8	2	76	---	--	---	44.6	15.2
Kan. x Minhardi	11726	59.9	17	98	100	72	18.8	39.2	13.6
Mont. 36 x Bel.-Kan.	12108	60.5	2	54	100	52	---	37.1	16.0
Yogo x Oro Mont. Sel.	5	59.9	9	93	100	67	---	30.0	16.9
Col. Turkey	12150	59.7	4	63	75	47	---	40.0	13.2
Chey. x Tenmarq	11972	60.0	0.3	38	100	46	---	40.9	11.4
Nebr. 60 x Med.-Hope	12500	59.2	7	19	100	42	---	38.4	12.2
H.F. - Marq.[2] x Kan.	C.A340	57.9	0	21	93	38	---	32.4	8.7
H44 x Mint.[3]	12519	---	41	--	100	--	30.3	33.3	---
do	M.2784	58.7	40	93	100	78	24.5	26.9	16.8
Tk.-Tenq.-Chey. x Tk.	12523	60.0	4	94	98	65	---	46.4	11.2
Hope-Tk. x Chey.	N.436333	60.4	0.3	20	99	40	---	33.6	12.7
do	NP44552	59.2	1	75	99	58	---	37.4	10.9
Hope x Chey.[2]	N.45904	60.2	1	68	93	54	---	33.5	10.7
Hope x Mint.[2]	12506	59.9	28	88	100	72	30.5	36.1	15.7
Marmin x H44-Minh.	12508	59.0	43	98	100	80	26.2	30.4	12.1
do	12520	58.8	56	98	100	85	30.4	31.3	13.4
do	M.2785	58.7	47	--	100	--	40.3	31.4	11.7
Mint. x H44-Mint.	12509	59.2	12	--	100	--	25.6	37.3	12.2

Preliminary Report of Results Obtained in Winter Wheat Uniform Rust Nurseries in 1948.

H. A. Rodenhiser

The following is a summary report of results obtained in the 1948 winter wheat uniform rust nurseries in cooperative studies conducted by members of the Divisions of Cereal Crops and Diseases and Plant Disease Control, U. S. Department of Agriculture and State Agricultural Experiment Stations. It is preliminary to a more complete one in which the data will be presented as the basis of coefficients of infection and will contain information on the physiologic races identified from the rust collections made in the different nurseries.

The 1948 winter wheat uniform rust nurseries comprised 11 soft red varieties and selections, 5 that were semi-hard red and 15 hard red. They were grown at 27 different stations, In table 1 there are presented stem rust data obtained on these wheats at 15 stations where sufficient rust developed to show differential reactions. The averages for the soft red wheats ranged from 1 to approximately 44 percent infection. Trumbull^2-Red Wonder-Steintim was the most resistant of the group and Trumbull x Frondoso next in line with an average of 9 percent infection. Heretofore this wheat has shown a higher degree of resistance than was evident this year when 50 percent infection was recorded for the selection in tests at Lincoln, Nebraska. Trumbull^{2}x Wabash-Hope-Hussar was somewhat intermediate in reaction with an average for all stations of 12 percent. Five semi-hard red wheats were tested of which Hope-Hussar-(3.8 percent) was the most resistant and Hussar (41.2 percent) was the most susceptible. Average infection percentages in the hard red group ranged from .4 for the most resistant selection, Comanche x (Med.-Hope) to 29.7 for Kharkof the most susceptible. Three wheats, in addition to the former, had low averages of less than 2 percent and at no individual station did they develop over 10 percent infection. These wheats were (Hd. Fed.-Kv.) x (Med.-Hope), Comanche x Hope-Hussar and Med.-Hope x Pawnee.

The leaf rust data are presented in table 2. On the whole the leaf rust epidemics in the nurseries were exceptionally good and data were obtained from 20 of the 27 nurseries planted. Trumbull x Frondoso was the most resistant of the soft red wheats tested with an average of 3.2 percent infection for all nurseries. Trumbull x Hope-Hussar and Trumbull^2-Red Wonder-Steintim were next in order with percentages of 10.3 and 11.6, respectively. Fulcaster with 46.5 was the most susceptible of the group. The 5 semi-hard red wheats tested reacted essentially the same as for several years with Hussar the most resistant of the group (12.3 percent) and Minturki (40.0 percent) the most susceptible. Average infection percentages for the hard red winter wheats ranged from 2.8 for Comanche x (Med.-Hope) to 32.1 for Kharkof the most susceptible. In addition to the former 5 wheats averaged less than 10 percent infection namely, Oro x Med.-Hope (3.2), (Kawvale-Marquillo) x Kawvale-Tenmarq (5.9) (Hd. Fed.-Kv.) x (Med.-Hope) (6.3),

Med.-Hope x Pawnee (6.4) and Marquillo-Oro x Oro-Tenmarq (7.6). Each of these, however, had fairly high percentage of infection at at least one of the stations.

A few wheats had fairly low average percentages of infection to both leaf and stem rust. Of the soft reds Trumbull x Frondoso and Trumbull-Red Wonder-Steintim had the best performance records. Of the hard red wheats Comanche x Med.-Hope, Oro x Med.-Hope and (Hd. Fed.-Kv.) x (Med.-Hope) were the most outstanding for combined resistance to both rusts.

Table 1.--Severity of stem rust infection on winter wheat varieties grown in Uniform Rust Nurseries in 1948.

Variety or Cross	C. I. Number	Percent severity of stem rust at: Manhattan, Kans.	Stillwater, Okla.	Denton, Texas	College Station, Texas	Lincoln, Nebr.	Madison, Wis.	East Lansing, Mich.	Urbana, Ill.	Lafayette, Ind.	Vincennes, Ind.	Wooster, Ohio	Wolf Creek, W. Va.	Wythe-ville, Va.	Quincy, Fla.	Fayette-ville, Ark.	Average
Soft Red																	
Trumbull^2-Red Wonder-Steintim	12559	T	1	T	5	5	--	0	T	T	2	0	T	T	T	0	1.0
Trumbull x Frondoso	12461	5	1	T	10	50	--	--	0	T	10	0	20	10	2	0	9.0
Trumbull^{2}x Wabash-Hope-Hussar	12456	5	0	5	10	40	10	T	T	T	10	0	20	35	25	20	12.0
Trumbull^{3}x Hope-Hussar	12457	65	5	75	20	20	25	T	5	20	50	0	50	40	65	20	30.7
Wabash	11384	65	2	80	20	50	45	7	15	35	50	5	70	60	40	20	37.6
Trumbull	5657	60	10	80	25	65	--	T	10	35	50	5	90	50	65	20	40.4
Mediterranean	3332	65	3	85	35	40	40	4	10	35	50	5	80	50	65	20	39.1
Fulcaster	6471	60	4	80	20	75	40	1	10	35	50	0	90	40	65	20	39.3
Trumbull x Hope-Hussar	12458	65	3	80	15	75	45	7	10	35	60	5	65	75	40	20	40.0
Trumbull x (W38 x Fultz-Hung. 128)	12530	60	12	65	25	65	45	2	5	25	60	0	80	70	100	20	42.3
" x " x " "	12454	60	15	50	15	75	35	3	20	25	60	0	95	80	100	20	43.5
Semi-hard Red																	
Hope-Hussar	11682	T	3	T	5	5	15	T	0	T	2	0	T	1	25	T	3.8
Minturki	6155	5	5	60	30	50	5	T	T	1	35	5	65	20	T	T	18.8
Harvest Queen x Kawvale	12284	50	2	50	35	60	10	T	T	1	25	0	25	30	25	T	20.9
Kawvale	8180	20	8	40	15	30	8	T	0	5	35	0	85	25	40	10	21.4
Hussar	4843	65	15	70	20	60	30	15	5	25	75	0	98	80	40	20	41.2
Hard Red																	
Comanche x (Med.-Hope)	12329	T	0	T	2	T	T	0	0	T	2	0	T	T	T	T	.4
(Hd. Fed.-Kv.) x (Med.-Hope)	12459	T	0	T	5	5	T	T	0	T	1	0	T	T	T	T	.9
Comanche x Hope-Hussar	12405	T	1	T	1	3	1	0	5	T	2	0	T	T	5	0	1.3
Med.-Hope x Pawnee	12141	T	1	T	5	2	3	0	0	T	5	0	T	1	T	10	1.9
Marain x H44-Minhardi	12508	2	0	T	5	15	1	T	0	T	2	5	T	T	10	0	2.7
Oro x Med.-Hope	12460	T	0	T	10	5	--	T	0	T	25	0	T	1	T	0	3.0
H44-Minhardi x Minturki	12509	2	2	T	5	10	5	T	T	T	2	0	1	2	25	0	3.7
Marquillo-Oro x Oro-Tenmarq	12407	T	1	5	30	T	5	0	T	T	15	0	T	T	T	0	3.8
Nebred x Med.-Hope	12404	T	2	5	10	10	8	0	0	T	2	0	T	T	25	0	4.2
Marquillo-Oro x Oro-Tenmarq	12406	2	3	10	35	5	1	T	0	T	2	5	T	T	T	0	4.3
(Kawvale-Marquillo) x Kawvale-Tenmarq	12331	T	3	40	15	5	50	T	5	5	25	0	65	5	T	T	14.6
Kanred	5146	10	5	60	25	65	15	T	5	10	15	0	40	25	5	T	18.7
Malakof	4898	20	10	60	40	15	25	T	5	10	25	5	65	20	40	T	22.7
Wester	12110	40	5	80	35	40	40	1	20	25	10	5	65	25	15	T	27.1
Kharkof	1442	50	10	65	35	50	20	T	0	20	25	5	60	65	40	T	29.7

Table 2. Severity of leaf rust infection on winter wheat varieties grown in uniform rust nurseries in 1948

Variety or Cross	C. I. Number	Percent severity of leaf rust at: Manhattan, Kans.	Stillwater, Okla.	College Station Tex.	Columbia, Mo.	Lincoln, Nebr.	Madison, Wis.	East Lansing, Mich.	Urbana, Illinois	Vincennes, Ind.	Bedford, Ind.	Lexington, Ky.	Wolf Creek, W. Va.	Whytheville, Va.	Raleigh, N. C.	Westminster, S. C.	Experiment, Ga.	Quincy, Florida	Hartsville, S. C.	Beltsville, Md.	Fayetteville, Ark.	Average
Soft Red																						
Trumbull x Frondoso	12461	T	0	10	3	15	--	--	3	T	T	2	15	T	0	5	T	T	T	T	--	3.2
Trumbull x Hope-Hussar	12458	T	3	15	1	15	70	1	T	T	T	T	40	25	T	10	T	5	T	T	20	10.3
Trumbull^2- Red Wonder-Steintim	12559	5	5	10	T	30	--	T	20	25	15	20	25	30	T	25	5	T	T	5	T	11.6
Trumbull x (W38 x Fultz-Hung. 128)	12530	T	0	40	1	10	50	0	10	10	T	10	50	30	T	5	T	5	10	T	10	12.1
Wabash	11384	T	2	50	3	10	40	T	45	35	5	90	25	15	2	10	T	5	1	50	20	18.9
Trumbull x (W38 x Fultz-Hung. 128)	12454	2	3	30	1	20	50	0	15	10	T	60	20	90	2	5	T	65	10	T	50	21.7
Trumbull^3 x Hope-Hussar	12457	T	8	15	25	25	40	2	10	5	50	80	95	70	20*	5	T	10	5	1	50	25.8
Trumbull^2 x Wabash-Hope-Hussar	12456	5	5	15	30	40	55	0	15	75	10	100	40	80	2	10	T	40	5	50	50	31.4
Mediterranean	3332	15	10	20	50	55	40	20	20	100	50	100	65	20	40	10	10	25	5	80	50	39.3
Trumbull	5657	25	5	30	60	40	--	25	30	100	100	100	60	30	40	40	5	40	10	85	50	46.1
Fulcaster	6471	25	25	40	70	55	50	30	20	100	90	100	40	25	40	25	10	40	10	85	50	46.5
Semi-Hard Red																						
Hope-Hussar	11682	2	2	5	5	40	15	T	T	5	15	10	50	80	T	5	T	10	T	1	T	12.3
Hussar	4843	10	8	50	5	35	50	T	5	10	15	10	25	95	1	5	T	65	5	10	20	21.2
Kawvale	8180	10	10	10	10	45	40	10	15	75	75	80	60	40	2	5	T	10	T	60	20	28.9
Harvest Queen x Kawvale	12284	10	2	30	8	65	40	15	30	85	25	100	30	60	T	10	10	5	T	85	20	31.5
Minturki	6155	40	5	40	35	75	45	20	10	90	75	60	75	65	15	25	T	25	T	80	20	40.0
Hard Red																						
Comanche x (Med.-Hope)	12329	T	5	5	2	30	1	T	0	T	T	T	5	T	0	5	T	T	T	T	0	2.8
Oro x Med.-Hope	12460	T	2	5	3	10	--	T	0	2	T	T	30	5	0	5	T	T	T	T	T	3.2
(Kawvale-Marquillo) x Kawvale-Tenmarq	12331	T	0	5	5	25	25	T	T	25	5	5	2	10	0	0	T	T	T	10	T	5.9
(Hd.Fed.-Kv.) x (Med.-Hope)	12459	T	T	5	1	10	15	T	T	T	1	10	50	30	0	0	T	T	T	T	T	6.3
Med.-Hope x Pawnee	12141	T	5	10	20	20	8	T	T	2	T	2	5	10	T	25	T	T	T	T	20	6.4
Marquillo-Oro x Oro Tenmarq	12407	T	8	10	1	10	15	4	5	T	T	30	15	30	0	5	10	T	T	2	5	7.6
" " x " "	12406	T	3	10	T	10	15	1	5	5	10	60	30	40	0	5	T	5	T	1	10	10.5
Comanche x Hope-Hussar	12405	T	5	5	15	30	15	T	T	2	5	30	20	80	0	5	5	2	T	T	5	11.3
Nebred x Med.-Hope	12404	2	5	1	15	40	10	T	T	15	T	5	60	65	0	5	T	2	T	T	5	11.6
Westar	12110	T	5	1	3	10	60	1	20	25	5	80	60	70	0	0	T	T	T	20	5	18.3
H44-Minhardi x Minturki	12509	25	8	5	15	50	10	T	5	25	75	60	30	75	T	10	T	T	T	T	25	21.0
Malakof	4898	15	5	60	45	40	30	2	10	10	35	50	98	25	1	5	10	25	T	10	20	24.8
Kanred	5146	5	8	30	8	35	25	5	5	75	25	90	80	30	T	25	5	5	T	60	5	26.1
Marvin x H44-Minhardi	12508	20	10	15	25	40	50	3	5	25	75	60	65	40	1	25	5	T	T	10	50	26.2
Kharkof	1442	25	8	60	30	60	25	2	10	95	75	100	10	60	T	10	5	25	T	40	10	32.1

*Segregating

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering

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SUMMARY OF RESULTS OF THE GREAT PLAINS UNIFORM WINTER WHEAT BUNT NURSERIES, 1948

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The Great Plains uniform winter wheat bunt nurseries were continued in 1948 in the same manner outlined in the reports for the 5 preceding years. Nine nurseries were sown and results were obtained in all except that sown at Beltsville, Md. All of the nurseries from which data were obtained were in the hard red winter wheat growing area and each represented either a state or an area comprising parts of several states with similar climatic and cropping conditions. Very heavy infections were obtained in the ordinary bunt nurseries at Bozeman, Montana and Manhattan, Kansas, and fairly good infection was obtained at Stillwater, Oklahoma, North Platte, Nebraska, and Fort Collins, Colo., but very light infections occurred at Denton, Tex., and Lincoln, Nebr. Unfavorable seedbed and weather conditions were responsible for low infections at those two stations.

The dwarf bunt nursery was sown at Spring Hill, Mont., in an area where that type of bunt was known to be abundant and on soil that was naturally infested. Clean seed was sown in that nursery so all infection resulted from soil-borne inoculum. Infections of dwarf bunt were only moderately heavy and in many selections there was a great difference in severity in the two replications.

A total of 55 varieties and selections were grown in 8-foot rows in 2 replications at each station in 1948. The composites of inoculum for the ordinary bunt nurseries were prepared at Manhattan, Kans., and sent to Lincoln, Nebr., where the seed was assembled, inoculated, and sent to the various stations for sowing. As usual, the inoculum consisted of a composite of approximately equal parts of the physiologic races known to occur in the state or area each nursery represented. Inoculum of the physiologic races was furnished by C. S. Holton, Pullman, Wash. Only races of *Tilletia foetida* were used for stations in Texas, Oklahoma, Kansas, Nebraska, and Colorado, while a mixture of races of *T. foetida* and *T. caries* was used for the nursery at Bozeman, Mont. The soil-borne dwarf bunt inoculum at Spring Hill, Mont., is a race of *T. caries*. Infection counts

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Plant Industry Station
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were made either by cooperators at the stations or by L. P. Reitz at the time of his visit to the station. The data were assembled and tabulations were made at Manhattan, Kans.

The data obtained are presented and summarized in Table 1. For clarity and ease of tabulation the percentage of infection for each selection at each station is given as a whole number, all fractions below 0.5 having been disregarded, while the whole number was raised by one unit when fractions were 0.5 or greater. It is obvious that the data from Lincoln, Nebr., and Denton, Tex., where the susceptible Kharkov, Cheyenne, and Red Chief checks had low infections, are of little worth in evaluating the resistance of newer hybrid lines. At those stations many of the latter had no infection or only traces. It also is clear that the infections at Fort Collins, Colo., were unusually low for that station. Furthermore, it is surprising that the presence of physiologic race 18 in the inoculum at Fort Collins did not have the usual effect of causing some selections to have a susceptible reaction there while they were resistant at stations where the race 18 was not used. As a matter of fact, except for differences due to the level of infection at the various stations, the reaction of the strains was about the same. In most cases, at all stations where only races of T. foetida were used in the inoculum, the sharpest differences and probably the most reliable data were obtained at Manhattan, Kans. It is notable that the presence of 110 in the inoculum used at Stillwater, Okla., had little effect in 1948. In other years that race occasionally has heavily infected some selections that were resistant in Texas, Kansas, and Nebraska. At most of the stations south of Bozeman, Mont., most of the selections, aside from the susceptible checks, were resistant. Notable exceptions are 275 Doubleross C. I. 12503, Kawvale Gunning x Comanche (C.I. 12149), Comanche x Mediterranean-Hope K. 3801, Comanche x Oriental K.45309, Blackhull-Oro x Pawnee W.4381-84, Comanche x Cheyenne-Blackhull W.4616-85, H44-Minhardi x Mainin M.2768, H44 x Minturki M.2784, and Minturki x H44-Minhardi M.2786.

Infections were very heavy at Bozeman, Mont., and most of the selections were susceptible. Edit, with 18 percent infection, was the only named variety that showed much resistance. However, 6 unnamed hybrid selections showed high resistance. These were four selections from the cross Marquillo-Oro x Oro-Turkey-Florence, one selection of Oro x Oro-Turkey-Florence, and one of Marquillo-Oro x Hussar-Hohenheimer. All of these were developed in Kansas where they have been selected for resistance to many races of T. foetida and T. caries. Early generations were tested for resistance to several races in Colorado, Montana, and Washington. It is encouraging that all but one of them also were highly resistant to dwarf bunt.

In 1947 the uniform bunt nursery at Bozeman failed and heavy infections occurred only at Stillwater, Okla., and Fort Collins, Colo. This resulted in a low average infection of only 8.4 percent for all nurseries. In 1946, however, very heavy infections were obtained at Bozeman and even though low infections occurred at several other stations, the average for all stations was 14.7 percent. In 1947 there were 21 selections with average infections below 1 percent for all stations, while in 1948 there were only four selections with average infections below 1 percent.

Table 1 shows that 16 selections had average infections below 10 percent in 1948. If that level is accepted as the upper limit for an acceptable degree of resistance, 29 percent of the selections in the nursery (including the standard testers Oro, Ridit, Nebred, and Relief) had promising resistance to bunt. The most resistant selection was Marquillo-Oro x Hussar-Hohenheimer K.47B52 with only 0.1 percent average infection while the highest infection was obtained on Red Chief, the most susceptible of the check varieties.

Thirty-one of the selections in the 1948 bunt nursery also were grown in the 1947 uniform bunt nursery. The 2-year average infections for those selections are shown in Table 1. Hussar, Ridit, and Relief had the lowest 2-year averages although 23 others had average infections below 10 percent. A total of 10 selections have been grown for the 5-year period 1944-48, inclusive. All were named varieties and all but Kharkof, Cheyenne, and Red Chief showed promising resistance for the period. Relief was the most resistant, closely followed by Hussar. Only 7 varieties have been grown in the nursery continuously for the 17-year period 1932-48. These also were all named varieties. Hussar had the lowest average infection with Nebred in second place. Five of the seven selections maintained their resistance for the full 17 years.

It has been mentioned that there were wide variations in the reaction of many selections in the two replications of the dwarf bunt nursery at Spring Hill, Mont. For that reason the figures in Table 1 showing only moderate infections of dwarf bunt are subject to question. It is felt, however, that the high and low averages are reliable indices of susceptibility and resistance. The most resistant selection was Oro x Oro-Turkey-Florence K.47B167. All but one of the selections involving Oro-Turkey-Florence and Hussar-Hohenheimer had a very promising degree of resistance to dwarf bunt. In addition to those the selections Chief-Kanix-Martin-Fenaro (C.I. 12146), Marquillo-Oro x Pawnee K.45R2024, and Hussar (C.I. 4843) also exhibited a promising degree of resistance to dwarf bunt. Owing to the fact that clean seed was sown and infection was due to soil-carried infection, and also due to the limited distribution of dwarf bunt in the area, the dwarf bunt figures were not included in calculating the average infections for 1948 shown in Table 1.

Table 1. Summary of bunt infection in 55 varieties and selections of winter wheat grown in the Great Plains uniform winter wheat bunt nurseries at 7 stations in 1948 and average infections for various periods from 1932 to 1948.

Variety or Cross	C.I. or Selection No.1/	Ordinary bunt: Average percent bunt at - Denton, Tex.	Stillwater, Okla.	Manhattan, Kans.	Lincoln, Nebr.	North Platte, Nebr.	Fort Collins, Colo.	Bozeman, Mont	1948 Av.	Weighted average: 1947 and 1948	1944 to 1948	1932 to 1948	Dwarf bunt: Spring Hill, Mont.
Mqo.-Oro x Hussar-Hohen.	K47B52	0	T	0	0	0	T	1	0.1	--	--	--	3
Oro x Oro-Turk.-Florence	K47B167	0	0	0	0	0	0	2	0.3	--	--	--	0
Mqo.-Oro x Oro-Turk.-Florence	K47B8	0	T	0	0	0	0	2	0.3	--	--	--	2
do	K47B7	0	0	0	0	0	0	4	0.6	--	--	--	8
do	K47B4	0	0	0	0	0	0	7	1.0	--	--	--	4
do	K47B3	0	0	0	0	0	0	10	1.4	--	--	--	3
Ridit	5703	0	6	8	0	0	1	15	4.3	2.8	8.8	5.4	18
Relief	10082	T	T	4	0	0	0	28	4.6	2.6	2.1	--	1
Hussar	4843	0	0	6	0	0	1	26	4.7	2.5	2.8	2.9	2
Hope-Turkey x Turkey 11530	K44767	0	T	3	T	3	3	35	6.3	3.8	--	--	8
Nebred	10094	1	4	4	T	1	3	33	6.6	5.6	6.2	3.9	38
Oro x Medit-Hope	12460	0	T	2	T	1	2	43	6.9	4.3	--	--	10
Mqo.-Oro x Pawnee	12505	T	4	9	2	T	2	40	8.1	--	--	--	23
do	K45R2024	0	2	4	2	T	1	50	8.4	8.8	--	--	3
Blackhull-Oro x Pawnee	W43h1-89	T	1	2	0	T	3	55	8.7	4.8	--	--	48
Oro	8220	T	4	6	0	T	2	55	9.6	5.5	6.9	7.7	18
Hope-Turkey x Cheyenne	M436333	T	2	3	2	1	2	63	10.1	5.6	--	--	40
Comanche Doublecross	T171-44-82	0	0	2	0	0	1	68	10.1	--	--	--	33
Blackhull - Oro x Pawnee	W43h1-400	0	0	0	0	T	5	73	11.1	9.4	--	--	15
Comanche Doublecross	12145	T	1	1	T	T	4	73	11.3	6.4	--	--	14
do	T171-44-159	0	2	4	T	1	10	65	11.7	--	--	--	15
275 Doublecross	12594	0	0	0	T	0	6	78	12.0	--	--	--	15
Comanche x Blackhull-Hd.Fed.	W43h2-315	0	1	0	0	0	15	68	12.0	6.8	--	--	35
do	W43h2-329	0	T	1	T	T	5	80	12.3	8.0	--	--	45
Chiefkan x Oro-Tenmarq	HC46-49	0	0	1	T	0	10	75	12.3	--	--	--	30
Hard Federation-Hybrid	W43h1-399	0	0	2	T	0	5	80	12.4	6.1	--	--	25
Kawvale-Tenmarq x Comanche	K451689	0	8	8	8	2	3	60	12.7	--	--	--	12
Chiefkan x Oro-Tenmarq	HC46-64	0	1	1	T	T	8	80	12.9	--	--	--	40
do	HC46-41	0	T	1	1	T	14	75	13.0	--	--	--	40
275 Doublecross	T172-43-205	0	1	1	T	T	6	83	13.0	7.3	--	--	40
do	T172-43-211	0	T	1	0	0	16	75	13.1	7.2	--	--	28
Comanche x Cheyenne-Blkhull	W43h3-86	0	1	0	2	T	9	80	13.1	--	--	--	55
Chiefkan x Oro-Tenmarq	12148	0	1	2	T	1	10	80	13.4	7.5	--	--	33
Comanche	11673	T	5	9	1	1	4	75	13.6	7.9	8.6	--	11
Chiefkan x Oro-Tenmarq	HC46-52	0	1	1	0	T	11	83	13.7	7.4	--	--	25
do	HC46-53	T	2	2	T	T	7	85	13.7	--	--	--	33
Comanche x Cheyenne-Blkhull	W43h3-81	T	T	2	2	1	8	83	13.7	--	--	--	43
Chiefkan x Oro-Tenmarq	12133	0	1	4	T	2	16	75	14.0	8.0	--	--	43
Comanche x Blackhull-Hd.Fed.	W43h2-123	0	3	2	T	2	8	85	14.3	7.1	--	--	50
Chiefkan x Martin-Tenmarq	12146	0	1	46	T	1	0	53	14.4	8.6	--	--	2
Hope x Minturki[2]	M2724	0	3	16	T	T	1	85	15.0	--	--	--	55
Minturki	6155	T	4	28	0	0	2	75	15.6	9.5	7.8	6.5	23
H44-Minhardi x Marmin	M2785	0	3	19	2	6	4	88	17.4	--	--	--	45
Comanche x Med.-Hope	K2801	0	8	59	1	6	4	65	20.4	11.6	--	--	33
H44 x Minturki[3]	M2784	7	10	43	T	1	5	88	22.0	--	--	--	55
Kawvale-Tenmarq x Comanche	12149	1	14	59	5	4	7	65	22.1	12.0	--	--	18
H44-Minhardi x Marmin	M2758	2	8	45	T	3	5	93	22.3	--	--	--	70
Blackhull - Oro x Pawnee	W43h1-94	1	14	56	5	10	6	80	24.6	6.9	--	--	50
Kharkof	1442	6	9	73	3	18	12	88	29.9	31.3	38.6	40.8	25
275 Doublecross	12503	1	27	71	6	15	21	78	31.3	--	--	--	40
Comanche x Chiefkan	K45309	17	45	73	12	28	28	40	34.7	--	--	--	25
Cheyenne	8885	15	25	74	9	25	27	68	34.7	33.1	40.5	42.9	55
Minturki x H44-Minhardi	M2786	16	34	68	19	35	24	93	41.3	--	--	--	60
Comanche x Cheyenne-Blkhull	W43h3-85	25	47	83	10	36	25	88	44.9	7.2	--	--	55
Red Chief	12109	32	50	95	10	50	80	90	58.1	62.0	67.0	--	25
Station average	12109	2.2	6.5	18.3	1.9	4.7	8.2	61.5	14.7				28.1

1/ Letters preceding selection numbers refer to the stations at which the strains originated as follows: HC= Hays, Kans.; T = Denton, Tex.; N = Lincoln, Nebr.; K = Manhattan, Kans.; W = Woodward, Okla.; M = St. Paul, Minn.
C.I. refers to accession number of the Division of Cereal Crops and Diseases.

DATA FROM THE QUALITY LABORATORY

Grain harvested from the uniform plots and yield nursery was sent by cooperators to the Federal Hard Wheat Quality Laboratory for milling and baking tests. Results available on the varieties grown uniformly at several stations will appear in a separate report.