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L. T. Reitz

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 1947

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By

L. P. Reitz, Agronomist, 1/

Division of Cereal Crops and Diseases

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Contents

1/ The writer wishes to express his appreciation to Dorothy M. Wilson, Agent, and Ruben M. Heermann and Albert Hoffman of Lincoln, Nebraska, for their assistance in assembling the data, making calculations, and typing this report.

EXPERIMENTS IN 1947

The crop of 1947 was the seventeenth one harvested since the present cooperative improvement program was begun in 1930. The results of this work were much in evidence in 1947 on farms over the entire region in the form of new varieties which have emanated from this project. The great increase in superior breeding stock being used at all of the stations is further testimony of success.

This report is patterned after those which preceded it and contains data obtained on the varieties and selections in several uniform tests. In addition to data for the current year, period summaries of certain data have been made.

A program of this kind involves the work and cooperation of a large number of stations and people. Most of the cooperating stations are shown on the accompanying map. The principal workers, agencies, and stations involved in 1947 were as follows:

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
Iowa Park	Substation No. 16	I. M. Atkins, L. E. Brooks
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. Locko
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, ~~L. M. Gloyna~~ A B Erhart

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

COLORADO AGRICULTURAL EXPERIMENT STATION:		
Agronomy		D. W. Robertson
*Akron	U. S. Dry Land Field Station2/	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, ~~H. C. Murphy~~ 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. L. Zook, ~~L. P. Reitz~~ Paul Ehlers
Alliance	Box Butte Experiment Farm	Harold Chapman, L. P. Reitz
WYOMING AGRICULTURAL EXPERIMENT STATION:		
Agronomy		A. F. Vass Dale Bohmont
Laramie	Agricultural Experiment Station	~~Dayton Klingman~~
*Sheridan	U. S. Dry Land Field Station2/	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
NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		T. E. Stoa
Dickinson	Dickinson Substation	~~R. W. Smith~~ 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

A number of changes in personnel occurred during the year as a comparison of the above roster with that in the 1946 report will reveal. New names include H. A. Rodenhiser, long an authority in the field of cereal pathology, who has taken special leadership in rust work. Karl Finney returned to the Hard Wheat Quality Laboratory at Manhattan; he is being assisted by Byron Miller. K. R. Porter is in charge of the cereal work at the Bushland station. T. H. Johnston assists with all of the cereal work in Oklahoma. D. E. Weibel, L. H. Penny, and Don Crumbaker are new assistants at their respective Kansas stations and have already made their presence felt in the smooth operation of local projects. T. E. Haus is similarly

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

effective in Colorado. V. C. Hubbard and M. A. Bell are reunited in the work at Havre.

The persistent drive toward worthwhile goals and the fine cooperation of all workers were the outstanding impressions retained after the writer's first season of work over the region. It is impossible to express adequately the appreciation due those listed above and the many others who contributed to the year's program.

P. B. Dunkle, Superintendent of the station at Denton, passed away May 26. We regret this loss for he was an active supporter of the coordinated wheat program. Men, like trees, are never exactly replaced; another takes his position. The work goes on.

ACCESSION NUMBERS ASSIGNED

The following Cereal Investigation or C. I. numbers of the Division of Cereal Crops and Diseases were assigned to hard red winter wheats of the region during the year.

C. I. No.	Name	State No.
12502	Blue Jacket	----------
12503	(Sel. 29-34-275 x Frontelra) x (Sel. 29-34-275 x Comanche)	Texas No. 172-43-67
12504	do	Texas No. 172-43-210
12505	Marquillo-Oro x Pawnee	Kansas No. 45R2023
12506	Hope x Minturki^2	Minn. No. 2724
12508	Marmin x H44-Minhardi	Minn. No. 2768
12509	H44 x Minturki^2	Minn. No. 2786
12510	Iohardi	Iowa Sel. No. I-M516
12532	H44 x Minturki^2	Minn. No. 2765

NEW VARIETIES

No new varieties were released during 1947. One was named in Iowa preparatory to release in that state in 1948. This variety, called Iohardi, is a selection from a cross between Iobred and Minhardi. It is winterhardy, high yielding, and of good quality according to reports from the Iowa station. Regional data are lacking.

Cimarron was the name assigned by the Oklahoma station to Blackhull x Hard Federation (C. I. 12120). About 1,000 acres of it was grown on the J. C. Brillhart farm near Spearman, Texas. This was badly mixed. By roguing heavily, a few acres were set aside as a seed source for fall plantings and large-scale milling and baking studies. An increase of foundation seed was planted by the Oklahoma station. No release date has been announced. Small increases were made of several experimental hybrids in various states but it would be inappropriate to list them here. BlueJacket appeared this year as another in the series of varieties released by Earl G. Clark, Sedgwick, Kansas. It is similar to Blackhull but appears slightly taller, with stiffer straw, and more intense black striping on the glumes.

Pawnee, Comanche, Wichita, Westar, and Triumph, scarcely new wheats any longer to wheat breeders, made large gains in acreage over the southern and central Plains this year. This trend was predicted by tabulations of seed supplies given in the last three Regional reports. Minter was increased further in Minnesota. It was gratifying to see these fine wheats on thousands and thousands of acres, all doing well in their regions of adaptation. The extra production made possible by the use of these varieties added importantly to the supplies of food for this country and for export. Likewise, and for the first time in the Plains, crop estimators took varieties into account in judging the expected yield.

UNIFORM VARIETIES IN PLOTS

The hard winter wheat region is so large and conditions are so varied that it is divided into three districts, southern, central, and northern, for tests of advanced material. The map which accompanies this report shows the various districts for 1947. On a trial basis, the northern district has been subdivided with northeastern and northwestern districts for 1948. The northeastern area includes Ames, the Minnesota stations, and Brookings while the remaining northern stations comprise the northwestern district.

Each of the stations grows many varieties of local interest in addition to the ones designated as "uniform varieties". The uniform lists for the districts in 1947 and for 1948 are as follows:

Variety	C.I. No.	1947			1948			
		S	C	N	S	C	N.E.	N.W.
Kharkof	1442	x	x	x	x	x		x
Tenmarq	6936	x	x		x	x		
Blackhull	6251	x	x					
Early Blackhull	8856	x			x			
Comanche	11673	x	x		x	x		
Pawnee	11669	x	x		x	x		
Red Chief	12109	x	x		x	x		
Wichita	11952	x	x		x	x		
Westar	12110	x			x			
Cheyenne x E. Blackhull	12122	x	x					
Triumph	12132	x			x			
Cimarron	12120	x			x	x		
Chiefkan x Oro.-Tenq.	12133		x		x	x		
do	12148				x	x		
Kawvale-Mqo. x Kawv.-Tq.	12128				x	x		
Comanche doublecross	12145				x			
Minturki	6155			x			x	x
Yogo	8033			x				x
Marmin	11502			x			x	x
Karmont	6700			x				
Nebred	10094			x				x
Mont. 36-Bel. x Kan.	12108			x				x
Minter	12138			x			x	x
H44 x Minturki^2	12139			x				
Marmin x H44-Minhardi	12508						x	
Hope x Minturki^2	12506						x	
H44 x Minturki^2	12532						x	

The most widely grown varieties are included for the most part in the uniform list but it is obvious that they cannot all be maintained indefinitely. Some of the most promising new strains are included. It is desirable to have new varieties in the uniform plot series in the district of expected adaptation for a year or more before they are released. This gives a wider range of trial of the new strain and permits workers at other stations to become familiar with many of the characteristics of the new variety before it is in the hands of farmers.

Whenever the data on plot experiments with varieties included strains other than those on the uniform list, all have been presented in this report for that station.

PLOT DATA

Data from field plot experiments were received from 25 of the 28 stations in the hard winter wheat region. This indicates that generally favorable conditions prevailed during the crop season. The production of a billion bushels of winter wheat by U. S. farmers in 1947 likewise shows this to have been a favorable year. Good stands were obtained at most of the stations in the fall of 1946 and the wheat made excellent growth on the abundant moisture supplied by fall rains. This protective growth and moisture were of great benefit in bringing the wheat through the dry, cold and windy mid-winter weather in the central and southern Plains. All states in the region received less than normal precipitation in February; seven of the states received 50% of normal or less. Except for Montana, the region was drier than normal all winter. Spring came to the rescue with rain and snow for the central and southern Plains, soaked the topsoil, filled drainage basins, brought floods and caused considerable loss of wheat from drowning in local areas. Hail and tornadic winds caused damage to the crop as heading and maturity proceeded. Temperatures dropped to -15° in north Texas and -31° in central Kansas in January, but snow helped protect much of the wheat and as a result very little winter-killing occurred in this part of the region. Winter survival notes were obtained at several stations in the northern district. Heavy snow late in May caused lodging in western Nebraska and adjacent areas. This was followed by a sharp freeze which caused floret sterility over a large area in northern Kansas and southern Nebraska. Another freeze occurred June 11-13 and was accompanied in some areas by snow. This caused added sterility in Colorado and Nebraska wheat and the snow accentuated lodging.

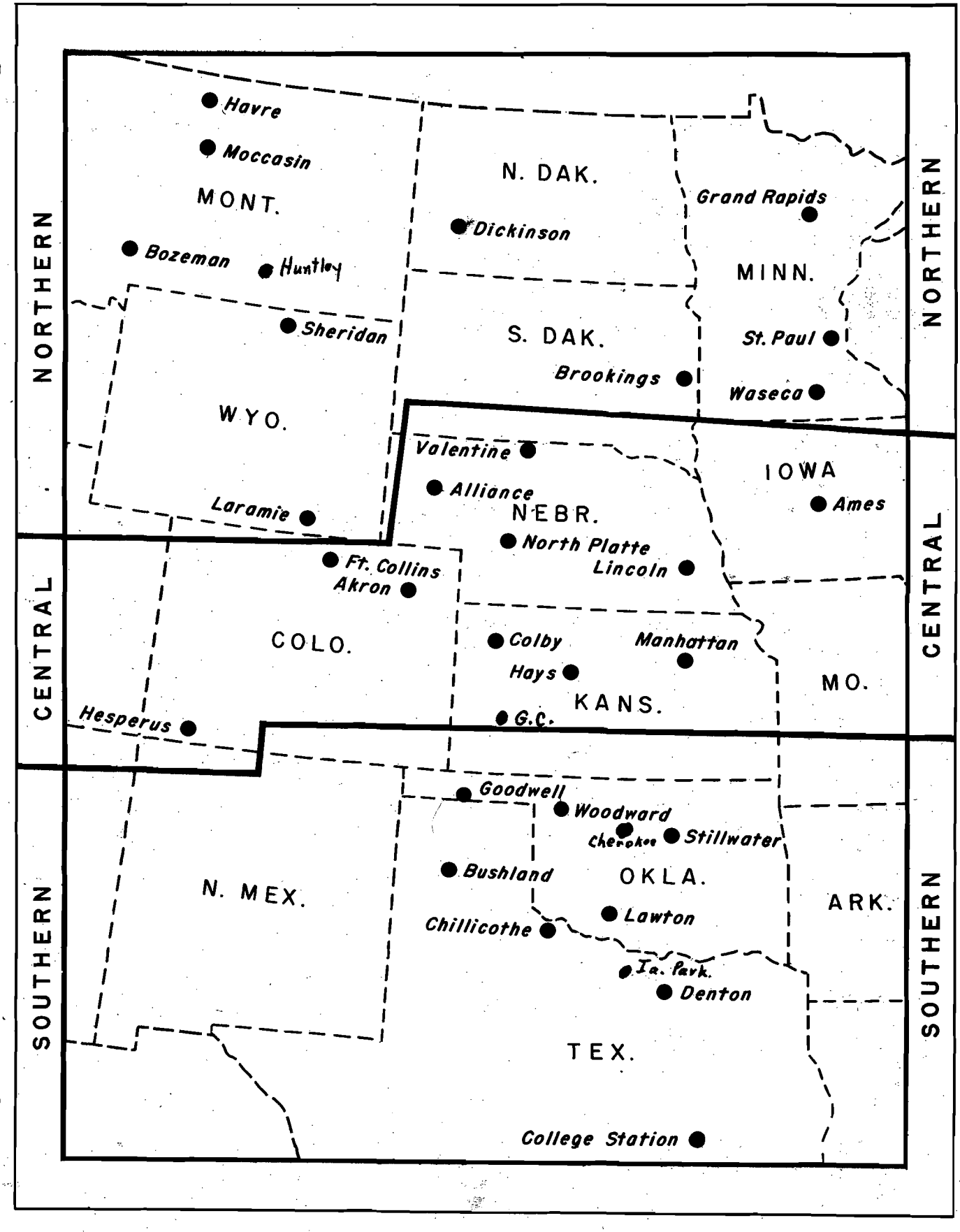
Leaf rust was an important disease in all states in the region with the possible exception of Montana and northern Wyoming. Stem rust was present over a wide area but built up late in the season and caused small loss except locally and at a few stations. Septoria was most severe in the central part of the region and on the more susceptible varieties. Mildew was important early in the spring.

The greenbug, southward especially, and the hessian fly in the central area were the most common insects in commercial plantings. The greenbug was found as far north as northern Nebraska. Hessian fly was most prominent in the general area where Kansas, Nebraska, and Colorado join. Entomologists in Kansas and Nebraska expressed the opinion that the widespread use of Pawnee reduced the fly population in the eastern parts of these states.

Table 1 shows the average data obtained on winter wheat varieties and strains grown in plot tests at each of 25 stations. All varieties reported were included in this table and are listed in order of declining yield for 1947. In addition to the data for the current season, the average yields for various periods of years are shown along with a relative yield in per cent of Kharkof for the entire period of testing since 1930. In table 2 are shown the number of plots, the average yield of all varieties and standard errors of the yields at each station.

Early Blackhull, Comanche, certain new rust resistant hybrids, and several soft wheat selections were highest in yield at Denton. Low yields were made by Fulcaster, Tenmarq, Blackhull and Kharkof. Good differential readings on the rusts were obtained but with some disappointment because of the high leaf rust readings on Pawnee, Comanche, and Westar which have been considered highly resistant. Comanche has the best long time yield record at this station, exceeding the Kharkof check by 47.3% in the 9-year comparison.

In the Iowa Park test a new strain, C. I. 12503, was highest in yield. In fact the first six strains in yield were new unnamed selections. Comanche was the highest yielding named variety. In the two-year comparisons C. I. 12147, C. I. 13504, and Westar gave the best yields. Greenbugs attacked this planting but because of spotted occurrence it was not possible to evaluate varietal resistance; however, late varieties seemed to be affected most.


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

Yields and test weights were high at Chillicothe, Cimarron, Comanche, and several unnamed hybrids exceeded 40 bushels to the acre. Leaf rust notes on two dates are of interest since C.I. 12145 and C.I. 12504 exhibited only trace amounts on both dates. Comanche and Pawnee have the best two-year yield records among named varieties and several of the unnamed strains likewise yielded well.

The varieties were grown at Bushland on ordinary fallow and fall irrigated fallow. Yields were higher on the irrigated fallow but the varietal ranks were similar. Blackhull and Westar gave the best yields in 1947 with Westar, Pawnee, and Comanche showing best in the longer record. Greenbugs attacked this planting and appeared to be responsible for the club-like heads on part of the tillers.

In the Lawton test Comanche and Cimarron were highest in yield and Red Chief and Tenmarq were lowest in 1947, while varieties tested two or more years with resulting high relative yield were C.I. 12122, Comanche, and Wichita. Leaf rust notes taken on two dates show Cimarron, Pawnee, Red Chief in the resistant range on the first date; all had readings of 50% or higher on the second date.

At Stillwater (Perkins Farm), Westar and Cimarron tied for first place in yield but Cimarron exceeded Westar by 2.2 pounds in bushel weight. Leaf rust was rather severe on all varieties. Probably Westar showed the most resistance at least in pustule type, although it did not receive the lowest reading. In the two-year average of yield Pawnee, Westar, and Reliant lead and in averages exceeding two years Pawnee, Comanche, and Reliant have the highest relative yields.

Cimarron, Pawnee and Wichita had the highest yields at Cherokee. Here again, Cimarron demonstrated high test weight by exceeding all other varieties. Lodging notes showed Cimarron, Cheyenne, and Okla. 42 had the stiffest straw. Among the varieties tested for two years, Triumph, C.I. 12122, and Westar led in average yield.

At Woodward, two replications were grown on cropped land and two on fallow and the data combined. In this test C.I. 12122 and Cimarron, which originated from crosses made at this station, were highest in yield; Pawnee was third, and Chiefkan and Blackhull were the lowest yielding. Cimarron again exceeded all varieties in test weight. For longer testing periods C.I. 12122, Pawnee, Wichita, and Comanche appear best in yield.

In the Goodwell test, Cimarron exceeded all varieties in yield and test weight, followed by C.I. 12122 and Wichita. Pawnee yielded least due to thin stands which apparently developed in late spring from an undetermined cause. Greenbugs attacked this planting, but it seems unlikely that this was the cause of loss of stand. Two-year averages give C.I. 12122, C.I. 11972 top rank while three-year or longer records favor C.I. 12122, Wichita, C.I. 11972, Westar, and Comanche.

Records from the central district begin with Manhattan where Westar, C.I. 12141, Ks. 2798, and Pawnee lead in yield. These and seven other selections exceeded 40 bushels per acre. Straw was long, reaching 50 inches in four varieties. Leaf rust was intense. Most resistance was displayed in several Marquillo hybrids and in Westar. Mildew resistance was sharply exhibited in three selections of Mediterranean-Hope x Pawnee. Lodging differences were marked by the wide range of zero and a trace in Ks. 2793, Cheyenne and Kawvale to 70% in Early Blackhull. Best two-year or longer average yields were made by Pawnee, C.I. 12141, Ks. 2788, C.I. 12287, C.I. 12128, and Westar.

At Garden City, C.I. 12133 and C.I. 12122 exceeded 40 bushels to the acre. Straw growth was heavy and tall with one variety reaching 50 inches. Leaf rust ranged from zero on C.I. 12128 and 1% on Westar to 35% on three varieties. A good spread in lodging called attention to Red Chief as a stiff-strawed type. Comanche has the best long-time yield record at this station.

The crop at Hays in the cropland replications was caught at flowering time by the late May freeze. While varietal differences appear, there is no direct or conclusive evidence yet that this reflects physiological resistance to low temperatures. The notes on yellow berry show an interesting relationship to time of maturity.

Eight varieties exceeded 40 bushels to the acre with C.I. 12148, C.I. 12101, Cheyenne, and Pawnee in the lead. All entries exceeded 62 pounds in weight per bushel with six above 65 pounds. Yields based on two or more years favor Pawnee, C.I. 11972, Chiefkan, C.I. 12101, and Comanche.

At Colby C.I. 12133 placed first with a yield of over 40 bushels to the acre. Other varieties with high yields were C.I. 12122, Wichita, and Pawnee. Only two varieties fell below 60 pounds in weight per bushel. Two and three-year yield records favor C.I. 12133, C.I. 12122, and C.I. 12128, all unnamed hybrids; but over the years, Comanche, Pawnee, and C.I. 11972 have performed well in most seasons.

The wheat at Akron was grown after corn and on fallow and the data combined. Pawnee, Blackhull, and C.I. 11972 gave the best yields. The range was from 31.0 to 7.9 bushels per acre. Wichita, Tenmarq, and Alton showed extreme dwarfing of plants to only half or one-third normal height. These varieties and several others earlier showed a mottling on the leaves symptomatic of mosaic. Greenbugs and hessian fly were present in damaging amounts. For the two-year period, C.I. 11972 and Blackhull had the best yields and for the longer periods these varieties with C.I. 12122, C.I. 11970, Comanche, and Early Blackhull gave the most grain per acre.

The wheat at Ft. Collins was affected by frost at blossom time with damage estimated at 20 to 91%. In some replications the grain that did form was largely on late tillers and in heads which escaped. Leaf and stem rust developed and good readings were obtained. It was a surprise to find that yields of eight varieties exceeded 30 bushels to the acre and one went over 40. All test weights exceeded 61 pounds. Highest yields were made by the late varieties, Cheyenne and C.I. 11972, with Colorado selections A149 and 76 and the early selections C.I. 12133 and Pawnee giving good yields also. The two to four-year averages give highest yield ranking to A149, C.I. 11972, Pawnee, and Cheyenne.

At Lincoln the wheat was rank and tall with extensive lodging and high leaf rust infection. Stem rust developed too late to do much damage except on a few varieties. Test weights ranged from 52.8 to 62.7 pounds. Red Chief was highest in test weight, yield, and lodging resistance. Nebraska selection 405304, Pawnee, Comanche, and three other entries exceeded 40 bushels to the acre. Lodging was important in depressing yields because it was impossible to combine such grain as successfully as in the wheat which stood better. Scab and mildew also were present. Yield summaries show that Pawnee, 383464, and C.I. 12501 have the best relative rank although several other varieties have good records.

Pawnee, Cheyenne, C.I. 12122 and Local Turkey gave the best yields at North Platte in 1947. The May freeze damaged Triumph especially but affected other varieties only slightly. Stem rust built up late on the fallow plots. All entries exceeded 60 pounds per bushel. Best relative yields based on three or more years point to C.I. 11972, Wichita, Red Chief, Pawnee, C.I. 12122, Turkey, and Cheyenne.

Six entries exceeded 40 bushels to the acre at Alliance with a Chiefkan x Cheyenne selection surpassing the 50 bushel mark. Several varieties lost in stand over the winter and this was reflected in the yield. Snow and cold weather in late May and June threatened the crop and caused lodging but did not appear to affect yields a great deal. Stem rust came in late but damaged some, maybe all, varieties. C.I. 12142 and C.I. 12501 lead in two and three-year comparisons while Cheyenne, Nebred, and Nebraska 60 have good eight and ten-year records.

The northern district reports begin with Waseca. Four Hope and H44 crosses led in yield this year but the spread in yield was not great. Test weights were above 60 pounds except for one selection. Minter has the best average yield considering all years.

At St. Paul all varieties surpassed 44 bushels to the acre with six entries above 50 bushels. Again test weights were good. The selections differed greatly in leaf rust infection. Based on 1 to 9 years data, C.I. 12509, Minn. 2785, C.I. 12532, C.I. 12506, C.I. 12508, and Minter appear best for yield.

Winterkilling at Grand Rapids overshadowed other factors although stem and leaf rust were prominent. The high error term largely nullified yield differences in a statistical sense. Yields and average survival were related.

Cheyenne exceeded all varieties at Sheridan in 1947 and in the period summaries. Very long straw was produced but only a little lodging was reported.

Yields at Bozeman were 55 bushels to the acre or higher except for Pawnee which yielded 49.8 bushels. Kharkof x Ridit, Nebred, and two selections of Martin x Tenmarq[3] were highest in yield this year. Test weights were high and lodging quite pronounced. Three-year or longer averages of yields show C.I. 11823, C.I. 11804, Nebred, C.I. 11824, and Yogo are highest. Resistance to dwarf bunt make the Martin x Tenmarq[3] selections of special interest.

At Moccasin, Yogo headed the list in yield followed by C.I. 12108, Marmin, Kharkof, and Karmont. Test weights were low. Yogo is the highest yielding variety at this station for comparisons from 1941 to 1947, and Yogo x Oro has the highest two-year record. The Martin x Tenmarq[3] selections appear promising.

The Havre test was subjected to some winterkilling and dry soil in the spring. Karmont and Yogo yielded 20.7 and 18.3 bushels per acre with Nebred in third place. Test weights were low. Yogo has the best long average yield but Karmont, C.I. 11804, and C.I. 12108 also have good records.

STANDARD ERRORS

Standard errors have been calculated for yields where possible. The accuracy of these errors may be open to question since the plots were not randomized at all of the stations. From the agronomic standpoint it is felt that the statistic is of use.

The analysis of variance was used for the 1947 yield data at each station. To obtain the standard error of the mean, 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 for each variety. The standard error of a difference was obtained by multiplying the standard error of a mean by $\sqrt{2}$.

The standard error is also expressed as a percentage of the mean yield. The summary of these standard errors is shown in table 2, together with the number of plots and average yields at each station. In this table a footnote indicates the stations at which nursery plots were used in place of field plots.

Table 1.--Yield and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 25 stations in the hard red winter wheat region in 1947, with average yields for various periods.

Denton, Texas

(Rod-row plots, 8 replications)

Variety	C. I. or Sel. No.	Winter survival	Date Headed	Date Ripe	Ht.	Rust Leaf	Rust Stem	Septoria 1/
		%			In.	%	%	
Early Blackhull	8856	100	4/22	5/26	40	65	0	3
Med.-Hope x Med. 3015-105-1	97-38-7-2	100	4/30	6/3	38	3	0	1
Sel. 29-34-275 Composite Cross	12503	90	4/26	5/26	39	1	0	4
Med.-Hd.Fed. x Med.-Hope	124-40-328	95	4/28	5/30	35	0	0	2
Sel.29-34-275 Composite Cross	172-43-211	100	4/29	6/1	39	2	0	2
Comanche	11673	100	4/27	6/1	37	45	3	3
Med.-Foisy x Med.-Hope	173-43-311	100	4/27	5/30	38	1	6	2
Early Blackhull x Cheyenne	12122	100	4/26	5/31	38	65	T	3
Red May selection	7250-1	100	4/27	5/30	35	38	32	3
Honor-Forward x Med.-Hope	128-43-26	100	4/29	6/2	37	16	2	1
Comanche Double Cross	12145	100	4/27	6/1	37	7	0	2
Cimarron	12120	100	4/28	6/2	33	61	1	4
Sel.29-34-275 Comp. Cross	172-43-205	100	4/28	6/1	37	4	0	2
Mediterranean sel. 3015-81	10086	100	4/28	5/30	39	24	22	2
Clarkan-Hd.Fed. x Med.-Hope	125-40-354-2	90	5/1	6/3	35	0	0	2
Med.-Hope x Fulcaster[2]	114-40-164-4	75	4/29	6/2	35	4	0	3
Med.-Hd.Fed. x Med.-Hope	124-41-196	85	4/26	6/1	34	6	0	2
Austin	12346	58	4/21	6/2	38	23	0	3
Med.-Hd.Fed. x Med.-Hope	124-41-130	90	4/29	6/2	38	1	0	2
Pawnee	11669	100	5/1	6/4	34	34	T	3
Med.-Hope x Fulcaster[2]	114-40-166-2	100	5/2	6/4	34	1	0	2
Clarkan	8858	100	5/2	6/5	41	60	21	2
Triumph	12132	100	4/24	5/26	35	64	T	3
Med.-Hd.Fed. x Med.-Hope	124-41-103	85	4/30	6/3	34	4	0	4
Red Chief	12109	100	4/30	6/3	37	68	4	4
Kanred	5146	100	5/4	6/5	36	50	3	3
Wichita	11952	100	4/26	5/28	36	64	T	4
Westar	12110	100	5/1	6/3	37	18	14	4
Med.-Hope x Med.3015-81[2]	115-40-146-1	95	4/28	5/29	38	4	0	2
Denton	8265	100	5/3	6/5	42	22	30	2
Kharkof	1442	100	5/5	6/6	36	60	6	3
Blackhull	6251	100	5/2	6/4	38	61	T	3
Clarkan-Hd.Fed. x Med.-Hope	125-40-374-4	90	5/2	6/5	34	0	0	3
Tenmarq	6936	100	5/3	6/5	36	60	12	3
Fulcaster	6471	95	5/3	6/4	38	68	28	3

1/ Degree of susceptibility 0 to 4.

Table 1.--(Continued.)

Denton, Texas (Continued)

(Rod-row plots, 8 replications)

C. I. or Sel. No.	Weight per bushel	Av. acre yield	Av. yield 1943-1947	Av. yield 1946-1947	No. years grown	Percent of Kharkof	Rank
	Lbs.	Bu.	Bu. 5 yrs.	Bu.			
8856	63.5	29.8	23.1	26.7	14	123.8	9
97-38-7-2	60.0	29.0	....	....	1	136.8	2
12503	60.0	28.4	....	....	1	134.0	4
124-40-328	57.5	27.6	....	....	1	130.2	5
172-43-211	60.0	27.2	....	....	1	128.3	6
11673	57.0	27.1	24.8	29.3	9	147.3	1
173-43-311	59.5	26.9	....	....	1	126.9	7
12122	62.0	26.8	....	25.9	3	115.3	17
7250-1	59.0	26.6	21.5	26.2	7	112.2	21
128-43-26	60.0	25.8	....	....	1	121.7	10
12145	60.0	25.7	....	....	1	121.2	12
12120	63.0	25.5	....	....	1	120.3	13
172-43-205	60.0	25.4	21.0	26.2	16	106.7	28
10086	59.5	25.2	....	....	1	118.9	15
125-40-354-2	59.0	24.6	....	26.6	3	109.5	23
114-40-164-4	60.0	23.6	....	28.9	2	120.2	14
124-41-196	60.0	23.5	....	24.3	2	101.0	32
12346	57.5	23.2	....	25.2	4	118.8	16
124-41-130	59.5	23.2	....	24.2	2	100.6	33
11669	59.0	23.2	22.4	26.0	9	134.1	3
114-40-166-2	61.0	22.9	....	26.9	3	114.5	19
8858	59.5	22.4	19.9	22.3	13	113.9	20
12132	62.0	22.4	....	24.8	2	103.3	30
124-41-103	60.5	22.3	....	25.7	2	106.9	27
12109	60.5	22.3	20.8	23.0	5	109.0	25
5146	56.0	22.3	20.2	23.3	16	115.0	18
11952	62.0	22.2	19.9	19.3	5	104.6	29
12110	59.0	22.1	23.8	27.1	5	125.0	8
115-40-146-1	59.0	21.9	....	25.7	2	107.1	26
8265	59.0	21.8	19.8	24.1	16	109.3	24
1442	56.0	21.2	19.1	24.0	16	100.0	34
6251	62.0	21.0	18.7	22.3	16	110.1	22
125-40-374-4	59.0	19.6	....	....	1	92.5	35
6936	58.5	18.8	18.9	19.5	16	121.6	11
6471	57.5	17.0	18.0	19.8	16	101.1	31

Standard error of a difference between the mean yields of any two varieties = 1.97 bushels.

Table 1--(Continued)

Iowa Park, Texas

(Rod-row plots, 4 replications)

Variety	C. I. No.	Date Headed	Date Ripe	Wt. per bu. Lbs.	Av. acre yield Bu.	Av. yield 1946-47 Bu.	No. years grown	Percent of Turkey	Rank
Sel. 29-34-275 (D. C. 172-43-67)	12503	4-30	5-29	58	32.2	--	1	141.2	1
M.-T. x Kharkof 43-2142	12147	5-7	6-3	58	32.1	33.3	4	125.7	7
Sel. 29-34-275 (D. C. 172-43-210)	12504	5-4	6-1	61	30.8	31.3	2	137.9	2
Com. D. C. 171-43-29	12145	5-2	5-31	60	30.1	--	1	132.0	3
Sel. 29-34-275 (D. C. 127-43-205)		5-3	5-31	59	29.8	--	1	130.7	4
Com. D. C. 171-43-263		5-5	6-2	60	28.2	--	1	123.7	9
Comanche	11673	5-6	6-3	59	27.6	28.2	6	120.9	10
Sel. 29-34-275 (D. C. 172-43-211)		5-4	6-2	60	27.2	--	1	119.3	11
Westar	12110	5-6	6-4	59	27.2	30.9	5	127.6	6
Wichita	11952	5-2	5-28	62	26.7	25.2	6	103.8	21
Pawnee	11669	5-7	6-3	60	26.7	27.4	5	116.2	14
Med.-Hope x Com. 157-43-195		5-2	5-30	58	25.6	--	1	112.3	15
Cimarron	12120	5-2	6-1	62	25.4	--	1	111.4	16
Austin	12346	5-4	6-1	57	24.8	25.8	6	118.3	12
Early Blackhull	8856	4-30	5-27	62	24.8	23.5	6	104.8	19
Early Blackhull x Cheyenne	12122	5-3	5-31	61	24.6	26.5	3	129.3	5
Turkey	1558	5-10	6-6	59	22.8	22.7	6	100.0	26
Tenmarq	6936	5-8	6-5	58	22.7	21.3	6	101.4	23
M.-T.xChiefkan 160-42-333	12146	5-5	5-31	60	21.9	26.6	2	117.0	13
M.-T.xChiefkan 160-42-318		5-8	6-5	60	21.9	25.3	2	111.2	17
Triumph	12132	5-2	5-28	61	21.7	23.3	2	102.6	22
Denton	8265	5-9	6-5	58	21.4	23.0	6	108.9	18
M.-T. x Kharkof 42-2862		5-10	6-6	57	21.1	28.5	3	123.8	8
Kharkof	1442	5-10	6-6	58	21.1	23.4	3	104.8	19
Blackhull	6251	5-8	6-5	62	18.2	21.1	6	100.6	25
Red Chief	12109	5-7	6-5	62	17.4	21.1	6	100.7	24
Chiefkan	11754	5-7	6-5	61	17.2	21.7	6	97.1	27

Standard error of a difference between the mean yields of any two varieties = 3.90 bushels.

Table 1.--(Continued.)

Chillicothe, Texas

Rod-row plots; 8 replications; planted Oct. 2

Variety	C. I. No.	Date Headed	Date Ripe	Leaf rust 12/23	Leaf rust 5/8	Lodging	Wt. per bu.	Av. acre yield 1947	Av. yield 1942-1946	Av. yield 1947	No. years grown	Percent of Kharkof	Rank
		April	June	%	%	%	Lbs.	Bu.	Bu.	Bu.			
Sel. 29-34-275 Double Cross	12503	29	2	30	T	..	61	46.6	....	....	1	187.9	1
Early Blackhull x Cheyenne	12122	27	2	20	30	60	63	46.0	....	33.5	3	162.2	5
Sel.29-34-275 DoubleCross 172-43-205		24	2	10	T	40	61	45.0	....	....	1	181.5	2
Cimarron	12120	27	7	5	25	40	65	45.0	....	....	1	181.5	2
Comanche Double Cross	12145	24	2	T	T	20	61	40.3	....	....	1	162.5	4
Comanche x Med.-Hope 157-43-195	.....	29	7	50	5	20	62	40.2	....	....	1	162.1	6
Comanche	11673	29	7	40	25	40	61	40.0	24.5	30.0	10	125.4	13
Early Blackhull	8856	23	2	40	40	80	63	38.8	22.6	27.6	10	115.2	19
Pawnee	11669	28	2	40	15	60	60	38.7	22.9	30.2	10	124.0	15
Triumph	12132	26	2	50	40	60	63	38.4	....	27.7	2	125.1	14
Wichita	11952	26	2	50	45	60	62	37.3	23.0	27.8	6	125.7	12
Sel.29-34-275 DoubleCross 1/	12504	28	7	T	T	20	61	36.3	....	....	1	146.4	7
Martin-Tenmarq x Chiefkan	12146	29	2	10	25	20	61	36.2	....	29.6	2	133.7	8
Martin-Tenmarq x Kharkof 2/	12147	5/1	7	20	20	60	60	35.5	....	28.7	3	131.0	9
Red Chief	12109	5/1	7	50	40	..	64	35.3	21.4	27.5	6	116.8	17
Chiefkan	11754	5/1	7	50	25	..	62	35.3	19.9	29.2	10	112.0	22
Blackhull	6251	28	7	50	35	20	63	34.0	20.5	26.6	10	114.1	20
Martin-Tenmarq x Chiefkan 160-42-318		5/1	7	20	10	..	62	34.0	....	28.4	2	128.3	10
Tenmarq	6936	5/1	7	30	45	..	61	32.1	20.5	25.9	10	117.9	16
Westar	12110	5/1	7	5	25	40	61	31.4	....	27.5	4	126.9	11
Sel.29-34-275 Double Cross 172-43-211 1/		29	7	20	T	20	60	28.9	....	....	1	116.5	18
Comanche Double Cross 171-43-263 1/	...	29	7	30	T-25	..	63	28.3	....	....	1	114.1	20
Kanred	5146	5/5	9	50	45	60	61	27.4	19.5	25.3	10	105.8	24
Kharkof	1442	5/5	10	60	35	20	61	24.8	18.3	22.1	10	100.0	25
Martin-Tenmarq x Kharkof 42-2862	.....	5/5	10	50	25	20	60	24.2	....	24.1	2	108.8	23

Standard error of a difference between the mean yields of any two varieties = 2.97 bushels.

1/ Shattering 10% at maturity. 2/ Shattering 20%.

Table 1 (Continued)

Bushland, Texas

(Sixteen plots; 8 dryland; 8 irrigated)

Variety	C. I. No.	Date Headed	Ht. 1/	Leaf rust irrig.	Wt. per bu. Irrigated	Av. acre yield			No. years grown	Percent of Kharkof	Rank
						Dryland	Irrigated	Average			
		May	In.	%	Lbs.	Bu.	Bu.	Bu.			
Blackhull	6251	13	33	24	59.5	19.2	31.6	25.4	11	105.3	6
Westar	12110	11	32	T	60.0	19.7	30.5	25.1	4	117.7	1
Tenmarq	6936	12	32	32	59.0	19.4	30.5	25.0	11	105.8	5
Kharkof	1442	17	33	18	59.5	18.3	31.7	25.0	11	100.0	7
Cimarron	12120	8	27	18	61.5	19.6	30.1	24.9	1	99.6	8
Cheyenne x Early Blackhull	12122	9	29	15	60.0	20.4	29.0	24.7	1	98.8	9
Pawnee	11669	11	27	13	57.5	17.6	30.0	23.8	8	115.5	2
Red Chief	12109	13	32	26	61.0	19.9	26.8	23.4	4	108.2	4
Comanche	11673	11	30	21	59.5	15.1	30.4	22.8	8	114.3	3
Triumph	12132	7	27	40	58.0	16.0	22.0	19.0	1	76.0	12
Wichita	11952	7	29	35	58.0	16.7	20.6	18.7	4	97.4	10
Early Blackhull	8856	5	28	36	57.0	17.9	18.7	18.3	10	93.8	11

1/ Average of irrigated and dryland.

Standard error of a difference between the mean yields of any two varieties = 1.57 bushels on dryland; 1.87 bushels on irrigated.

Table 1 (Continued)

Lawton, Oklahoma

(Three, 1/68.8 acre plots; seeded Oct. 9; emerged Oct. 18)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Leaf Rust 4/17	Leaf Rust 5/5	Septoria 1/	Lodging	Wt. per bu.	Av. acre yield	Av. yield 1941-1947 2/ 6 yrs.	No. years grown	Percent of Kharkof	Rank
		May	June	In.	%	%		%	Lbs.	Bu.	Bu.			
Comanche	11673	5	7	37	10	60	T	8	59	30.0	29.9	7	132.8	3
Cimarron	12120	5	8	35	2	65	M	2	62	29.7	—	1	146.3	1
Cheyenne x Early Blackhull	12122	4	7	36	10	65	M	50	61	27.2	—	2	143.6	2
Westar	12110	7	9	37	10	65	H	8	59	27.0	—	3	125.4	6
Early Blackhull	8856	4/29	8	34	25	65	M	50	62	26.8	—	12	106.8	11
Triumph	12132	2	6	37	25	65	M	27	62	25.8	—	1	127.1	5
Reliant	12144	7	12	39	25	65	H	0	61	25.4	—	1	125.1	7
Kanred	5146	9	12	39	25	65	M	4	58	24.5	25.2	13	108.3	10
Pawnee	11669	9	9	32	5	50	H	0	60	24.2	27.3 3	7	123.0	8
Wichita	11952	2	4	38	25	65	M	53	61	23.5	28.2 2	6	128.9	4
Blackhull	6251	9	12	39	25	65	M	2	60	22.1	22.9	13	102.4	13
Cheyenne	8885	12	12	36	25	65	M	0	58	21.9	24.8	13	106.3	12
Clarkan	8858	9	11	43	20	50	H	3	59	21.7	22.0	9	100.3	14
Kharkof	1442	13	12	37	25	65	0	0	58	20.3	21.9	13	100.0	15
Red Chief	12109	10	11	40	5	50	M	0	61	20.0	—	5	98.4	16
Tenmarq	6936	9	11	37	25	65	M	5	57	19.5	25.3 4	13	109.3	9

1/ 0 = None; T = trace; M = medium; H = heavy infection

2/ No yields from 1946 in this average.

Standard error of a difference between the mean yields of any two varieties = 1.61 bushels.

Table 1 (Continued)

Stillwater, Oklahoma

(Four, 1/77.8 acre plots; seeded Oct. 24 and 25)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Leaf Rust 1/ Severity	Leaf Rust 1/ Response	Wt. per bu.	Av. acre yield	Av. yield 1943-1947	Av. yield 1946-1947	No. years grown	Percent of Kharkof	Rank
		May	June	In.	%	2/	Lbs.	Bu.	Bu.	Bu.			
Westar	12110	10	19	39	16	HR-CS	58.2	29.9	---	25.4	2	115.2	4
Cimarron	12120	8	19	35	75	CS	60.4	29.9	--	--	1	118.7	1
Denton	8265	15	21	44	10	CS	57.7	27.9	--	--	14	103.2	11
Blue Jacket	12502	13	20	41	65	CS	60.9	26.8	--	--	1	106.3	9
Reliant	12144	13	20	38	24	S-CS	59.7	26.3	24.1	25.1	5	117.3	3
Cheyenne x Tenmarq	11972	13	20	37	36	CS	58.9	25.9	22.4	23.7	5	109.1	6
Triumph	12132	5	13	35	60	CS	60.8	25.7	22.3	21.9	5	108.8	7
Comanche	11673	10	18	37	44	CS	58.8	25.7	23.5	22.4	7	113.5	5
Karkof	1442	14	20	40	55	CS	57.5	25.2	20.5	22.0	15	100.0	16
Cheyenne	8885	16	21	37	73	CS	57.8	25.1	23.2	24.6	15	103.3	10
Fulcaster	6471	15	21	43	25	CS	56.4	25.1	--	--	10	92.7	21
Turkey	1558	14	20	40	38	CS	57.7	24.8	--	--	14	94.8	19
Cheyenne x Early Blackhull	12122	9	18	36	55	CS	59.4	24.5	--	22.6	2	102.7	12
Kawvale	8180	13	19	40	34	CS	56.8	24.5	21.4	22.8	15	99.2	17
Pawnee	11669	12	15	36	40	CS	58.7	24.4	24.8	26.1	7	118.6	2
Blackhull	6251	13	20	41	63	CS	59.3	23.6	21.4	22.2	14	101.9	14
Tenmarq	6936	12	20	40	50	CS	57.7	23.4	19.6	18.8	15	98.8	18
Red Chief	12109	15	21	40	56	CS	61.7	23.3	22.3	23.4	5	108.5	8
Early Blackhull	8856	5	14	38	63	CS	60.4	23.2	22.8	20.7	15	93.2	20
Chiefkan	11754	14	20	41	40	CS	59.2	22.3	20.5	22.2	9	101.3	15
Super Red Chief (4119)		14	21	39	44	CS	61.7	21.8	---	---	1	86.5	23
Clark's Soft	12556	16	22	41	45	CS	60.1	21.3	--	--	1	84.5	24
Wichita	11952	6	14	36	56	CS	59.6	20.6	--	19.9	3	90.5	22
Clarkan	8858	16	21	42	40	CS	58.9	19.8	21.3	21.6	11	102.6	13

1/ Prevalence in all varieties 100 percent. Notes taken by Botany and Plant Pathology Dept. Okla. A & M College.

2/ S = susceptible; CS = completely susceptible; HR = highly resistant.

Standard error of a difference between the mean yields of any two varieites = 1.95 bushels.

Table 1.--(Continued.)

Cherokee, Oklahoma

Rod-row plots; 4 replications; seeded Oct. 19

Variety	C. I. No.	Date ripe	Ht.	Lodging	Wt. per bu.	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
		June	In.	%	Lbs.	Bu.	Bu.			
Cimarron	12120	18	41	8	63.1	33.2	....	1	124.8	9
Pawnee	11669	17	42	25	60.4	32.6	29.0	2	126.6	8
Wichita	11952	12	42	20	61.8	31.5	28.1	2	122.7	11
Cheyenne x Tenmarq	11972	20	41	13	59.8	30.8	29.2	2	127.5	7
Comanche	11673	18	43	30	59.6	30.6	27.4	2	119.7	13
Cheyenne x Early Blackhull	12122	17	42	48	61.7	30.1	30.4	2	132.8	2
Cheyenne	8885	21	42	8	60.0	29.9	27.8	2	121.4	12
Blue Jacket	12502	18	45	18	62.8	28.9	....	1	108.6	14
Red Chief	12109	20	45	15	63.0	28.9	29.6	2	129.3	6
Tenmarq	6936	20	43	20	58.9	28.1	24.7	2	107.9	15
Triumph	12132	12	40	18	61.9	28.0	31.6	2	138.0	1
Turkey	1558	21	42	18	59.3	27.9	23.9	2	104.4	16
Early Blackhull	8856	12	44	38	62.4	27.8	29.7	2	129.7	5
Reliant	12144	19	44	20	60.7	27.2	29.9	2	130.6	4
Kharkof	1442	21	43	20	58.6	26.6	22.9	2	100.0	18
Westar	12110	20	44	20	58.9	26.2	30.2	2	131.9	3
Chiefkan	11754	20	45	25	60.1	26.1	28.2	2	123.1	10
Super Red 4119	.....	19	45	18	62.3	25.3	....	1	95.1	19
Blackhull	6251	20	44	23	59.8	24.1	23.6	2	103.1	17
Nebred x Med.-Hope Okla.42	.....	19	40	8	59.9	22.6	....	1	85.0	20

Standard error of a difference between the mean yields of any two varieties = 2.33 bu.

Table 1 (Continued) Woodward, Oklahoma

(Four 1/51st acre plots, two on fallow, two on cropped land; seeded Oct. 2; emerged Oct. 11)

Variety	C. I. No.	Date Headed	Date Ripe	Wt. per bu.	Av. Acre yield	Average Yield 1943-1947	Average Yield 1946-1947	No. years grown	Percent of Kharkof	Rank
		May	June	Lbs.	Bu.	Bu.	Bu.			
Cheyenne x Early Blackhull	12122	5	14	60.9	30.9	--	27.9	3	133.0	1
Cimarron	12120	5	15	61.5	29.2	33.5	27.8	5	114.1	9
Pawnee	11669	8	15	58.8	27.3	34.2	27.9	10	128.0	2
Cheyenne x Tenmarq	11972	11	17	58.3	26.9	34.8	26.4	5	118.3	6
Reliant	12144	10	16	59.1	26.5	--	--	1	121.0	4
Wichita	11952	3	12	59.6	26.3	33.9	28.7	6	121.7	3
Early Blackhull	8856	4/30	10	61.1	25.1	29.4	25.6	16	97.5	19
Comanche	11673	9	15	57.8	24.8	33.1	26.7	10	120.2	5
Cheyenne	8885	13	18	58.4	24.7	33.7	25.3	16	107.8	12
Red Chief	12109	9	16	60.6	24.0	34.6	27.2	6	116.6	7
Triumph	12132	1	10	59.8	23.9	--	26.3	3	116.0	8
Tenmarq	6936	9	16	57.4	23.7	31.1	23.2	16	107.4	13
Super Red 4119	--	9	16	60.6	23.4	--	--	1	106.8	14
Blue Jacket	12502	10	15	61.4	22.6	--	--	1	103.2	15
Westar	12110	9	15	56.8	22.1	--	26.0	4	108.7	11
Kharkof	1442	12	18	57.4	21.9	29.4	21.5	16	100.0	16
Turkey	1558	12	18	57.3	21.9	--	--	13	99.6	18
Chiefkan	11754	10	16	57.3	21.4	30.9	26.1	11	111.2	10
Blackhull	6251	10	15	59.3	21.2	30.5	22.9	16	99.9	17

Standard error of a difference between the mean yields of any two varieties = 1.64 bushels.

Table 1. (Continued)

Goodwell, Oklahoma

(Five, rod-row plots)

Variety	C. I. No.	Weight per bushel Lbs.	Av. acre yield Bu.	Av. yield 1939-2/ 1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Cimarron	12120	62.0	28.3	--	--	1	166.5	1
Cheyenne x Early Blackhull	12122	61.5	26.8	--	26.6	3	150.9	2
Wichita	11952	58.0	24.7	--	24.9	4	148.6	3
Cheyenne x Tenmarq	11972	59.5	24.5	--	26.3	4	143.6	4
Triumph	12132	58.0	23.9	--	21.7	2	113.6	11
Comanche	11673	59.0	23.4	22.9	23.2	6	130.8	6
Westar	12110	58.5	22.3	--	23.7	4	133.7	5
Reliant	12144	59.0	21.3	--	--	1	125.3	8
Cheyenne	8885	58.0	20.5	--	24.5	9	104.7	15
Oro x Mediterranean - Hope	12140	59.0	20.4	--	--	1	120.0	10
Blackhull	6251	60.0	19.4	22.0	22.5	10	108.5	14
Kawvale-Marquillo x Kawvale-Tenq.	12128	57.0	19.2	--	--	1	112.9	13
Red Chief	12109	61.5	18.8	--	21.3	4	128.4	7
Chiefkan	11754	59.5	18.5	21.3	21.8	6	121.4	9
Tenmarq	6936	58.0	18.0	18.9	21.0	10	96.2	18
Early Blackhull	8856	60.0	17.8	20.0	17.5	10	88.1	20
Turkey	1558	56.5	17.7	--	--	1	104.1	16
Kharkof	1442	57.0	17.0	17.5	19.1	10	100.0	17
Nebred x Med. Terranean-Hope Okla.	42	60.0	15.2	--	--	1	89.4	19
Pawnee 1/	11669	58.5	11.5	19.9	16.8	6	113.5	12

1/ No noticeable stand reduction in early spring, but poor stand and plant abnormalities noted just prior to harvesting.

2/ No yields from 1941-1943 in this average.

Standard error of a difference between the mean yields of any two varieties = 3.38 bushels.

Table 1. (Continued)

Manhattan, Kansas

(Three, 1/56 acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Leaf rust	Mildew score 1/	Lodging
		May	July	In.	%		%
Westar	12110	22	5	48	T+	4+	46
Med.-Hope x Pawnee	12141	20	2	44	10	0	13
Kaw.-Tq. x Comanche (Ks. 2798)		18	2	42	22	4	60
Pawnee	11669	20	2	45	25	3+	43
Mqo.-Oro x Oro-Tq. Ks. 2795		22	3	47	T+	4	36
Kaw.-Mqo. x Kaw.-Tq. Ks. 2793		23	6	44	T-25	3+	0
Med.-Hope x Pawnee Ks. 2794		20	3	44	12	0	30
Med.-Hope x Pawnee Ks. 2788		19	2	44	12	0	20
Kaw.-Mqo. x Kaw.-Tq.	12128	21	3	45	T	1	43
Med.-Hope x Pawnee	12287	19	2	44	10	1	23
Kaw.-Tq. x Comanche	12149	20	2	46	20	4	63
Triumph	12132	17	1	42	80	3	33
Blue Jacket	12502	23	5	50	53	3	26
Wichita	11952	19	1	46	68	3	40
Blackhull x Cheyenne	12101	23	5	45	68	3	36
Kaw.-Mqo. x Kaw.-Tq.	12331	22	3	44	T	1+	46
Cheyenne x E. Blackhull	12122	21	1	44	73	4	56
Super Deluxe Red Chief	12109	23	6	50	48	4	23
Comanche	11673	21	3	46	43	4	53
Med.-Hope x Pawnee Ks. 2790		20	3	44	7	4	20
Chiefkan x Oro.-Tq.	12133	20	3	45	58	4+	40
Kawvale x Oakley	12386	23	4	48	42	2	13
Clark's Soft	12556	26	7	51	50	3	16
Tenmarq Selection	12125	23	5	48	38	4	36
Clarkan	8858	26	7	50	48	3-	13
Cheyenne x Tenmarq	11972	25	6	43	38	4	40
Tenmarq	6936	23	5	48	43	4	36
Red Chief	12109	23	6	47	45	3+	20
Early Blackhull	8856	16	1	45	77	3+	70
Kawvale	8180	25	4	47	15	2	T
Cheyenne	8885	30	6	45	52	3-	T
Chiefkan	11754	23	5	48	30	3	43
Kharkof	1442	31	7	44	47	3-	30
Turkey	1558	31	7	44	37	3-	53
Kanred	5146	29	6	44	35	3	43
Blackhull	6251	26	6	46	57	3+	40

1/ 0 = resistant; 4 = susceptible.

Table 1. (Continued)

Manhattan, Kansas

(Three, 1/56 acre plots)

C. I. No.	No. of culms per A.	Wt. per bu.	Av. acre yield	Av. yield 1941-1947	Av. yield 1946 1947	No. years grown	Percent of Kharkof	Rank
	0000	Lbs.	Bu.	Bu.	Bu.			
12110	308	59.2	43.4	—	37.6	3	148.6	12
12141	289	60.1	42.9	—	35.5	2	154.7	6
Ks. 2798	307	60.7	42.4	—	—	1	161.8	1
11669	314	60.3	42.1	36.7	36.9	10	156.3	5
Ks. 2795	315	59.5	41.8	—	—	1	159.5	2
Ks. 2793	270	60.7	41.7	—	—	1	159.2	3
Ks. 2794	288	62.4	41.4	—	—	1	158.0	4
Ks. 2788	306	59.8	41.1	—	35.3	2	153.6	7
12128	301	60.7	40.9	—	34.1	3	150.0	11
12287	293	59.9	40.2	—	33.4	3	153.0	8
12149	300	60.8	40.0	—	—	1	152.7	9
12132	237	61.9	39.7	—	—	1	151.5	10
12502	296	62.9	38.4	—	—	1	146.6	14
11952	218	60.9	37.9	32.0	31.3	8	135.1	20
12101	312	60.2	37.5	—	33.2	3	131.4	23
12331	294	60.5	36.2	—	33.8	2	147.3	13
12122	280	61.2	35.7	—	32.3	4	141.1	15
12109	266	63.6	35.5	—	31.1	2	135.5	19
11673	290	58.6	35.0	31.7	31.5	10	136.3	18
Ks.2790	285	59.0	34.7	—	—	1	132.4	22
12133	273	60.5	34.6	—	32.0	2	139.2	16
12386	221	59.5	34.4	—	29.6	3	123.3	25
12556	218	62.1	33.9	—	—	1	129.4	24
12125	269	59.4	33.4	—	32.0	4	135.1	20
8858	223	60.7	31.8	27.9	29.0	16	113.7	31
11972	294	58.6	31.5	32.7	31.4	8	137.5	17
6936	259	57.6	30.9	28.8	30.5	16	114.8	30
12109	264	62.8	30.8	27.4	27.7	7	116.7	28
8856	252	61.1	30.7	26.9	29.2	16	109.0	32
8180	225	57.9	30.5	29.6	24.4	16	119.4	27
8885	260	58.1	30.3	28.8	28.0	16	115.1	29
11754	263	60.7	30.3	28.7	27.7	10	122.4	26
1442	257	58.2	26.2	23.5	23.0	16	100.0	36
1558	284	57.6	26.0	22.6	25.3	16	101.3	35
5146	275	55.6	25.3	23.4	25.9	16	101.9	34
6251	262	59.8	22.2	25.3	25.2	16	108.4	33

Standard error of a difference between the mean yields of any two varieties = 2.23 bushels.

Table 1. (Continued)

Garden City, Kansas

(Three plots; planted Sept. 24; emerged Oct. 1)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Plants per acre	Leaf rust	Septoria 1/	Lodging	Wt. per bu.	Av. acre yield	Av. yield 1941-7	Av. yield 1946-7	No. years grown	Percent of Turkey	Rank
		May	July	In.	000	%		%	Lbs.	Bu.	Bu.	Bu.			
Chiefkan x Oro - Tenq.	12133	28	4	43	246	15	3	20	59.3	41.0	--	31.2	2	118.0	9
Chey. x E. Bkl.	12122	27	4	43	227	17	4	60	60.0	40.8	--	29.0	4	129.1	3
Kv.-Mqo. x Kv.-Tq.	12128	30	5	45	225	0	3	13	59.5	39.4	--	--	1	123.5	4
Comanche	11673	30	5	46	203	17	3	47	57.4	38.9	30.7	31.0	9	136.6	1
Pawnee	11669	30	5	43	260	3	3	20	58.1	37.4	30.9	27.6	9	134.4	2
Triumph	12132	24	1	41	224	35	3	43	56.8	36.5	--	27.1	2	102.5	12
Westar	12110	31	7	47	253	1	4	20	57.9	36.1	--	24.8	2	93.9	15
Tenmarq	6936	6-2	8	47	222	32	3	23	57.0	34.0	27.4	28.2	9	121.6	5
Wichita	11952	26	2	44	199	35	4	23	58.3	33.5	25.9	22.9	7	115.7	11
Blue Jacket	12502	6-1	7	50	223	8	3	13	60.2	32.6	--	--	1	102.2	13
Turkey	1558	6-5	10	45	208	35	4	33	57.9	31.9	22.4	26.4	9	100.0	14
Early Blackhull	8856	23	1	44	260	22	4	53	57.6	31.0	25.6	23.9	9	118.3	8
Blackhull	6251	6-2	8	47	251	33	3	23	58.3	30.2	26.2	29.3	9	117.9	10
Super Deluxe Red Chief	12109	6-1	8	48	220	7	3	10	59.9	29.7	--	--	1	93.1	16
Red Chief	12109	6-1	8	48	177	7	3	10	60.3	28.5	--	28.6	6	120.3	6
Chiefkan	11754	6-1	8	48	214	5	3	20	58.3	28.0	26.9	28.1	9	120.1	7

1/ Susceptibility 0-4.

Standard error of a difference between the mean yields of any two varieties = 1.33 bushels.

Hays, Kansas

Table 1. (Continued)

(Four 1/50 acre plots, 2 on fallow, 2 on cropped land;
Seeded Sept. 26, emerged Oct. 3.)

Variety	C. I. No.	Date Headed May	Date Ripe June	Ht. In.	Frost inj. 3/ %	Leaf rust %	Yellow berry 1/	Septoria 2/	Lodging %	Wt. per bu. Lbs.	Av. acre yield Bu.	Av. yield 1941-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Chiefkan x Oro - Tq.	12148	19	28	39	7.1	20	0	2+	3	65.0	45.1	--	--	1	123.2	9
Blackhull x Cheyenne 40-102	12101	22	28	41	24.2	20	40	4	28	64.3	41.6	--	32.2	4	128.0	4
Cheyenne	8885	24	28	42	23.8	20	63	4	35	63.5	41.5	23.8	32.2	16	113.5	13
Chiefkan	11754	23	29	45	5.2	20	0	4	55	64.8	40.7	27.8	28.7	12	132.0	3
Pawnee	11669	20	28	40	43.1	5	1	3	23	64.0	40.2	27.8	28.0	10	139.5	1
Early Blackhull	8856	17	26	40	5.3	35	0	4	15	64.8	40.1	27.1	28.5	16	124.1	8
Cheyenne x Early Blackhull	12122	20	27	40	25.8	38	0	3+	38	65.6	40.0	--	28.1	4	124.4	7
Chey. x Tenmarq	11972	23	28	40	32.8	25	40	4	45	63.3	40.0	28.4	32.1	7	136.3	2
Westar	12110	21	28	45	49.2	T	5	4	28	63.0	39.7	--	28.2	2	99.6	22
Triumph	12132	17	26	37	8.7	46	3	3	18	64.0	39.5	--	29.3	2	103.5	17
Kaw.-Mqo. x Kaw.-Ten.	12128	20	28	39	33.0	T	5	4	35	64.0	39.2	--	28.6	2	101.1	19
Chiefkan x Oro - Tq.	12134	22	28	44	9.8	28	0	2	33	64.0	38.8	--	28.9	3	112.8	14
Chiefkan x Oro - Tq.	12133	20	28	38	16.9	30	0	3+	30	64.0	38.5	--	29.3	3	121.2	10
Comanche	11673	21	28	39	42.2	20	T	3	50	63.8	38.4	26.6	28.4	11	125.7	5
Wichita	11952	19	27	40	8.9	32	1	2+	23	65.0	38.0	25.0	24.7	7	120.3	11
Tenmarq	6936	22	28	45	48.9	18	10	4	40	62.8	37.7	24.8	28.6	16	120.1	12
Turkey	1558	23	28	43	10.0	30	40	2+	75	63.8	37.5	20.9	27.8	16	101.8	18
Red Chief	12109	22	29	45	12.0	20	0	2	35	65.8	37.1	25.9	27.5	7	124.5	6
Blue Jacket	12502	22	29	47	7.2	10	0	3	38	65.5	36.7	--	--	1	100.3	20
Kharkof	1442	24	28	43	10.6	30	50	3	68	62.5	36.6	20.8	28.3	16	100.0	21
Tenmarq Selection	12125	23	28	44	22.0	12	10	4	45	63.8	36.3	--	27.3	2	96.6	24
Super Deluxe Red Chief	12109	23	29	45	7.8	25	0	1+	35	65.5	36.3	--	--	1	99.2	23
Kanred	5146	24	28	43	40.2	35	25	3	70	62.3	34.8	21.1	27.2	15	105.5	16
Blackhull	6251	21	28	44	27.2	20	0	3	38	64.8	34.1	22.6	26.2	16	112.6	15

1/ Yellow berry on cropped land only.

2/ Septoria grade on fallowed land only.

3/ Frost injury determinations were taken from only one replication on cropped land. Little or no frost injury on fallowed land.

Standard error of a difference between the mean yields of any two varieties = 1.60 bushels.

Table 1. (Continued)

Colby, Kansas

(Three 1/50 acre plots)

Variety	C. I. No.	Date Headed	Ht.	1/ Septoria	Wt. per bu.	Av. Acre yield	Av. yield 1942-1947	Av. yield 1946-1947	No. years grown	Percent of Turkey	Rank
		June	In.		Lbs.	Bu.	Bu.	Bu.			
Chiefkan x Oro - Tenmarq	12133	16	41	2	63.5	40.3	—	41.4	2	141.1	1
Cheyenne x E. Blackhull	12122	13	37	1	62.5	38.2	—	43.6	3	139.2	2
Wichita	11952	14	39	4	63.5	36.7	48.2	33.9	7	120.1	9
Pawnee	11669	15	39	3	61.5	36.1	50.2	33.5	7	125.9	6
Kawvale-Marq. x Kawvale-Ten.	12128	18	41	3	61.5	35.7	—	40.5	2	138.0	3
Tenmarq Selection	12125	19	43	3	61.0	34.2	—	36.0	4	122.9	8
Cheyenne	8885	21	44	2	60.5	33.6	45.1	37.0	11	111.7	14
Westar	12110	16	42	4+	60.5	33.4	—	34.4	2	117.0	11
Cheyenne x Tenmarq	11972	20	39	3	62.0	32.7	52.6	39.7	6	132.3	5
Comanche	11673	15	39	2	60.5	32.4	48.4	35.9	8	120.1	9
Kanred	5146	20	43	4+	60.0	32.3	42.8	37.0	11	103.4	17
Red Chief	12109	17	44	T	64.5	30.7	46.0	36.1	6	115.6	12
Blue Jacket	12502	19	45	3	63.0	30.7	—	—	1	125.3	7
Triumph	12132	7	36	3	61.0	30.5	—	40.1	2	136.6	4
Chiefkan	11754	20	45	3+	62.0	30.1	45.4	33.7	8	114.7	13
Tenmarq	6936	19	42	3+	59.5	29.7	44.6	33.1	10	114.0	15
Early Blackhull	8856	11	39	4	61.5	29.2	43.8	35.3	11	105.0	18
Blackhull	6251	18	43	3+	61.5	28.0	43.5	35.8	11	109.2	16
Turkey	1558	21	42	4+	58.5	24.5	39.7	29.4	11	100.0	19

1/ Septoria range 1-2 resistant; 3-4 susceptible.

Standard error of a difference between the mean yields of any two varieties = 2.18 bushels.

Table 1. (Continued)

Akron, Colorado

(Four, 1/41 acre plots; two on fallow; two on corn land)

Variety	C. I. No.	Mosaic dwarf-ing %	Av. Acre yield Bu.	Av. yield 1943-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Pawnee	11669	0	31.0	19.6	19.0	9	114.3	8
Blackhull	6251	66	29.8	23.1	21.9	16	121.1	2
Cheyenne x Tenmarq	11972	0	29.8	23.0	23.0	5	115.3	7
Chiefkan-Oro x Tenmarq	12133	0	27.7	--	--	1	132.5	1
Red Chief	12109	61	25.7	20.1	17.9	6	110.2	11
Cheyenne x Early Blackhull	12122	0	25.4	--	17.7	3	108.8	3
Early Blackhull	8856	60	24.4	19.8	13.3	16	116.2	5
Kanred - Hd. Fed. x Minturki-Minhardi	11970	40	22.8	20.6	16.3	9	117.9	4
Comanche	11673	68	21.6	20.7	15.7	9	116.2	5
Cheyenne	8885	0	21.6	21.8	18.7	16	109.5	12
Minturki	6155	58	21.1	18.0	17.1	16	92.7	15
Kharkof	1442	0	20.9	20.0	18.0	16	100.0	14
Kanred	5146	0	20.0	19.8	17.1	16	106.4	13
Wichita	11952	75	19.9	19.2	11.4	7	112.9	9
Tenmarq	6936	70	16.6	19.3	14.3	16	112.4	10
Alton	1438	75	7.9	14.6	8.9	16	79.7	16

Standard error of a difference between the mean yields of any two varieties = 1.95 bushels.

Table 1. (Continued)

Ft. Collins, Colorado

(Rod-row plots. 7 replications)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Frost damage	Rust Leaf 1/ Sev.	Rust Leaf 1/ Type	Rust Stem	Lodging	Wt. per bu.	Av. acre yield	Av. yield 1946-7	No. years grown	Percent of Kharkof 2/	Rank
		June	July	In.	%	%		%	%	Lbs.	Bu.	Bu.			
Cheyenne	8885	7	30	45	30	50	4	35	0	63.2	43.8	48.7	4	113.2	5
Cheyenne x Tenmarq	11972	5	27	43	40	55	4	35	0	63.8	36.5	47.7	4	120.1	2
Eureka-Minturki x Kanred (A-149)		4	28	44	44	55	4	35	0	63.7	35.9	54.6	2	138.1	1
E. Blkhl.-Marmin x Hope-Med. (76)		6	28	45	30	5	X	T	5	61.8	33.3	41.7	2	105.6	8
Chiefkan x Oro-Tenmarq	12133	1	26	44	53	67	4	5	0	62.4	31.8	--	1	115.6	4
Pawnee	11669	1	23	43	70	20	X	20	0	62.4	31.6	40.7	4	118.2	3
Red Chief	12109	4	30	46	20	40	2-3	35	0	64.0	30.2	40.4	3	104.2	10
Tenmarq	6936	5	28	45	39	60	4	35	0	62.9	30.1	43.5	4	105.3	9
E. Blkhl.-Marmin x Hope-Med. (10)		6	28	45	43	T	0-2	T	50	61.5	29.3	39.8	2	100.8	14
Mutant 348 (A-910)		3	27	44	51	60	4	20	40	62.4	28.1	41.8	2	105.8	7
Kanred	5146	7	29	43	37	65	4	20	15	63.0	27.5	39.5	4	100.0	16
Kharkof	1442	6	29	42	47	70	4	10	56	62.0	27.5	39.5	2	100.0	16
E. Blkhl.-Marmin x Hope-Med. (73)		5	28	45	51	25	X	T	10	61.5	27.1	40.4	2	102.3	12
H.Fed-Marq. x Marq.-Kanred (A-340)		2	24	42	79	50	4	35	0	62.2	23.0	33.5	2	84.8	21
Kanred x Hope-H. Fed.	12135	5	27	43	49	50	4	15	0	62.3	22.4	34.8	2	88.1	19
Comanche	11673	3	26	42	57	55	4	10	0	62.8	22.0	36.6	4	106.1	6
Cheyenne x E. Blackhull	12122	1	26	42	77	67	4	10	0	62.5	21.0	38.2	3	100.3	15
Wichita	11952	5-29	22	44	86	67	4	T	0	62.3	20.4	31.3	4	103.1	11
Blackhull	6251	4	26	44	81	67	4	15	20	62.7	17.7	32.5	4	100.9	13
E. Blkhl.-Marmin x Hope-Med. (25)		4	27	44	65	10	1-4	0	30	62.2	16.5	35.4	2	89.6	18
E. Blackhull x Tq.	12124	1	24	43	83	60	4	35	0	61.7	13.7	32.7	2	82.8	22
E. Blkhl.-Marmin x Hope-Med. (5)		4	25	43	83	55	4	T	30	61.5	12.9	33.8	2	85.4	20
E. Blkhl.-Marmin x Hope-Med. (15)		5	28	45	70	5	0-2	T	15	61.9	10.5	29.7	2	75.1	24
Early Blackhull	8856	5-27	22	44	91	64	4	10	20	61.8	9.6	22.7	3	78.9	23

1/ Pustule type. 0 = immune, 1-2 resistant, 3-4 susceptible, X mixture of types. Prevalence was 100% on all except trace on Sel. 10.

2/ Percentage based upon Kanred in 1944, 1945 and Kharkof in 1946, 1947.

Standard error of a difference between the mean yields of any two varieties = 3.63 bushels.

Table 1. (Continued)

Lincoln, Nebraska

(5 repl.; 1/84 A. plots; seeded Sept. 24, emerged Oct. 1)

Variety	C. I. No.	Date Headed June	Date Ripe July	Ht. In.	Lodging %	Rust Stem %	Rust Leaf %	Wt. per bu. Lbs.	Av. acre yield 1943 Bu.	Av. yield 1946 Bu.	Av. yield 1947 1/ Bu.	No. years grown	Percent of Kharkof	Rank
Red Chief	12109	5	14	48	12	1	50	62.7	54.9	38.2	42.7	5	119.3	11
Hung. Sel. x Nebred (405304)	12507	6	11	46	18	T	48	58.0	44.9	--	--	1	164.5	1
Pawnee	11669	1	9	45	49	T	31	58.1	43.9	43.9	40.1	11	134.7	5
Comanche	11673	2	10	46	31	1	44	56.7	42.7	36.8	36.6	9	116.3	13
Tk.-Tq. x Chey.-Tk. (383134)	12523	4	11	47	50	3	18	59.3	42.1	--	--	1	154.2	2
Triumph	12132	5/26	7	44	46	T	84	59.4	41.6	--	34.5	2	123.0	9
Marquillo x Oro (383464)		5	14	46	34	T	6	57.4	40.8	--	36.0	2	128.4	7
Neb. 60 x Med.-Hope	12500	1	10	45	47	0	13	59.7	39.7	--	--	1	145.4	3
Wichita	11952	5/30	7	44	79	T	85	58.7	38.3	37.3	34.9	5	116.7	12
Chey. x Hung. Sel. (403858)		5	11	45	40	21	69	52.8	38.1	--	--	1	139.6	4
Tk. x Tk.-Chey. (383130)		2	11	48	71	1	12	59.7	36.6	--	--	1	134.1	6
Compound Hyb.	12501	6	11	44	82	1	65	55.7	36.6	--	34.7	2	123.8	8
Nebred	10094	6	11	44	79	T	78	57.1	36.0	33.2	32.0	16	105.5	18
Cheyenne	8885	7	12	45	30	20	65	55.7	36.0	36.3	35.6	16	112.4	15
Blackhull	6251	4	11	45	87	T	54	58.3	33.5	30.8	32.5	16	101.1	19
Chey. x E. Blackhull	12122	1	9	43	95	T	88	58.5	33.0	--	33.5	2	119.5	10
Tenmarq	6936	5	11	48	43	3	45	55.9	32.7	34.2	32.1	16	106.2	17
Nebr. 60	6250	9	15	47	61	6	74	56.9	31.6	31.4	31.1	16	97.6	22
Turkey	12137	8	12	45	78	4	78	55.3	31.1	31.8	29.1	16	99.6	21
Turkey x Chey.	12142	6	12	44	93	2	70	56.2	27.5	--	30.4	2	108.6	16
Kharkof	1442	8	14	44	63	5	66	54.5	27.3	32.0	28.0	16	100.0	20
Chey. x Tenmarq	11972	5	11	43	87	2	65	55.7	26.9	35.3	31.2	6	113.1	14

1/ No yields in 1945.

Standard error of a difference between the mean yields of any two varieties = 2.97 bushels.

Table 1. (Continued)

North Platte, Nebr.

(Four 1/40 acre plots, 2 after corn, 2 on fallow)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Stem rust 1/	Wt. per bu.	Av. acre yield	Av. yield 1943-1947	Av. yield 1946-1947	No. years grown	Percent of Kharkof	Rank
		June	July	In.	%	Lbs.	Bu.	Bu.	Bu.			
Pawnee	11669	7	12	35	15	62.8	36.0	43.2	37.8	9	114.5	4
Cheyenne	8885	10	16	36	55	60.8	34.8	38.8	37.8	15	108.9	7
Chey. x E. Blkhl.	12122	7	14	36	5	63.6	34.2	--	39.7	3	113.0	5
Turkey	12143	10	15	37	20	60.8	34.0	42.4	37.8	15	109.2	6
Wichita	11952	6	14	38	10	62.0	32.8	42.0	34.8	5	120.7	2
Chey. x Tenq.	11972	10	15	35	35	62.1	32.0	--	38.4	4	121.3	1
Chiefkan x Oro-Tq.	12133	7	15	35	5	62.6	31.2	--	--	1	106.5	10
Neb. 60	6250	12	16	38	50	60.5	31.0	34.5	33.8	15	100.1	12
Tenmarq	6936	10	16	38	35	61.4	30.8	36.9	32.9	15	101.3	11
Nebred	10094	11	15	34	20	61.4	30.3	37.3	31.6	13	106.7	9
Kharkof	1442	11	17	39	40	60.3	29.3	34.8	33.0	15	100.0	13
Red Chief	12109	7	16	38	25	64.7	29.3	40.9	31.8	5	117.7	3
Comanche	11673	8	14	38	30	60.9	28.5	39.4	32.9	9	107.0	8
Blackhull	6251	10	16	38	15	63.5	27.8	35.1	32.3	15	99.2	14
Triumph	12132	3	12	31	5	61.7	20.7	--	24.5	2	74.1	15

1/ Fallow plots only.

Standard error of a difference between the mean yields of any two varieties = 2.49 bushels.

Table 1. (Continued)

Alliance, Nebraska

(Rod-row plots; 7 replications; seeded Sept. 9)

Variety	C. I. No.	Winter Survival	Date Headed	Date Ripe	Stem rust	Lodging	Wt. per bu.	Av. acre yield	Av. yield 1943-1947	Av. yield 1946-1947	No. years grown	Percent of Kharkof	Rank
		%	June	July	%	%	Lbs.	Bu.	Bu.	Bu.			
Chiefkan x Cheyenne (422123)		90	11	26	54	70	61.6	53.0	---	---	1	121.3	1
Cheyenne x Turkey	12142	89	11	26	63	89	59.8	49.1	---	38.1	3	109.9	3
Compound Hybrid	12501	95	12	26	44	97	59.7	46.8	---	38.0	2	111.1	2
Chiefkan x Oro-Tenmarq	12133	81	8	25	38	28	62.8	45.0	---	---	1	103.0	5
Kharkof	1442	90	12	26	76	92	60.1	43.7	35.0	34.2	10	100.0	9
Cheyenne x Early Blackhull	12122	74	8	26	41	53	62.9	42.5	---	34.0	3	102.5	6
Cheyenne	8885	84	12	27	84	46	59.7	38.4	36.8	33.3	10	107.8	4
Wichita	11952	71	8	25	28	11	61.8	36.8	31.8	29.6	5	90.8	15
Blackhull	6251	89	10	26	64	76	59.6	35.6	31.6	29.1	10	93.7	12
Red Chief	12109	87	8	26	46	14	64.1	35.2	29.5	29.6	5	84.4	18
Cheyenne x Hung. Sel. (403858)		80	11	26	78	44	56.7	35.2	---	31.1	2	91.1	14
Comanche	11673	79	8	26	38	72	60.6	35.0	33.1	29.4	7	97.6	10
Nebred	10094	81	10	26	59	57	61.5	34.8	34.2	30.6	8	100.1	8
Nebraska No. 60	6250	71	15	27	90	70	58.9	33.6	33.6	31.0	10	100.8	7
Pawnee	11669	83	8	26	49	69	61.3	32.9	32.5	27.9	7	96.0	11
Hungarian Sel. x Nebred (405304)		60	13	27	65	21	59.4	32.9	---	27.1	2	79.4	19
Marquillo x Oro (Ks. 383464)		56	12	28	25	21	59.5	32.1	---	28.1	3	87.3	17
Turkey x Turkey-Cheyenne (383130)		50	11	27	55	44	60.1	29.5	---	---	1	67.5	20
Cheyenne x Tenmarq	11972	56	12	27	86	28	57.6	27.3	---	26.5	4	92.2	13
Tenmarq	6936	45	12	27	80	41	54.4	19.7	29.7	22.3	10	90.5	16

Standard error of a difference between mean yields of any two varieties = 3.59 bushels.

Table 1. (Continued)

Waseca, Minnesota

(Three, 1/40 acre plots)

Variety	Number C. I.	Number Minn.	Winter survival	Date Headed	Date Ripe	Ht.	Grain texture 1/	Wt. per bu.	Av. acre yield	Av. yield 1943	Av. yield 1946	Av. yield 1947	No. years grown	Percent of Minturki	Rank
			%	June	July	In.	%	Lbs.	Bu.	Bu.	Bu.				
Hope x Minturki[2]	12506	2724	100	23	23	36	76	61.8	34.5	--	19.8	2		83.9	15
H_{44} x Minturki[3]		2785	100	24	23	34	70	61.3	34.1	--	--	1		106.2	2
H_{44}-Minhardi x Marmin	12509	2786	100	23	23	37	68	60.5	33.8	--	--	1		105.3	3
Marmin x H_{44}-Minhardi		2783	100	23	23	39	77	62.3	32.4	--	--	1		100.9	4
Minturki	6155	1507	100	27	23	40	68	60.8	32.1	18.7	23.6	15		100.0	7
Blackhawk	12218	2725	87	25	26	38	60	60.4	32.0	--	17.5	4		93.1	12
H_{44} x Minturki[3]		2782	100	23	22	38	68	61.0	31.8	--	--	1		99.1	9
Marmin x H_{44}-Minhardi	12508	2768	100	23	24	38	73	60.7	31.5	--	23.8	2		100.6	5
Marmin	11502	2614	100	21	20	38	65	61.3	31.1	18.1	19.8	13		100.0	7
Minter	12138	2713	100	23	23	36	76	61.3	30.9	20.8	21.2	6		111.4	1
H_{44} x Minturki[3]		2784	100	24	25	40	78	60.4	30.9	--	--	1		96.3	10
Minhardi-Minhardi x H_{44}-Minhardi		2769	100	23	22	38	80	62.3	30.7	--	18.6	2		78.6	17
H_{44} x Minturki[3]		2772	95	23	25	39	78	61.0	30.7	--	22.4	2		94.9	11
H_{44} x Minturki[4]	12532	2765	100	23	22	39	72	60.9	30.4	--	19.4	2		82.2	16
H_{44} x Minhardi		2770	95	23	23	36	80	62.3	29.5	--	20.5	2		86.7	14
H_{44} x Minturki[2]		2780	100	22	23	39	75	61.3	29.3	--	--	1		91.3	13
H_{44} x Minturki[2]	12139	2714	100	24	24	38	68	59.4	28.9	17.7	19.8	6		100.6	5
H_{44} x Minturki[3]		2767	100	24	24	39	77	61.0	26.5	--	16.0	2		67.8	18

1/ All 95% plumpness except Minn. 2770 which was 93%.

Standard error of a difference between the mean yields of any two varieties = 3.08 bushels.

Table 1. (Continued)

St. Paul, Minnesota

(Three 1/40 acre plots)

Variety	Number C. I.	Number Minn.	Winter Survival	Date Headed	Date Ripe	Ht.	Leaf rust	Mildew	Lodging Percent	Lodging Degree	Plumpness	Texture	Wt. per bu.	Av. acre yield	Av. yield 1946-7	No. years grown	Percent of Minturki	Rank
			%	June	July	In.	%						Lbs.	Bu.	Bu.			
H_{44}-Minh. x Marmin	12509	2786	82	26	28	41	40	0	0	0	95	75	60.4	57.4	--	1	123.2	1
H_{44} x Minturki^3		2785	96	26	28	41	40	T	2	20	95	80	61.2	54.0	--	1	115.9	2
Marmin x H_{44}-Minh.	12508	2768	97	25	28	43	30	L+	0	0	95	80	61.2	53.2	44.8	2	105.5	5
H_{44} x Minturki^3		2767	97	26	27	44	20	L	73	28	95	85	60.9	52.4	43.0	2	101.3	13
Hope x Minturki^2	12506	2724	96	26	29	43	5	T	10	60	92	82	59.9	52.0	46.4	2	109.3	4
Marmin	11502	2614	95	26	28	43	60	H-	40	60	93	75	59.7	51.3	44.7	9	102.7	10
H_{44} x Minturki^4	12532	2765	97	26	29	41	20	M-	70	59	95	82	59.8	49.7	47.1	2	111.0	3
Minter	12138	2713	99	26	28	42	5	0	100	23	92	82	59.5	49.2	44.8	4	105.2	6
Blackhawk	12218	2725	97	27	28	43	T	L	67	45	92	72	60.0	49.1	40.7	3	101.6	12
H_{44} x Minturki^3		2782	98	26	28	40	20	L	67	15	93	77	60.0	48.7	--	1	104.5	7
H_{44} x Minturki^3		2784	97	27	29	45	30	T	100	27	95	82	59.9	47.9	--	1	102.8	9
Marmin x H_{44}-Minh.		2783	95	27	29	41	25	0	100	52	90	78	59.6	47.7	--	1	102.4	11
H_{44} x Minturki^2	12139	2714	95	28	29	42	10	0	80	18	87	72	58.4	46.8	41.1	4	103.6	8
H_{44} x Minturki^2		2780	100	25	28	40	30	0	95	69	95	82	60.3	46.6	--	1	100.0	14
Minturki	6155	1507	95	27	28	43	60	H	87	30	93	72	59.5	46.6	42.5	9	100.0	14
Minard-Minh. x H_{44}-Minh.		2770	99	27	29	38	25	0	97	57	95	85	60.9	46.5	40.3	2	94.8	17
Minard-Minh. x H_{44}-Minh.		2769	98	26	28	38	25	0	100	62	95	82	60.6	46.1	41.2	2	96.9	16
H_{44} x Minturki^3		2772	99	27	29	41	5	0	100	35	87	80	58.5	44.3	39.3	2	92.6	18

Standard error of a difference between the mean yields of any two varieties = 3.16 bushels.

There was a trace of loose smut in No. 2767, 2614, 2782, 2783, 2780, 1507.

Table 1. (Continued)

Grand Rapids, Minnesota

(Three 1/40 acre plots)

Variety	Number C. I.	Number Minn.	Winter survival	Date Headed	Date Ripe	Rust Ht.	Rust Stem	Rust Leaf	Plumpness	Texture	Wt. per bu.	Av. acre yield	No. years grown	Percent of Minturki	Rank
			%	July	Aug.	In.	%	%			Lbs.	Bu.			
H_{44} x Minhardi		2770	77	6	7	41	5	37	95	85	61.9	36.6	1	187.7	1
Minter	12138	2713	53	6	6	38	11	22	95	83	61.0	33.3	3	123.0	6
Blackhawk	12218	2725	53	6	5	41	45	1	90	65	58.6	27.1	2	101.7	9
Minard-Minh. x H_{44}-Minh.		2769	55	7	5	36	3	35	95	83	62.0	26.3	1	134.9	2
H_{44} x Minturki^3		2767	63	6	4	37	2	35	95	78	61.3	25.2	1	129.2	3
Marmin x H_{44}-Minh.	12508	2768	67	6	5	32	6	43	95	73	60.6	24.8	1	127.2	4
H_{44} x Minturki^3		2782	53	7	5	37	17	35	95	67	60.0	24.5	1	125.6	5
H_{44} x Minturki^3		2784	50	7	6	37	19	40	95	75	60.3	22.9	1	117.4	7
Hope x Minturki^2	12506	2724	43	6	5	36	3	17	95	78	59.9	22.3	1	114.4	8
Marmin	11502	2614	45	6	5	35	32	52	95	68	60.4	20.7	7	95.7	13
H_{44} x Minturki^3		2772	43	7	6	35	8	40	95	80	60.9	19.7	1	101.1	10
Minturki	6155	1507	43	6	6	35	13	47	93	68	59.3	19.5	7	100.0	11
H_{44}-Minh. x Marmin	12509	2786	50	6	5	32	6	30	95	77	60.3	18.6	1	95.4	14
H_{44} x Minturki^2		2780	47	7	5	32	3	38	95	77	60.8	17.3	1	88.7	15
H_{44} x Minturki^4	12532	2765	42	6	4	31	3	42	95	77	61.5	16.3	1	83.6	16
H_{44} x Minturki^3		2785	42	7	6	32	13	45	95	73	59.8	15.9	1	81.5	17
Marmin x H_{44}-Minh.		2783	37	7	5	31	6	22	92	73	60.8	12.6	1	64.6	18
H_{44} x Minturki^2	12139	2714	37	7	5	30	1	22	92	65	57.5	10.6	3	98.1	12

Standard error of a difference between the mean yields of any two varieties = 11.50 bushels.

Table 1. (Continued)

Sheridan, Wyoming

(Three, 1/55 acre plots; seeded Oct. 17)

Variety	C. I. No.	Winter survival %	Date Headed	Date Ripe	Ht. In.	Weight per bushel Lbs.	Av. acre yield Bu.	Av. yield 1937-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Cheyenne	8885	93	6/31	8/3	48	59.3	43.1	39.6	56.3	13	110.2	1
Kanred	5146	93	6/26	8/1	46	57.0	37.6	38.3	52.8	17	106.0	2
Karmont	6700	90	7/3	8/3	47	58.3	37.6	35.1	46.8	17	98.0	6
Marmin	11502	93	6/29	8/4	51	60.0	37.0	34.4	43.3	12	94.1	8
Nebred	10094	88	7/1	8/3	47	59.0	34.8	36.6	47.7	11	99.9	5
Minturki	6155	93	7/3	8/4	54	58.3	34.8	33.9	45.1	17	92.0	9
Mont. 36-Bel. x Kanred	12108	93	7/5	8/5	48	59.7	33.4	--	47.3	6	100.5	3
Kharkof	1442	92	7/4	8/3	49	58.3	33.2	36.6	45.8	17	100.0	4
Yogo	8033	87	6/30	8/5	52	58.0	33.0	36.0	48.0	17	100.5	3
Rye #2148	--	--	6/2	7/29	57	52.7	31.8	--	--	1	95.8	7
H_{44} x Minturki	12139	92	7/4	8/5	51	55.7	31.3	--	47.8	3	91.5	10
Minter	12138	92	7/2	8/5	52	57.0	30.9	--	45.1	3	91.4	11

Note: Weak straw in Kanred, Kharkof, and Karmont

Standard error of a difference between the mean yields of any two varieties = 3.62 bushels.

Table 1. (Continued)

Bozeman, Montana

(Rod-row plots; five replications)

Variety	C. I. No.	Date Headed June	Date Ripe Aug.	Lodging %	Wt. per bu. Lbs.	Av. acre yield Bu.	Av. yield 1943-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Kharkof x Ridit (Huntley 4a)		25	8	60	60.2	73.7	—	—	1	130.0	1
Nebred	10094	24	5	20	62.6	68.5	65.3	62.8	9	109.7	4
Martin x Tenmarq[3]	11824	23	6	16	60.9	68.2	—	64.8	3	108.5	5
Martin x Tenmarq[3]	11823	22	6	24	60.2	67.8	—	64.9	3	115.8	2
Karmont	6700	26	6	46	61.7	64.9	60.3	62.7	12	100.0	10
Minter	12138	26	6	26	62.3	63.3	—	55.0	3	93.5	18
Newturk	6935	27	7	40	61.2	62.0	58.6	57.9	14	94.8	17
H_{44} x Minturki[2]	12139	28	7	18	59.4	61.1	—	58.4	3	100.1	9
Comanche	11673	20	4	12	61.7	61.0	—	—	1	107.6	6
Martin x Tenmarq[3]	11804	22	5	16	60.0	60.9	—	62.3	3	115.1	3
Yogo	8033	27	6	38	61.8	60.7	61.1	61.3	14	103.3	7
Wasatch	11925	25	6	26	61.6	60.1	—	57.9	4	95.4	16
Marmin	11502	24	5	20	60.8	58.9	54.3	55.4	10	90.1	20
Minturki	6155	27	7	18	61.4	57.9	57.1	56.1	14	96.3	14
Yogo x Oro (Sel. 5)		26	6	34	62.4	57.9	—	53.2	4	95.6	15
Cache	11599	26	8	56	61.4	57.7	53.4	58.3	6	91.3	19
Kharkof	1442	26	6	54	60.9	56.7	58.7	57.6	14	100.0	10
Wichita	11952	20	5	8	61.8	55.7	—	—	1	98.2	12
Mont. 36-Bel. x Kanred	12108	26	6	40	61.5	55.7	59.0	53.8	5	100.5	8
Compound Hybrid	11744	24	6	50	61.0	55.0	—	56.1	3	98.0	13
Pawnee	11669	21	6	2	60.8	49.8	—	—	1	87.8	21

Standard error of a difference between the mean yields of any two varieties = 4.30 bushels.

Table 1. (Continued)

Moccasin, Montana

(Rod-row plots; five replications)

Variety	C. I. No.	Date Headed July	Date Ripe Aug.	Height In.	Weight per bu. Lbs.	Av. acre yield Bu.	Av. yield 1941-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Yogo	8033	8	6	33	55.0	20.0	28.5	17.9	14	107.7	2
Mont. 36-Bel. x Kanred	12108	8	6	31	56.0	18.7	--	16.2	6	105.6	4
Marmin	11502	7	6	33	56.8	18.5	25.0	17.2	7	92.6	16
Kharkof	1442	8	6	32	55.0	18.2	27.0	17.0	14	100.0	8
Karmont	6700	9	7	29	55.0	18.1	27.6	17.6	14	102.2	6
Yogo x Oro, Sel. 5		8	6	29	55.3	17.6	--	18.7	6	102.3	5
Wasatch	11925	9	7	32	56.0	17.5	--	--	1	96.2	13
Cache	11599	8	9	28	55.0	17.1	--	--	1	94.0	15
Martin x Tenmarq^3	11804	9	9	29	51.0	16.7	--	14.9	3	108.4	1
Newturk	6935	7	7	30	53.0	16.6	--	--	1	91.2	17
Compound Hybrid	11744	9	8	29	54.0	16.1	--	16.5	6	99.0	9
H$_{44}$ x Minturki^2	12139	8	5	31	50.5	15.8	--	14.7	3	101.3	7
Minturki	6155	9	5	29	54.0	15.8	27.0	15.3	14	98.8	10
Nebred	10094	9	6	30	56.0	15.6	27.0	16.5	9	98.1	11
Martin x Tenmarq^3	11823	9	8	29	49.8	15.0	--	15.1	3	105.9	3
Pawnee	11669	8	6	27	55.5	15.0	--	--	1	82.4	19
Minter	12138	8	6	31	54.0	14.9	--	15.4	3	95.4	14
Huntley, Sel. 4a		9	10	29	53.5	14.9	--	14.6	2	85.9	18
Wichita	11952	9	9	28	58.0	14.0	--	--	1	76.9	20
Martin x Tenmarq^3	11824	9	9	28	54.5	13.7	--	13.1	3	97.3	12
Comanche	11673	9	12	26	55.5	12.2	--	--	1	67.0	21

Standard error of a difference between the mean yields of any two varieties = 1.65 bushels.

Havre, Montana

Table 1. (Concluded)

(Five, 1/50 acre plots; seeded Oct. 4; emerged Nov. 5)

Variety	C. I. No.	Winter Survival %	Height In.	Weight per bu. Lbs.	Yield per acre Bu.	Av. yield 1943-1947 Bu.	Av. yield 1946-1947 Bu.	No. years grown	Percent of Kharkof	Rank
Karmont	6700	98	36	56.9	20.7	18.8	19.6	15	104.9	3
Yogo	8033	96	35	56.5	18.3	20.4	19.0	15	112.1	1
Nebred	10094	90	31	58.1	16.5	16.7	16.6	10	90.1	11
Kharkof x Ridit. (Huntley 4a)		95	36	55.5	16.2	--	16.9	2	104.3	5
Mont. 36-Belog.-Kanred	12108	91	31	58.4	16.2	19.1	16.4	6	104.9	3
Kharkof	1442	96	34	56.3	16.0	18.1	16.2	15	100.0	8
Minturki	6155	94	35	56.6	15.7	18.6	17.0	15	103.3	7
Yogo x Oro (Mont. 5)		93	36	55.8	15.4	--	16.5	3	103.7	6
Marmin	11502	90	35	58.0	15.0	16.6	16.0	10	86.0	13
Minter	12138	79	34	56.2	14.0	--	16.0	4	96.5	10
Compound Hybred B.H.-32-33	11744	88	38	55.3	13.3	--	--	1	83.1	14
H44 x Minturki[2]	12139	96	33	52.4	12.3	--	16.1	4	96.8	9
Martin x Tenmarq[3]	11804	92	33	55.6	11.3	--	15.6	3	105.2	2
do.	11824	75	31	56.0	10.3	--	13.9	3	88.7	12

Note: All varieties headed by June 18 and ripe by July 29.

Standard error of a difference between the mean yields of any two varieties = 2.36 bushels.

Table 2.-- Number of plots, average yield, and standard errors for the variety tests at each cooperating station, 1947.

Station	No. of plots	Average yield all varieties	Standard error of a Single plot	Difference between means	Mean in Bushels	Mean in Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton	8*	23.97	3.94	1.97	1.39	5.80
Iowa Park	4*	24.88	5.51	3.90	2.76	11.09
Chillicothe	8*	36.01	5.95	2.97	2.10	5.83
Bushland:Dryland	8*	18.31	3.14	1.57	1.11	6.06
Irrigated	8*	27.65	3.73	1.87	1.32	4.77
Oklahoma:						
Lawton	3	24.36	1.97	1.61	1.14	6.61
Stillwater	4	24.67	2.76	1.95	1.38	5.59
Cherokee	4*	28.32	3.30	2.33	1.65	5.83
Woodward	4	24.61	2.32	1.64	1.16	4.71
Goodwell	5*	20.46	5.35	3.38	2.39	11.68
Kansas:						
Manhattan	3					
Hays	4	38.67	2.25	1.60	1.13	2.92
Garden City	3	34.34	1.63	1.33	.94	2.74
Colby	3	32.57	2.66	2.18	1.54	4.73
Colorado:						
Akron	4	22.88	2.75	1.95	1.38	6.03
Ft. Collins	7*	25.10	6.81	3.63	2.57	10.24
Nebraska:						
Lincoln	5	37.08	4.69	2.97	2.10	5.66
North Platte	4	30.85	3.52	2.49	1.76	5.71
Alliance	7*	36.96	6.72	3.59	2.54	6.87
Minnesota:						
Waseca	3	31.17	3.77	3.08	2.18	6.99
St. Paul	3	49.43	3.87	3.16	2.24	4.53
Grand Rapids	3	21.91	14.09	11.50	8.14	37.15
Wyoming:						
Sheridan	3	35:19	4.44	3.62	2.56	7.27
Montana:						
Bozeman	5*	60.84	6.80	4.30	3.04	5.00
Moccasin	5*	16.30	2.62	1.65	1.17	7.18
Havre	5	15.08	3.73	2.36	1.67	11.07

* Nursery Plots

SUMMARY OF PLOT DATA

The yields by districts and by states have been summarized in tables 3 to 15. Wherever possible the yields for 1947 and for the last two years are shown. Other agronomic data are summarized in tables 16-18.

Yields by Districts

In the southern district there were yields in 1947 on 12 varieties from eight stations and for the two-year period, 11 varieties representing 15 station years. (Tables 3 and 4). Cimarron, C. I. 12122, Comanche, and Pawnee were highest in 1947 while C. I. 12122, Westar, Pawnee, and Comanche led in the 1946-47 averages. Blackhull, Tenmarq, and Kharkof had the lowest averages.

Table 3.--Summary of average yields of winter wheat varieties grown uniformly in plot tests at 8 stations in the southern district, 1947.

Variety	C. I. No.	Average yield in bushels per acre at: Den-ton	Iowa Park	Chillicothe	Bushland	Lawton	Stillwater	Chero-kee	Woodward	Av.
Cimarron	12120	25.5	25.4	45.0	24.9	29.7	29.9	33.2	29.2	30.4
Cheyenne x E. Blackhull	12122	26.8	24.6	46.0	24.7	27.2	24.5	30.1	30.9	29.4
Comanche	11673	27.1	27.6	40.0	22.8	30.0	25.7	30.6	24.8	28.6
Pawnee	11669	23.2	26.7	38.7	23.8	24.2	24.4	32.6	27.3	27.6
Early Blackhull	8856	29.8	24.8	38.8	18.3	26.8	23.2	27.8	25.1	26.8
Westar	12110	22.1	27.2	31.4	25.1	27.0	29.9	26.2	22.1	26.4
Wichita	11952	22.2	26.7	37.3	18.7	23.5	20.6	31.5	26.3	25.9
Triumph	12132	22.4	21.7	38.4	19.0	25.8	25.7	28.0	23.9	25.6
Red Chief	12109	22.3	17.4	35.3	23.4	20.0	23.3	28.9	24.0	24.3
Tenmarq	6936	18.8	22.7	32.1	25.0	19.5	23.4	28.1	23.7	24.2
Blackhull	6251	21.0	18.2	34.0	25.4	22.1	23.6	24.1	21.2	23.7
Kharkof	1442	21.2	21.1	24.8	25.0	20.3	25.2	26.6	21.9	23.3

Table 4.--Summary of varietal yields from plot tests at 9 stations in the southern district for all or part of the period 1946-47.

Variety	C. I. No.	Average yield in bushels per acre at: Den-ton	Iowa Park	Chillicothe	Bushland	Lawton	Stillwater	Chero-kee	Woodward	Good-well	Av.
No. years grown		2	2	2	1	1	2	2	2	1	15
Cheyenne x E. Blackhull	12122	25.9	26.5	33.5	24.7	27.2	22.6	30.4	27.9	26.4	27.5
Westar	12110	27.1	30.9	27.5	25.1	27.0	25.4	30.2	26.0	25.1	27.4
Pawnee	11669	26.0	27.4	30.2	23.8	24.2	26.1	29.0	27.9	22.0	26.9
Comanche	11673	29.3	28.2	30.0	22.8	30.0	22.4	27.4	26.7	22.9	26.9
Triumph	12132	24.8	23.3	27.7	19.0	25.8	21.9	31.6	26.3	19.4	25.0
Red Chief	12109	23.0	21.1	27.5	23.4	20.0	23.4	29.6	27.2	23.8	24.7
Early Blackhull	8856	26.7	23.5	27.6	18.3	26.8	20.7	29.7	25.6	17.2	24.7
Wichita	11952	19.3	25.2	27.8	18.7	23.5	19.9	28.1	28.7	25.1	24.4
Blackhull	6251	22.3	21.1	26.6	25.4	22.1	22.2	23.6	22.9	25.5	23.4
Kharkof	1442	24.0	23.4	22.1	25.0	20.3	22.0	22.9	21.5	21.1	22.6
Tenmarq	6936	19.5	21.3	25.9	25.0	19.5	18.8	24.7	23.2	24.0	22.4

There were ten varieties grown at eight central stations in 1947 with C. I. 12133 and Pawnee in the lead; Blackhull and Tenmarq were lowest. (Table 5). Two-year averages are incomplete for Cheyenne but the other eight varieties were grown at nine stations both years. (Table 6). The averages favor Cheyenne, C. I. 12122, Pawnee, and Red Chief. Kharkof and Wichita are at the bottom of the list.

Table 5.--Summary of average yields of the uniform varieties grown in plot tests at 8 stations in the central district, 1947.

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Garden City	Hays	Colby	Akron	Ft. Collins	North Platte	Alliance	Av.
Chiefkan x Oro-Tenq.	12133	34.6	41.0	38.5	40.3	27.7	31.8	31.2	45.0	36.3
Pawnee	11669	42.1	37.4	40.2	36.1	31.0	31.6	36.0	32.9	35.9
Cheyenne	8885	30.3	--	41.5	33.6	21.6	43.8	34.8	38.4	34.9 2/
Chey. x E. Blackhull	12122	35.7	40.8	40.0	38.2	25.4	21.0	34.2	42.5	34.7
Wichita	11952	37.9	33.5	38.0	36.7	19.9	20.4	32.8	36.8	32.0
Comanche	11673	35.0	38.9	38.4	32.4	21.6	22.0	28.5	35.0	31.5
Red Chief	12109	30.8	28.5	37.1	30.7	25.7	30.2	29.3	35.2	30.9
Kharkof	1442	26.2	31.9 1/	36.6	24.5 1/	20.9	27.5	29.3	43.7	30.1
Tenmarq	6936	30.9	34.0	37.7	29.7	16.6	30.1	30.8	19.7	28.7
Blackhull	6251	22.2	30.2	34.1	28.0	29.8	17.7	27.8	35.6	28.2

1/ Turkey C. I. 1558 2/ Seven stations

Table 6.--Summary of varietal yields from plot tests of 9 stations in the central district for the period 1946-47.

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Garden City	Hays	Colby	Akron	Ft. Collins	Lincoln	North Platte	Alliance	Av.
No. years grown		2	2	2	2	2	2	2	2	2	18
Cheyenne	8885	28.0	--	32.2	37.0	18.7	48.7	35.6	37.8	33.3	33.9 2/
Chey. x E. Blkhl.	12122	32.3	29.0	28.1	43.6	17.7	38.2	33.5	39.7	34.0	32.9
Pawnee	11669	36.9	27.6	28.0	33.5	19.0	40.7	40.1	37.8	27.9	32.4
Red Chief	12109	27.7	28.6	27.5	36.1	17.9	40.4	42.7	31.8	29.6	31.4
Comanche	11673	31.5	31.0	28.4	35.9	15.7	36.6	36.6	32.9	29.4	30.9
Tenmarq	6936	30.5	28.2	28.6	33.1	14.3	43.5	32.1	32.9	22.3	29.5
Blackhull	6251	25.2	29.3	26.2	35.8	21.9	32.5	32.5	32.3	29.1	29.4
Kharkof	1442	23.0	26.4 1/	28.3	29.4 1/	18.0	39.5	28.0	33.0	34.2	28.9
Wichita	11952	31.3	22.9	24.7	33.9	11.4	31.3	34.9	34.8	29.6	28.3

1/ Turkey C. I. 1558 2/ Eight stations

Only four varieties were grown uniformly in the northern district as shown in tables 7 and 8. In 1947 the seven-station average favored Minter and Marmin and in the two-year period, with data from six stations, there was less than a bushel difference in the averages.

Table 7.--Summary of average yields of the uniform varieties grown in plot tests at 7 stations in the northern district, 1947.

Variety	C. I. No.	Average yield in bushels per acre at: Waseca	St. Paul	Grand Rapids	Sheridan	Bozeman	Moccasin	Havre	Av.
Minter	12138	30.9	49.2	33.3	30.9	63.3	14.9	14.0	33.8
Marmin	11502	31.1	51.3	20.7	37.0	58.9	18.5	15.0	33.2
Minturki	6155	32.1	46.6	19.5	34.8	57.9	15.8	15.7	31.8
H_{44} x Mint.^{2}	12139	28.9	46.8	10.6	31.3	61.1	15.8	12.3	29.5

Table 8.--Summary of varietal yields from plot tests at 6 stations in the northern district for the period 1946-47.

Variety	C. I. No.	Average yield in bushels per acre at: Waseca	St. Paul	Sheridan	Bozeman	Moccasin	Havre	Av.
No. years grown		2	2	2	2	2	2	12
Minturki	6155	23.6	42.5	45.1	56.1	15.3	17.0	33.3
H_{44} x Mint.[2]	12139	19.8	41.1	47.8	58.4	14.7	16.1	33.0
Minter	12138	21.2	44.8	45.1	55.0	15.4	16.0	32.9
Marmin	11502	19.8	44.7	43.3	55.4	17.2	16.0	32.7

Yields by States

In the seven states with two or more stations reporting yields, a summary for 1947 and the period 1946-47 was prepared on each. The results are self evident in tables 9 to 15. C. I. 12122, Cimarron, and Comanche were the leaders in Texas and Oklahoma this year. Except for Cimarron, these varieties with Westar were best in the two-year averages. In Kansas, Pawnee, C. I. 12128, C. I. 12122 and C. I. 12133 led in 1947; and for the two-year period, C. I. 12133, C. I. 12122, Cheyenne, Comanche, and Pawnee had good records. The Colorado results favor C. I. 11972, Cheyenne, and Pawnee. In Nebraska Pawnee, Cheyenne, Red Chief, and C. I. 12122 have the highest rank. Minter had the best average in 1947 in Minnesota. For the two-year period three unnamed hybrids ranked highest. Blackhawk, a soft wheat, did rather well in 1947 but was low in yield in 1946. Huntley 4A, selected from a Kharkof x Ridit cross, was highest in average yield in Montana this year, followed by Karmont, Nebred, and Yogo. The latter three had the best two-year average.

Table 9.--Average yield in bushels per acre of varieties grown in plot tests in Texas in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (4 stations)	1946-47 (7 Sta. yrs.)	Rank of 2-year Averages
Chey. x E. Blackhull	12122	30.5	28.1	2
Cimarron	12120	30.2	--	
Comanche	11673	29.4	28.3	1
Pawnee	11669	28.1	27.3	4
Early Blackhull	8856	27.9	24.8	5
Westar	12110	26.5	28.0	3
Wichita	11952	26.2	23.3	10
Triumph	12132	25.4	24.4	6
Tenmarq	6936	24.7	22.6	11
Blackhull	6251	24.7	23.6	8
Red Chief	12109	24.6	23.8	7
Kharkof	1442	23.0	23.4	9

Table 10.--Average yield in bushels per acre of varieties grown in plot tests in Oklahoma in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (4 stations)	Average, bushels per acre: 1946 - 47 (8 sta. yrs.)	Rank of 2-year Averages
Cimarron	12120	30.5	--	--
Chey. x E. Blackhull	12122	28.2	26.9	1
Comanche	11673	27.8	25.7	4
Pawnee	11669	27.1	26.5	3
Reliant	12144	26.4	--	--
Westar	12110	26.3	26.9	1
Triumph	12132	25.9	25.6	6
Early Blackhull	8856	25.7	24.5	9
Wichita	11952	25.5	25.3	8
Cheyenne	8885	25.4	25.7	4
Red Chief	12109	24.1	25.5	7
Tenmarq	6936	23.7	22.1	11
Kharkof	1442	23.5	21.8	12
Blackhull	6251	22.8	23.1	10

Table 11.--Average yield in bushels per acre of varieties grown in plot tests in Kansas in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (4 stations)	Average, bushels per acre: 1946 - 47 (8 sta. yrs.)	Rank of 2-year Averages
Pawnee	11669	39.0	31.5	5
Kv.-Mqo. x Kv.-Tenq.	12128	38.8	--	--
Chey. x E. Blackhull	12122	38.7	33.3	2
Chiefkan x Oro-Tenq.	12133	38.6	33.5	1
Westar	12110	38.2	31.3	6
Triumph	12132	36.6	--	--
Wichita	11952	36.5	28.2	11
Comanche	11673	36.2	31.7	4
Cheyenne	8885	35.1 1/	32.4 1/	3
Blue Jacket	12502	34.6	--	--
Tenmarq	6936	33.1	30.1	7
Chiefkan	11754	32.3	29.6	9
Red Chief	12109	31.8	30.0	8
Kharkof	1442	29.8 2/	26.8 2/	12
Blackhull	6251	28.6	29.1	10

1/ Three stations and 6 station years, respectively.

2/ Turkey C. I. 1558 at 2 stations instead of Kharkof.

Table 12.—Average yield in bushels per acre of varieties grown in plot tests in Colorado in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (2 stations)	Average, bushels per acre: 1946-47 (4 sta. yrs.)	Rank of 2-year Averages
Cheyenne x Tenmarq	11972	33.2	35.4	1
Cheyenne	8885	32.7	33.7	2
Pawnee	11669	31.3	29.9	3
Chiefkan x Oro-Tenq.	12133	29.8	--	--
Red Chief	12109	28.0	29.2	4
Kharkof	1442	24.2	28.8	6
Blackhull	6251	23.8	27.2	9
Kanred	5146	23.8	28.3	7
Tenmarq	6936	23.4	28.9	5
Chey. x E. Blackhull	12122	23.2	28.0	8
Comanche	11673	21.8	26.2	10
Wichita	11952	20.2	21.4	11
Early Blackhull	8856	17.0	18.0	12

Table 13.--Average yield in bushels per acre of varieties grown in plot tests in Nebraska in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (3 stations)	Average, bushels per acre: 1946-47 (6 sta. yrs.)	Rank of 2-year Averages
Red Chief	12109	39.8	34.7	4
Pawnee	11669	37.6	35.3	3
Chey. x E. Blackhull	12122	36.6	35.7	1
Cheyenne	8885	36.4	35.6	2
Wichita	11952	36.0	33.1	5
Comanche	11673	35.4	33.0	6
Nebred	10094	33.7	31.4	10
Kharkof	1442	33.4	31.7	9
Blackhull	6251	32.3	31.3	11
Nebraska 60	6250	32.1	32.0	7
Cheyenne x Tenmarq	11972	28.7	32.0	7
Tenmarq	6936	27.7	29.1	12

Table 14.--Average yield in bushels per acre of varieties grown in plot tests in Minnesota in 1947 and for the period 1946-47.

Variety	C. I. or Sel. No.	Average, bushels per acre: 1947 (3 stations)	Average, bushels per acre: 1946-47 (4 sta. yrs.)	Rank of 2-year Averages
Minter	12138	37.8	33.0	5
Minard-Minh. x H_{44}-Minh.	2770	37.5	30.4	9
H_{44}-Minh. x Marmin	12509	36.6	--	--
Marmin x H_{44}-Minh.	12508	36.5	34.3	1
Hope x Mint.^{2}	12506	36.3	33.1	3
Blackhawk	12218	36.1	29.1	12
H_{44} x Mint.^{3}	2782	35.0	--	--
do	2767	34.7	29.5	11
do	2785	34.7	--	--
Marmin	11502	34.4	32.3	6
Minard-Minh. x H_{44}-Minh.	2769	34.4	29.9	10
H_{44} x Mint.^{3}	2784	33.9	--	--
Minturki	6155	32.7	33.1	3
H_{44} x Mint.^{4}	12532	32.1	33.3	2
H_{44} x Mint.^{3}	2772	31.6	30.9	7
H_{44} x Mint.^{2}	2780	31.1	--	--
Marmin x H_{44}-Minh.	2783	30.9	--	--
H_{44} x Mint. 2	12139	28.8	30.5	8

Table 15.--Average yield in bushels per acre of varieties grown in plot tests in Montana in 1947 and for the period 1946-47.

Variety	C. I. No.	Average, bushels per acre: 1947 (3 stations)	Average, bushels per acre: 1946-47 (6 sta. yrs.)	Rank of 2-year Averages
Kharkof x Ridit (Huntley 4A)		34.9	--	--
Karmont	6700	34.6	33.3	1
Nebred	10094	33.5	32.0	3
Yogo	8033	33.0	32.7	2
Marmin	11502	30.8	29.5	8
Minter	12138	30.7	28.8	11
Martin x Tenmarq^3	11824	30.7	30.8	5
Kharkof	1442	30.3	30.3	6
Yogo x Oro (Sel. 5)		30.3	29.5	8
Mont. 36-Bel. x Kan.	12108	30.2	28.8	11
Minturki	6155	29.8	29.5	8
H_{44} x Mint.^{2}	12139	29.7	29.7	7
Martin x Tenmarq^3	11804	29.6	30.9	4
Compound Hyb.	11744	28.1	--	--

SUMMARY OF AGRONOMIC DATA

Agronomic data other than yield are summarized for the varieties by districts in tables 16 to 18. In the southern district three to eight stations reported on six characters. Early Blackhull and Triumph were the earliest to head and ripen, followed in order by Wichita, C. I. 12122, Cimarron, and Comanche. Kharkof was the latest variety. In height, Pawnee and Cimarron were the shortest, Blackhull and Red Chief the tallest. Lodging has great significance in the efficiency of combining wheat. Only three stations reported differences but the weakness of Early Blackhull and C.I. 12122 is a serious fault in both varieties. Leaf rust attacked the wheat at five stations. Westar with 14% and Pawnee with 25% were most resistant but were far from immune. Red Chief ranked second to Cimarron in test weight this year with Triumph, C. I. 12122 and Early Blackhull surpassing 61 pounds.

Table 16.--Summary of agronomic data other than yield for varieties grown in the southern district in 1947.

Variety	C. I. No.	Date Headed	Date Ripe	Height	Lodging	Leaf rust	Weight per bushel
		May	June	In.	%	%	lbs.
Number of stations		7	7	5	3	5	8
Kharkof	1442	11	13	38	13	39	58.3
Blackhull	6251	8	12	39	15	42	60.6
Tenmarq	6936	8	12	38	--	42	58.4
Early Blackhull	8856	4-29	5	37	56	46	61.4
Pawnee	11669	7	9	34	28	25	59.3
Comanche	11673	5	10	37	26	29	59.0
Wichita	11952	2	5	36	44	45	60.8
Red Chief	12109	8	12	39	--	39	61.7
Westar	12110	6	11	38	23	14	59.0
Cimarron	12120	3	10	34	17	36	62.3
Chey. x E. Blackhull	12122	3	8	36	53	35	61.1
Triumph	12132	1	5	35	35	46	61.1

Three to seven stations from the central district reported on seven characters. Wichita, C. I. 12122, Pawnee, and C. I. 12133 were the earliest varieties; Kharkof and Cheyenne were the latest. Red Chief was the tallest and C. I. 12122 was the shortest. Leaf and stem rust readings were high on most of the varieties which re-emphasizes the need to breed for greater resistance in acceptable varieties. Lodging at five stations indicated Red Chief had the stiffest straw and that C. I. 12122, Comanche, and Kharkof were weakest. Four varieties exceeded 62 pounds in test weight, but Red Chief was the highest among them.

Table 17.--Summary of agronomic data other than yield for varieties grown in the central district in 1947.

Variety	C. I. No.	Date Headed	Date Ripe	Height	Rust Leaf	Rust Stem	Lodging	Weight per bushel
		June	July	In.	%	%	%	lbs.
Number of stations		7	6	6	4	3	5	7
Kharkof	1442	7 1/	15 2/	43 1/	46 2/	42	56 2/	59.9 1/
Blackhull	6251	4	13	44	44	31	39	61.5
Tenmarq	6936	4	14	44	38	50	28	59.4
Cheyenne 3/	8885	7	15	42	41	58	20	61.0
Pawnee	11669	1	11	41	13	28	31	61.5
Comanche	11673	2	12	42	34	26	44	60.7
Wichita	11952	5-31	10	42	51	13	19	62.0
Red Chief	12109	3	14	45	28	35	16	63.7
Chey. x E. Blackhull	12122	1	11	40	49	19	41	62.6
Chiefkan x Oro-Teng.	12133	1	12	41	43	16	24	62.2

1/ Turkey C. I. 1558 at 2 stations.

2/ Turkey C. I. 1558 at one station.

3/ One station less than indicated except for stem rust.

The northern district summary is given in table 18 on four varieties. Differences appeared in lodging, leaf rust and test weight, but not in the other four factors. Marmin had the stiffest straw; Minter and C. I. 12139 showed some resistance to leaf rust. C. I. 12139 fell below the other varieties in test weight.

Table 18.--Summary of agronomic data other than yield for varieties grown in the northern district in 1947.

Variety	C. I. No.	Winter Surv.	Date Headed	Date Ripe	Height	Lodging	Leaf rust	Weight per bushel
		%		Aug.	In.	%	%	lbs.
Number of stations		5	6	6	6	2	2	7
Minturki	6155	85	7-1	2	39	53	54	58.6
Marmin	11502	85	6-29	2	39	30	56	59.6
Minter	12138	85	6-30	2	39	63	14	58.8
H_{44} x Minturki^2	12139	84	7-1	2	38	49	16	56.2

UNIFORM YIELD NURSERY

The uniform yield nursery was sown in the fall of 1946 at 15 stations in the central and southern districts of the Region. Results were secured from all of them and are tabulated on the pages which follow. The nursery plots were of either three or four rows, permitting the harvesting of 16 square feet as one plot. These were arranged in three or more replications. Most of the stations used randomized order of entries within a replication. The entries in the test in 1947 were as follows:

Variety or Cross	C. I. No.	State No.
Kharkof	1442	.....
Blackhull	6251	.....
Early Blackhull	8856	.....
Comanche	11673	Kans. No. 2729
Pawnee	11669	Nebr. No. 1086
Wichita	11952	Kans. No. 2739
Cheyenne x Early Blackhull	12000	Woodward No. 1127
Cheyenne x Early Blackhull	12122	Hays Cereal No. 40-95
Blackhull x Cheyenne	12101	Hays Cereal No. 40-102
Westar	12110	Amarillo Sel. No. 25-34-116
Quivira x Tenmarq	12116	Kans. No. 2762
Cimarron	12120	Woodward No. 36h769-150
Kaw.-Marquillo x Kawvale-Tenmarq	12128	Kans. No. 2775
Cheyenne x Chiefkan	12129	Denton No. 42-2519
Triumph	12132	.....
Chiefkan x Oro-Tenmarq	12133	Hays Cereal No. 43-112
Chiefkan x Oro-Tenmarq	12134	Hays Cereal No. 43-113
Kanred x Hope-Hd. Federation	12135	Akron No. 536
Kanred x Hope-Hd. Federation	12136	Akron No. 869
Oro x Mediterranean-Hope	12140	Oklahoma No. 21
Medit.-Hope x Pawnee	12141	Kans. No. 2789
Cheyenne x Turkey	12142	N.P. No. 40410
(Com. x Honor-Fwd) x (Hope-Med. x Com)	12145	Texas Sel. 171-43-29
Martin-Tenmarq x Chiefkan	12146	Texas Sel. 160-42-333
Martin-Tenmarq x Kharkof	12147	Texas Sel. 43-2142
Chiefkan x Oro-Tenmarq	12148	Hays Cereal No. 45-51
Kawvale-Tenmarq x Comanche	12149	Kans. No. 2791
Turkey	12150	Colorado
Nebr. No. 60 x Medit.-Hope	12500	Nebr. Sel. 366-26
Compound Hybrid	12501	Nebr. No. 1139

The eight strains listed last were new entries included for the first time this year; hence, they do not appear in the tables of two-year summaries. Six strains were discontinued for various reasons from the list as reported in 1946. Ordinarily a strain is kept for at least two years in this nursery when it may be advanced to the plot tests or discarded. A few duplications exist between the nursery and plot series which serve as check varieties and in supplying data from stations where inclusion of certain varieties in the plot series could not be justified.

DATA OBTAINED

Table 19 contains the average of data obtained at the 15 cooperating stations in 1947 along with yield summaries for varieties grown in 1946 and 1947 and relative yields in per cent of Kharkof for all years available. The varieties are listed in declining order of yield in 1947. The same general conditions prevailing in the plot series already discussed are applicable to the uniform yield nursery as grown at each station, and will not be repeated in this section of the report.

The nursery was grown at three stations in Texas. Excellent notes were recorded and highly significant differences in yields resulted. Early Blackhull, C. I. 12148, C. I. 12147 and Comanche were highest in yield at Denton. C. I. 12148, Cimarron, C. I. 12122, C. I. 12133, C. I. 12141, and C. I. 12128 were best at Chillicothe. Leaf rust readings at these stations pointed to high resistance in C. I. 12128 and C. I. 12145. In the Bushland experiment, Westar was the highest named variety but was exceeded by eight unnamed hybrid selections.

There were three tests in Oklahoma. Rather complete notes were taken at Stillwater. C. I. 12122, Triumph, and C. I. 12128 were highest in yield but several others yielded within the range of these varieties as indicated by the error term. Wichita and Cimarron were highest at Cherokee. Cimarron, Triumph, Pawnee, and Wichita held the top places in 1947 at Woodward, although the yields were low.

There were two tests in Kansas with Westar, C. I. 12116, C. I. 12148, and Pawnee highest in yield at Manhattan; C. I. 12149, C. I. 12128, C. I. 12500 and C. I. 12141 were the four high entries at Hays. Lodging and leaf rust were high at both stations. Extremely high yields were recorded at the Hays station.

The three Colorado tests were located at Akron, Ft. Collins, and Hesperus. At Akron, notes on rust and a type of mosaic were reported and these maladies were important in the performance of the wheat. C. I. 12148, Triumph, C. I. 12122, and C. I. 12133 yielded the most grain in 1947. Frost damaged the varieties at Ft. Collins and depressed yields. Leaf and stem rust were severe except on C. I. 12145 and C. I. 12140 which appeared most resistant. Highest yields were recorded for C. I. 12129, C. I. 12133, and C. I. 12101, all unnamed selections. Again, at Hesperus, a freeze on June 12 injured the wheat at blossom time and depressed yields. Excellent stands and good growth were reported. There was no lodging, smut or rust present. C. I. 12142, C. I. 12134, and C. I. 12116 were highest in yield this year.

At Ames quite a number of selections yielded well. Little or no lodging occurred in any variety and no diseases or winterkilling were reported. The highest ranking varieties were C. I. 12142, C. I. 12129, C. I. 12128 and Pawnee. For the two-year period, C. I. 12142 has the best average. Cimarron, C. I. 12147 and C. I. 12135 have the lowest relative yields.

Results from three stations were reported from Nebraska. At Lincoln, C. I. 12128 yielded 40 bushels to the acre followed by Westar, C. I. 12148, C. I. 12145, and C. I. 12141 with Wichita lowest in yield at 19.9 bushels. Test weights ranged from 49.8 pounds for C. I. 12135 to 60.2 pounds for Cimarron and Triumph. Leaf and stem rust and lodging depressed yields although stem rust developed late. C. I. 12128 has been very promising at this station during the three seasons of testing. The North Platte yields were very high this year with C. I. 12142 and C. I. 12150 exceeding 45 bushels to the acre while Triumph and Early Blackhull yielded about 22.5 bushels. The latter two varieties and several other early ones were injured by the late May freeze. Test weights were above 60 pounds. C. I. 12142 has an excellent record at this station. Winterkilling at Alliance reduced stands in most varieties, but nearly eliminated C. I. 12145. C. I. 12133 was highest in yield followed by C. I. 12142 and Kharkof, all producing about 41 bushels to the acre. Stem rust and lodging affected yields. The more hardy Turkey types generally have excelled at the Alliance station.

Table 19.--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 area in 1947, and yield summaries for various periods.

Denton, Texas
(Four plots)

C. I. No.	Date Headed	Date Ripe	Height	Rust Leaf	Rust Stem	Septoria	Weight per bushel	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
			In.	%	%		Lbs.	Bu.	Bu.			
8856	4/22	5/26	40	65	0	3	63.5	34.3	28.2	14	147.2	3
12148	4/26	5/29	36	41	T	3	61.5	31.4	--	1	134.2	6
12147	5/2	6/4	34	45	6	3	57.5	31.0	--	1	132.5	7
11673	4/29	6/1	37	45	3	3	57.0	28.5	27.3	10	161.4	1
12000	4/25	5/29	36	68	T	3	62.0	28.4	26.5	6	129.1	9
12146	4/28	5/31	37	48	T	3	60.0	27.7	--	1	118.4	14
12116	4/29	6/1	37	44	4	4	60.0	27.6	24.8	5	114.9	16
12122	4/26	5/31	38	65	T	3	62.0	27.0	27.2	4	136.0	4
11669	5/1	6/4	34	34	T	3	59.0	25.8	25.7	11	149.2	2
12134	4/28	5/31	37	58	9	3	60.0	25.7	26.1	3	113.0	17
12141	4/29	6/2	35	27	0	4	59.5	25.5	29.9	2	121.1	13
12500	4/26	5/30	37	36	0	3	60.0	25.5	--	1	109.0	19
12128	4/29	6/2	36	4	0	3	60.0	24.7	28.9	3	126.2	11
12101	5/3	6/5	36	60	2	3	59.0	24.6	26.8	6	126.6	10
12120	4/28	6/2	33	61	1	4	63.0	24.3	25.5	4	123.8	12
12129	5/2	6/5	36	68	1	3	60.5	24.0	22.5	3	102.1	21
12145	4/27	6/1	37	7	0	2	60.0	23.8	--	1	101.7	22
12149	4/30	6/3	36	35	1	2	60.0	23.8	--	1	101.7	22
12133	4/28	5/31	35	51	2	3	61.0	23.6	25.6	3	111.7	18
1442	5/5	6/6	36	60	6	3	56.0	23.4	24.7	14	100.0	24
12110	5/1	6/3	37	18	14	4	59.0	23.0	27.2	5	129.9	8
12136	4/28	6/1	37	72	20	4	58.0	23.0	21.8	3	91.3	27
12140	5/3	6/5	34	12	0	3	59.0	23.0	26.9	2	108.9	20
12132	4/24	5/26	35	64	T	3	62.0	22.1	22.2	3	93.5	25
6251	5/2	6/4	38	61	T	3	62.0	21.9	22.5	14	115.8	15
11952	4/26	5/28	36	64	T	4	62.0	21.9	19.2	8	135.5	5
12150	5/4	6/5	39	90	4	3	60.0	21.4	--	1	91.5	26
12501	5/5	6/6	36	68	2	3	59.9	21.3	--	1	91.0	28
12142	5/4	6/5	33	85	T	3	60.0	18.5	20.0	2	80.9	30
12135	4/29	6/2	34	59	15	4	58.0	18.0	19.4	3	82.3	29

Standard error of a difference between the mean yields of any two varieties = 2.83 bushels.

Table 19.-(Continued)

Chillicothe, Texas
(Four plots)

C. I. No.	Date Headed	Date Ripe	Leaf 12/23	Rust 5/8	Lodging	Shattering	Weight per bushel	Average acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
			%	%	%	%	Lbs.	Bu.	Bu.			
12148	4/26	6/2	10	25	20	--	64	49.7	--	1	191.2	1
12120	4/27	6/7	5	25	40	--	65	47.9	32.1	4	140.5	10
12122	4/27	6/2	20	30	60	--	63	47.6	32.6	4	147.9	7
12133	4/27	6/2	20	35	20	--	63	46.5	30.9	3	147.2	8
12141	4/26	6/7	60	15	40	--	61	45.2	32.2	2	145.5	9
12128	4/27	6/2	10	T	60	--	61	44.7	31.9	3	157.1	3
12500	4/29	6/7	30	20	--	--	61	42.2	--	1	162.3	2
12000	4/26	6/2	20	35	60	--	63	40.6	27.6	6	130.0	14
12132	4/26	6/2	50	40	60	--	63	40.4	26.4	3	132.5	12
12149	5/1	6/7	20	5	40	--	62	39.9	--	1	153.5	4
12146	4/29	6/2	10	25	20	--	61	39.2	--	1	150.8	5
12145	4/24	6/2	T	T	20	--	61	39.0	--	1	150.0	6
8856	4/23	6/2	40	40	80	--	63	38.6	25.7	9	119.2	22
11673	4/29	6/7	40	25	40	--	61	38.3	28.6	9	134.0	11
12134	4/29	6/2	60	30	--	--	63	38.1	26.4	3	128.3	15
11669	4/28	6/2	40	15	60	--	60	37.4	28.5	9	124.2	18
12101	5/1	6/7	20	60	--	--	62	35.8	27.9	6	125.1	17
11952	4/26	6/2	50	45	60	--	62	35.6	26.7	8	118.2	23
12129	4/28	6/7	40	30	40	--	62	35.2	28.4	3	130.7	13
12116	4/27	6/2	50	15	40	--	63	34.2	25.1	5	117.8	24
12140	4/29	6/7	10	T	20	--	61	33.8	26.9	2	121.7	19
6251	4/28	6/7	50	35	20	--	63	33.4	25.7	9	114.5	25
12147	5/1	6/7	20	20	60	20	60	32.9	--	1	126.5	16
12150	5/5	6/9	60	45	20	--	63	31.3	--	1	120.4	21
12135	4/28	6/7	40	35	40	--	60	29.5	22.8	3	104.7	27
12136	4/29	6/7	30	50	40	--	60	28.2	22.6	3	105.7	26
12110	5/1	6/7	5	25	40	--	61	27.9	24.3	5	121.5	20
1442	5/5	6/10	60	35	20	--	61	26.0	22.1	9	100.0	28
12501	5/6	6/10	60	40	--	40	62	23.8	--	1	91.5	30
12142	5/2	6/7	60	60	--	--	61	23.2	20.7	2	93.7	29

Standard error of a difference between the mean yields of any two varieties = 4.21 bushels.

Table 19.--(Continued)

Bushland, Texas

(Eight plots; four dryland; four pre-sowing irrigated)

C. I. No.	Av. Date Headed 1/	Av. Ht. 1/	Leaf Rust Irrig.	Wt. per bu. Irrig.	Av. Acre Yield Dryland	Av. Acre Yield Irrig.	Av. Acre Yield Mean	No. years grown	Percent of Kharkof 2/	Rank
	May	Ins.	%	Lbs.	Bu.	Bu.	Bu.			
12101	10	31	17	60.0	22.2	43.9	33.1	5	127.4	1
12150	15	32	24	59.5	25.4	38.2	31.8	1	120.0	4
12129	14	33	19	60.5	26.3	36.6	31.5	1	118.9	5
12147	12	30	18	60.0	21.6	37.2	29.4	1	110.9	12
12146	10	31	14	59.0	24.3	34.0	29.2	1	110.2	13
12501	15	34	33	57.0	28.5	29.8	29.2	1	110.2	13
12142	12	30	18	59.0	24.8	33.1	29.0	1	109.4	15
12000	9	31	23	59.5	21.8	35.3	28.6	5	114.6	8
12110	11	32	T	60.0	22.1	33.7	27.9	4	122.9	2
12120	8	27	18	61.5	22.4	33.2	27.8	2	112.2	10
12148	8	28	18	61.0	19.1	35.6	27.4	1	103.4	17
6251	13	33	24	59.5	21.8	31.5	26.7	9	114.7	7
11669	11	27	13	57.5	19.8	33.4	26.6	9	120.9	3
1442	17	33	18	59.5	17.7	35.3	26.5	9	100.0	18
12135	9	30	23	58.0	20.7	31.9	26.3	1	99.2	19
12128	10	30	T	59.0	19.3	32.6	26.0	1	98.1	21
11673	11	30	21	59.5	17.4	34.4	25.9	9	112.3	9
12122	9	29	15	60.0	21.4	30.1	25.8	2	106.9	16
12140	13	31	T	58.0	18.2	32.7	25.5	1	96.2	22
12500	10	29	8	58.5	18.1	32.3	25.2	1	95.1	23
12116	10	30	10	59.5	19.6	30.5	25.1	3	111.5	11
12149	11	29	9	59.5	18.8	30.9	24.9	1	94.0	24
12145	9	29	T	57.5	15.5	34.1	24.8	1	93.6	25
12133	10	28	33	60.0	18.8	29.5	24.2	1	91.3	26
12134	11	30	33	60.0	18.9	27.5	23.2	1	87.5	27
12132	7	27	40	58.0	17.6	26.3	22.0	1	83.0	28
11952	7	29	35	58.0	18.9	25.1	22.0	7	115.4	6
12136	9	29	26	59.0	17.3	25.3	21.3	1	80.4	29
12141	9	27	8	58.0	16.4	25.3	20.9	1	78.9	30
8856	5	28	36	57.0	18.2	19.9	19.1	9	98.5	20
					av 20.4	32.0				

1/ Average of irrigated and dryland.

2/ Yields for dryland and irrigated plots in 1940, 1941, and 1947 used in calculating percent of Kharkof.

Standard error of a difference between the mean yields of any two varieties = 2.32 bushels.

Table 19.--(Continued)

Stillwater, Oklahoma

(Four plots; seeded Oct. 11; emerged Oct. 21)

C. I. No.	Date Headed May	Date Ripe June	Ht. In.	Leaf Rust 1/ Severity %	Leaf Rust 1/ Response	Septoria 2/ %	Lodging %	No. Culms per A 000	Wt. per bu. Lbs.	Av. yield 1946-47	Av. yield	No. years grown	Percent of Kharkof	Rank
12122	7	15	42	50	CS	1.8	38	1800	61.5	42.5	30.4	3	158.8	3
12132	4	12	39	54	CS	0.8	18	2000	62.0	42.1	29.8	3	149.2	6
12128	9	16	39	T	HR(S)	2.3	3	2116	59.9	41.1	33.6	3	170.6	1
12149	11	17	42	36	CS	1.3	18	1851	60.1	40.6	--	1	119.4	17
12148	7	15	40	31	CS	1.8	8	1750	61.4	40.0	--	1	117.6	18
12116	9	15	42	25	CS	3.5	15	2189	59.1	40.0	27.5	4	148.9	7
12000	6	15	41	41	CS	2.0	50	1986	60.8	39.6	28.8	5	160.8	2
12120	9	16	39	40	CS	2.3	5	2120	62.0	39.5	31.7	3	153.3	5
12133	8	15	41	43	CS	2.1	15	1942	60.3	39.2	26.0	3	128.5	13
11952	5	13	42	20	Int.	1.9	20	1528	60.9	39.1	28.6	7	148.8	8
12500	8	17	40	12	HR-CS	3.1	18	1946	60.3	38.6	--	1	113.5	21
11673	11	16	41	25	CS	1.8	23	1957	58.1	38.0	25.7	9	123.4	14
12145	12	19	39	T	HR	1.3	6	1830	58.0	37.6	--	1	110.6	23
12146	10	15	40	38	CS	2.1	15	1761	57.5	37.5	--	1	110.3	24
11669	13	16	41	29	CS	1.5	5	1626	57.6	37.0 3/	30.8	11	132.8	10
12110	11	16	43	2	HR(CS)	2.5	5	1898	58.3	37.0	28.1	5	154.9	4
12141	11	17	38	6	HR-CS	1.5	3	1884	59.3	36.9	30.9	2	146.2	9
12147	13	17	42	31	CS	3.1	T	1888	57.5	35.8	--	1	105.3	26
12129	12	17	43	23	CS	2.3	20	1888	58.8	35.2	36.6	3	131.0	11
12140	15	18	42	T	HR(S)	1.9	10	2149	58.1	35.1	24.5	2	115.9	20
12134	10	15	42	54	CS	1.8	30	1608	60.1	34.5	25.4	3	130.3	12
8856	5	13	42	45	CS	1.6	35	1626	60.6	34.4	28.5	14	111.6	22
1442	15	18	43	36	CS	2.8	15	2029	56.7	34.0	21.1	14	100.0	27
12101	13	17	42	45	CS	2.9	5	2182	58.2	33.7	24.4	5	121.9	16
12501	15	18	41	65	CS	1.1	13	2418	57.4	33.4	--	1	98.2	28
6251	14	18	43	33	CS	2.1	15	1942	58.8	32.6	24.2	14	108.6	25
12142	13	17	39	56	CS(R)	2.3	T	2421	57.8	31.7	25.8	2	122.0	15
12136	11	17	40	51	CS	2.8	20	2047	54.3	31.1	22.9	3	116.6	19
12150	16	19	44	31	HR-CS	2.5	28	2247	57.7	30.6	--	1	90.0	30
12135	12	16	40	45	CS	2.6	28	2160	53.8	25.4	16.5	3	90.6	29

1/ Leaf rust read on flag leaf May 28. Early Blackhull was in stiff dough stage and Pawnee in soft dough. Prevalence 100% on all entries except C. I. 12110, 95%; C. I. 12128, 78%; C. I. 12145, 93%. S = Severity. R = Response.

2/ Degree of susceptibility 0 to 4. Septoria and leaf rust readings made by Botany and Plant Pathology Department.

3/ Yield calculated by Yates formula, 1 rep.

Standard error of a difference between the mean yields of any two varieties = 2.14 bushels.

Table 19.--(Continued)

Cherokee, Oklahoma

(Four plots; seeded Oct. 19)

C. I. No.	Date ripe	Height	Lodging	Weight per bushel	Av. acre yield	Percent of Kharkof
	June	Ins.	%	Lbs.	Bu.	1/
11952	12	44	28	61.6	36.9	141.9
12120	18	42	18	63.6	35.7	137.3
12133	17	44	25	61.0	33.4	128.5
11673	19	42	33	59.9	32.9	126.5
12132	11	40	18	62.1	32.4	124.6
12128	18	43	23	60.6	32.1	123.5
12122	16	42	63	61.4	31.7	121.9
12101	20	42	25	60.4	31.6	121.5
12148	14	43	20	61.0	31.4	120.8
12150	21	44	28	60.0	31.3	120.4
12145	20	42	15	60.5	31.2	120.0
12141	19	42	8	60.0	30.9	118.8
12149	18	43	40	61.7	30.8	118.5
11669	18	42	30	60.5	30.6	117.7
12129	19	44	38	60.2	30.6	117.7
12134	17	45	30	60.8	30.5	117.3
12116	17	44	30	61.0	30.1	115.8
12110	18	43	25	59.0	29.7	114.2
12147	20	43	30	57.9	29.3	112.7
12500	20	41	33	60.8	29.3	112.7
12501	21	42	15	59.4	28.8	110.8
12142	21	42	10	59.6	28.4	109.2
12136	20	42	25	57.8	27.4	105.4
12146	18	42	33	57.4	27.1	104.2
6251	19	45	33	59.4	26.9	103.5
12000	16	44	65	60.5	26.8	103.1
12135	22	41	18	57.3	26.6	102.3
1442	21	43	18	58.0	26.0	100.0
12140	20	44	23	59.9	25.8	99.2
8856	12	44	33	61.9	24.9	95.8

Standard error of a difference between the mean yields of any two varieties = 2.56 bushels.

1/ Based upon 1947 only.

Table 19.--(Continued)

Manhattan, Kansas

(Three plots)

C. I. No.	Date Headed	Date Ripe	Ht.	Leaf rust	Lodging	Weight per bushel	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
	May	July	In.	%	%	Lbs.	Bu.				
12110	24	3	46	18	30	58.3	43.4	44.2	6	156.3	2
12116	21	1	45	67	27	59.6	42.0	44.6	5	145.6	5
12148	20	6-30	43	63	3	61.1	39.8	--	1	161.8	1
11669	21	6-30	44	80	15	59.9	39.3	41.4	13	142.2	11
12133	22	1	44	80	23	59.3	37.8	39.0	3	140.7	12
12132	17	6-26	41	80	50	59.4	36.7	33.6	3	133.7	15
12122	22	6-30	43	73	77	60.0	35.9	36.0	4	128.0	17
8856	18	6-27	45	73	86	59.8	35.7	31.2	16	118.3	20
12146	22	2	44	83	63	57.6	35.5	--	1	144.3	6
12149	22	2	45	70	73	59.6	35.3	--	1	143.5	8
12500	22	2	45	67	33	58.7	35.1	--	1	142.7	10
11952	20	6-28	44	80	72	60.7	35.0	36.1	9	146.2	4
12134	22	6-30	46	77	27	59.9	34.6	38.5	3	143.5	8
12101	25	5	44	80	20	58.3	34.5	35.9	7	124.3	19
12141	22	1	43	87	12	58.5	32.9	41.3	2	143.7	7
12129	25	4	44	73	57	59.0	30.7	34.9	3	111.3	24
12147	26	3	45	77	60	54.0	30.7	--	1	124.8	18
12140	24	3	46	37	28	56.8	29.8	39.0	2	135.7	14
6251	26	5	45	63	53	57.4	29.1	33.1	16	111.6	23
12000	21	6-30	43	73	73	59.6	28.0	35.4	7	136.4	13
12128	22	3	42	8	73	57.9	27.9	40.7	3	148.6	3
12145	25	5	42	10	48	57.2	27.6	--	1	112.2	22
11673	22	1	44	67	47	57.5	25.8	34.6	11	128.4	16
12501	26	5	44	87	50	54.5	25.7	--	1	104.5	26
12136	22	2	43	90	37	55.0	25.6	28.2	3	104.5	26
12142	24	3	45	90	47	53.5	25.4	31.9	2	111.1	25
12120	22	1	42	93	22	60.0	24.9	30.4	4	114.7	21
1442	27	6	43	80	47	56.0	24.6	28.7	16	100.0	28
12135	24	2	43	77	37	52.0	23.3	27.5	3	94.8	29
12150	28	5	44	83	83	53.5	20.5	--	1	83.3	30

Standard error of a difference between the mean yields of any two varieties = 3.46 bushels.

Table 19.---(Continued)

Woodward, Oklahoma

(Four plots; seeded Oct. 2; emerged Oct. 11)

C. I. No.	Percent ripe June 17	Height In.	Leaf rust %	Lodging %	Weight per bu. Lbs.	Av. acre yield Bu.	Average yield 1946-47 Bu.	No. years grown	Percent of Kharkof	Rank
12120	93	34	3	8	63.0	22.9	31.7	4	116.7	17
12132	100	32	--	10	61.0	22.1	34.4	3	128.6	8
11669	100	34	T	5	60.0	21.7	27.7	13	128.5	9
11952	100	33	--	30	61.0	20.7	28.9	9	125.6	10
12142	80	35	3	5	58.5	20.5	28.2	2	120.0	14
12122	96	34	5	10	60.5	20.3	33.3	4	115.0	19
12000	90	34	1	15	61.5	20.2	31.1	7	117.6	16
8856	100	33	--	30	63.0	20.1	30.7	16	107.0	25
12101	90	34	1	3	59.0	19.7	30.1	7	130.4	7
12116	98	36	0	10	60.5	19.4	29.8	5	114.8	20
12128	94	34	T	8	59.5	19.3	30.7	3	135.8	5
12148	98	34	T	5	61.5	19.2	--	1	150.0	1
11673	94	32	T	5	59.5	19.1	27.6	11	121.0	13
12147	76	36	T	3	57.0	18.7	--	1	146.1	2
6251	93	36	5	8	61.0	18.6	26.6	16	104.5	27
12134	90	34	5	T	60.5	18.5	28.2	3	114.0	21
12133	90	33	1	T	60.5	18.1	29.1	3	108.6	24
12149	95	34	T	10	61.0	18.1	--	1	141.4	3
12145	78	33	T	10	58.0	17.8	--	1	139.1	4
12146	93	33	T	13	59.0	17.3	--	1	135.2	6
12141	90	33	0	T	59.0	17.1	26.6	2	113.2	23
12110	89	36	T	3	57.0	16.5	28.0	6	116.2	18
12129	91	36	T	3	60.0	16.4	25.9	3	103.9	28
12501	75	33	10	T	59.0	15.9	--	1	124.2	11
12150	70	35	5	3	58.0	15.7	--	1	122.7	12
12500	90	33	T	8	59.5	15.1	--	1	118.0	15
12140	73	37	0	8	57.5	14.7	26.7	2	113.6	22
12136	65	35	T	8	56.0	14.5	24.8	3	106.5	26
12135	58	33	T	3	55.0	13.4	25.3	3	103.3	29
1442	65	35	5	8	56.0	12.8	23.5	16	100.0	30

Standard error of a difference between the mean yields of any two varieties = 1.85 bushels.

Table 19.--(Continued)

Hays, Kansas

(Three plots)

C. I. No.	Date Headed	Date Ripe	Ht.	Leaf rust	Lodging	Weight per bushel	Av. acre yield	Av. yield 1946-47	No. years grown	Percent of Kharkof	Rank
	May	June	In.	%	%	Lbs.	Bu.	Bu.			
12149	21	30	46	13	100	62	61.6	--	1	118.7	12
12128	21	30	45	3	63	62	60.3	43.8	3	126.1	11
12500	21	30	45	17	97	62	59.1	--	1	113.9	16
12141	21	30	45	5	32	61	58.6	42.0	2	113.4	17
12145	24	7-1	45	2	97	61	58.2	--	1	112.1	19
12147	25	30	47	17	87	60	58.1	--	1	111.9	20
12133	21	30	45	33	23	62	58.0	41.1	3	127.0	9
8856	17	29	44	40	57	62	57.1	38.7	15	115.7	15
12146	21	30	44	13	90	60	56.8	--	1	109.4	22
12122	20	30	45	37	83	63	55.8	40.0	4	131.1	5
12129	24	30	48	13	77	62	55.6	38.8	3	113.2	18
11669	21	30	43	8	28	61	55.3	38.6	12	134.1	2
12116	20	30	47	7	18	62	55.2	36.7	5	128.4	7
12101	24	30	46	37	57	61	55.1	38.2	7	132.5	4
12132	17	26	41	47	17	63	54.9	39.5	3	117.5	13
12000	19	30	45	33	63	62	54.7	36.0	7	133.5	3
12110	22	30	48	T	33	60	54.5	35.5	6	130.6	6
12120	21	30	42	17	20	64	54.1	39.5	4	127.7	8
11673	21	30	45	20	53	61	54.0	38.2	11	126.4	10
12134	21	30	49	30	22	62	53.9	39.5	3	116.1	14
12148	19	30	43	20	27	63	53.3	--	1	102.7	23
12136	22	30	46	23	53	60	53.2	35.8	3	100.1	24
11952	19	28	44	43	20	62	53.1	32.8	9	134.7	1
1442	27	30	46	27	92	58	51.9	37.0	15	100.0	25
12140	24	30	47	T	50	61	49.8	35.3	2	95.3	26
12501	26	7-1	45	37	100	59	48.6	--	1	93.6	27
6251	24	30	47	30	88	60	44.7	33.4	15	111.4	21
12142	25	7-1	46	20	100	59	44.6	32.7	2	88.2	28
12150	29	7-1	46	37	100	58	42.2	--	1	81.3	30
12135	24	30	45	23	53	57	40.4	30.3	3	83.2	29

Standard error of a difference between the mean yields of any two varieties = 2.77 bushels.

Table 19.—(Continued)

Akron, Colorado

(Five Plots)

C. I. No.	Rust: Leaf 1/ Severity	Rust: Leaf 1/ Type	Rust: Stem 2/	Mosaic 3/: Incid.	Mosaic 3/: Prev.	Mosaic 3/: Stunting	Wt. per bu.	Av. yield 1946-47	Av. yield years grown	No. of Kharkof	Percent: Kharkof	Rank
	%		%				Lbs.	Bu.	Bu.			
12148	50	3	35	4	90	0	61	40.8	--	1	160.0	1
12132	90	X	5	--	--	--	60	37.6	31.2	3	118.2	9
12122	75	3	5	5	50	10	60	37.0	29.3	4	125.1	2
12133	75	4	5	3	80	0	59	34.4	30.0	3	122.7	4
12000	75	X	15	5	90	30	60	33.3	27.7	7	124.2	3
12120	50	X	25	5	75	15	60	32.0	17.9	4	118.3	8
8856	75	X	5	3	100	10	62	31.8	27.0	13	121.1	5
12140	3	1	5	3	70	0	60	31.2	26.7	2	112.9	14
12135	75	X	5	5	30	20	60	29.5	29.1	3	121.1	5
12101	65	X	20	5	80	10	57	29.5	27.6	7	114.4	13
11673	60	2	15	4	80	20	57	29.2	24.2	10	112.6	16
11952	75	3	35	5	60	40	60	29.1	24.7	8	118.6	7
12116	30	X	15	5	50	20	61	29.0	25.6	5	116.1	12
12149	10	1	25	5	50	20	60	28.8	--	1	112.9	14
12146	30	X	10	5	85	10	59	28.7	--	1	112.5	17
12501	60	3	15	5	80	0	58	28.2	--	1	110.6	19
12136	20	X	5	5	80	20	57	28.2	24.0	3	108.4	21
12145	T	1	T	5	95	75	59	27.5	--	1	107.8	22
12141	2	1	T	5	40	40	58	27.4	23.5	2	99.4	28
12147	75	3	25	5	90	30	56	26.9	--	1	105.5	23
12128	2	0-1	25	5	50	50	59	26.7	23.6	3	103.5	24
12129	40	1-2	5	4	80	50	59	26.7	26.8	3	117.7	10
12142	10	X	10	5	50	20	59	26.4	23.5	2	99.4	28
12500	3	1	10	5	75	25	60	26.4	--	1	103.5	24
11669	30	X	35	5	40	20	59	25.7	22.9	11	116.5	11
6251	75	X	5	5	100	50	56	25.6	20.2	13	111.5	18
12110	15	2	35	3	50	10	55	25.6	21.6	6	100.8	26
1442	60	X	25	5	80	10	58	25.5	23.7	13	100.0	27
12150	50	X	75	5	90	30	56	25.1	--	1	98.4	30
12134	80	4	20	5	80	60	58	22.9	23.5	3	109.1	20

1/ Pustule type , 0 = immune, 1-2 resistant, 3-4 susceptible, X = mixture of types.

2/ Prevalence 100% except trace on C. I. 12141 and 25% on C. I. 12500.

3/ Mosaic incidence mild = 3, Moderate = 4, severe = 5.

Standard error of a difference between the mean yields of any two varieties = 2.94 bushels.

Table 19.--(Continued)

Ft. Collins, Colorado

(Five plots)

C. I. No.	Date Headed	Ripe	Ht. In.	Frost damage %	Rust Leaf 1/ Severity %	Type	Stem %	Wt. per bu. Lbs.	Av. acre yield Bu.	Average yield 1946-47 Bu.	No. years grown	Percent of Kharkof	Rank
		July											
12129	6-4	28	45	15	17	4	20	63.0	48.0	48.9	3	112.3	2
12133	6-1	27	40	40	50	4	5	63.0	45.0	48.2	3	103.1	7
12101	6-4	28	42	10	40	4	15	63.4	41.9	45.7	7	101.1	11
12145	6-4	27	42	40	T	1-2	T	62.4	40.6	--	1	107.7	4
12142	6-5	28	43	20	20	3	10	62.4	40.0	51.4	2	113.0	1
12147	6-4	27	42	30	50	4	T	63.0	39.5	--	1	104.8	6
12128	6-2	24	41	40	T	1-2	20	63.0	39.3	41.2	3	98.7	15
12141	5-31	21	42	55	10	4	0	61.6	38.7	42.8	2	94.1	20
12150	6-6	29	43	20	40	4	25	62.8	37.8	--	1	100.3	12
1442	6-6	28	44	20	39	4	35	62.5	37.7	45.5	15	100.0	14
12135	6-3	27	43	40	50	4	10	62.2	37.2	44.0	3	95.0	19
12140	6-3	24	44	55	T	0-1	T	62.2	34.4	43.7	2	96.0	18
12132	5-25	20	40	80	50	4	0	61.6	33.3	37.2	3	88.3	23
12116	5-29	25	42	60	30	4	25	62.0	33.0	42.4	5	96.8	17
12134	6-2	25	42	45	50	4	10	62.5	32.8	39.6	3	90.3	22
12501	6-6	29	43	60	65	4	10	61.5	31.3	--	1	83.0	25
12120	5-27	25	38	75	30	4	20	63.7	31.1	36.7	4	100.3	12
12110	6-3	28	44	40	5	X	35	62.7	31.1	38.1	6	87.4	24
11669	6-1	22	42	55	14	X	10	62.5	30.5	37.3	13	105.4	5
12000	5-29	27	41	55	52	4	25	63.2	30.2	39.4	7	110.3	3
11952	5-27	22	43	55	55	4	T	62.7	28.7	34.3	9	102.0	8
6251	6-3	26	44	65	55	4	25	62.8	28.3	34.7	15	98.1	16
12500	5-31	25	39	70	9	3	T	61.2	27.9	--	1	74.0	26
12122	5-30	25	42	60	50	4	25	62.8	27.7	38.6	4	101.8	9
12146	5-31	27	38	60	25	3	20	61.2	23.0	--	1	61.0	28
12149	5-31	21	41	70	8	3	5	62.3	22.0	--	1	58.4	29
8856	5-26	21	43	80	60	4	10	62.1	21.3	26.6	15	93.1	21
12136	5-31	24	40	55	20	4	10	62.3	21.2	33.8	3	73.6	27
11673	6-1	25	41	50	60	4	10	62.7	19.2	31.7	11	101.8	9
12148	5-27	22	39	75	50	4	T	60.9	17.6	--	1	46.7	30

1/ Pustule type 0 = immune, 1-2 resistant, 3-4 susceptible, X = mixed type; prevalence 100% on all except 25% on C. I. 12145 and 12128 and trace on C. I. 12140.

Standard error of a difference between the mean yields of any two varieties = 4.82 bushels.

Table 19.--(Continued)

Hesperus, Colorado

(Five plots)

C. I. No.	Date Headed	Date Ripe	Height	Weight per bushel	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
	June	July	In.	Lbs.		Bu.			
12142	19	22	42	51	39.9	47.9	2	119.5	3
12134	12	16	40	51	37.0	45.8	2	114.4	8
12116	12	17	40	51	36.9	49.0	4	114.0	9
12150	18	22	40	51	35.2	--	1	106.7	13
12501	17	20	40	51	35.2	--	1	106.7	13
1442	17	21	40	51	33.0	40.1	9	100.0	18
12147	18	22	40	51	32.6	--	1	98.8	19
12148	13	16	40	51	32.6	--	1	98.8	19
12101	14	21	38	52	32.0	49.0	6	115.1	6
12140	12	16	42	50	31.3	42.1	2	105.1	16
12145	16	22	40	51	30.7	--	1	93.0	22
12122	14	20	38	50	30.6	48.2	3	125.6	1
12110	13	21	38	51	28.5	46.4	5	114.8	7
11673	11	17	40	50	27.7	52.0	9	123.3	2
12120	12	17	41	51	27.5	39.0	3	108.0	11
6251	12	17	40	50	26.1	37.4	9	119.1	4
12128	14	16	38	51	26.0	42.5	2	106.1	15
12129	12	15	38	51	25.8	44.7	2	111.6	10
12000	10	17	38	51	25.8	39.8	6	117.9	5
12135	10	15	42	50	25.6	34.4	2	85.9	23
11669	12	20	41	50	25.2	49.5	9	107.0	12
12133	13	15	40	51	23.9	33.0	2	82.4	25
8856	10	15	38	49	21.5	49.8	9	102.5	17
12146	16	21	38	51	21.4	--	1	64.8	28
12136	10	14	42	51	20.2	33.6	2	83.8	24
12141	13	16	42	50	17.7	30.9	2	77.2	27
12500	16	18	40	50	16.9	--	1	51.2	29
12149	13	17	40	50	15.1	--	1	45.8	30
11952	11	17	40	51	12.6	33.1	8	97.0	21
12132	14	16	40	50	11.4	31.1	2	77.5	26

Standard error of a difference between the mean yields of any two varieties = 3.97 bushels.

Table 19.—(Continued)

Ames, Iowa

(Three plots)

C. I. No.	Date ripe	Height	Weight per bushel	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
	July	In.	Lbs.	Bu.	Bu.			
12142	12	39	59.2	39.6	40.9	2	135.4	1
12129	14	41	60.4	36.7	38.2	3	120.9	3
12128	11	39	60.2	36.4	35.9	3	118.3	5
11669	10	37	60.0	35.5	38.4	8	115.3	10
12132	8	37	60.6	34.8	34.8	3	107.6	17
12149	11	40	59.7	34.7	--	1	118.8	4
12133	11	39	60.0	34.6	36.7	3	110.6	14
12000	12	37	60.2	34.3	35.8	7	108.4	16
12501	12	37	60.6	34.1	--	1	116.8	6
12150	13	41	59.8	34.0	--	1	116.4	7
12148	10	37	61.2	33.9	--	1	116.1	8
12120	13	35	61.5	33.9	35.0	4	93.9	28
8856	15	40	60.2	33.9	34.8	8	100.0	22
12146	10	37	59.7	33.7	--	1	115.4	9
12110	13	39	60.8	33.4	33.4	6	100.2	21
11952	10	39	59.6	33.4	36.6	8	109.6	15
12141	12	37	59.5	33.1	36.9	2	122.2	2
11673	12	38	57.5	32.6	31.7	8	94.2	27
12145	14	38	59.1	32.5	--	1	111.3	13
12134	11	39	60.1	31.7	33.0	3	108.2	17
6251	14	39	60.6	31.1	31.2	8	95.9	25
12122	12	36	59.0	30.3	36.5	4	113.8	12
12101	12	39	58.5	30.0	34.7	7	104.9	19
12136	14	38	58.7	29.8	32.4	3	103.6	20
12116	11	39	60.0	29.6	34.6	5	94.7	26
1442	14	38	59.0	29.2	30.2	8	100.0	22
12500	12	36	60.0	29.1	--	1	99.7	24
12140	12	37	58.8	28.5	34.7	2	114.7	11
12147	12	37	58.8	26.7	--	1	91.4	29
12135	12	37	57.5	21.1	27.2	3	88.6	30

Standard error of a difference between the mean yields of any two varieties = 3.45 bushels.

Table 19.--(Continued)

Lincoln, Nebraska

(Five Plots)

C. I. No.	Date Headed	Date Ripe	Height	Rust Leaf	Rust Stem	Loose smut 1/	Lodging	Wt. per bu.	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
	June	July	In.	%	%		%	Lbs.	Bu.	Bu.			
12128	1	10	43	10	30	0	70	57.8	40.0	47.7	3	153.0	3
12110	2	10	46	15	73	0	85	56.6	39.2	42.6	6	118.4	20
12148	5-27	7	45	65	T	1	10	60.0	39.0	--	1	162.5	1
12145	3	14	44	0	3	9	95	57.2	38.9	--	1	162.1	2
12141	5-30	10	45	45	0	7	35	58.3	36.3	42.5	2	136.7	4
12116	5-30	8	46	65	8	2	55	58.0	33.3	39.3	5	124.8	13
11673	1	9	45	70	5	0	75	55.1	32.6	39.1	11	112.0	25
12133	5-30	10	45	90	5	9	40	57.2	32.4	39.1	3	126.4	11
12149	5-31	9	46	70	T	0	80	57.8	32.1	--	1	133.8	7
12132	5-25	7	43	90	T	0	25	60.2	31.4	34.2	3	124.1	15
12134	5-30	8	48	80	T	4	40	58.7	31.0	39.3	3	129.3	9
12500	5-31	9	44	65	5	1	90	57.6	30.8	--	1	128.3	10
12120	5-29	9	43	85	T	0	10	60.2	30.2	39.0	4	133.6	8
12147	4	9	44	65	5	0	95	53.2	29.8	--	1	124.2	14
12129	3	11	45	75	18	2	90	55.4	29.5	36.2	3	121.5	16
12146	5-30	9	43	70	10	3	90	55.0	29.1	--	1	121.3	17
12101	3	10	45	90	20	0	70	54.8	27.8	35.5	7	120.6	18
6251	5	14	46	80	13	0	95	53.9	27.5	34.3	16	112.7	24
12000	5-30	11	45	90	5	1	85	57.3	27.2	34.5	7	119.4	19
11669	1	8	43	70	8	0	70	55.1	26.5	37.6	13	135.4	5
12136	1	9	43	80	T	0	30	53.5	25.7	34.5	3	111.7	26
12142	5	9	44	95	10	0	85	52.0	25.4	35.1	2	112.9	23
12140	4	13	45	10	T	0	85	54.6	25.2	35.8	2	115.1	21
12122	1	9	43	90	T	6	80	56.8	24.5	34.5	4	134.8	6
1442	6	14	44	90	35	1	95	53.0	24.0	31.1	16	100.0	28
12135	3	9	44	80	5	T	70	49.8	23.7	34.5	3	104.4	27
8856	5-26	8	45	90	T	2	80	59.1	23.2	31.3	16	125.8	12
12150	7	14	45	95	35	0	95	51.8	22.9	--	1	95.4	29
12501	6	10	43	95	23	3	95	51.3	21.9	--	1	91.3	30
11952	5-29	7	46	90	T	0	75	57.0	19.9	28.1	9	113.7	22

1/ Average number of heads per rod row.

Standard error of a difference between the mean yields of any two varieties = 2.77 bushels.

Table 19.---(Continued)

North Platte, Nebraska

(Three plots)

C. I. No.	Date Headed	Height	Lodging	Weight per bushel	Av. acre yield	Average yield 1946-47	No. years grown	Percent of Kharkof	Rank
	June	In.	%	Lbs.	Bu.				
12142	6	43	15	62.3	49.9	49.0	2	135.0	1
12150	7	45	55	62.1	46.0	--	1	108.2	16
12147	7	45	15	61.7	44.9	--	1	105.6	19
12129	6	42	10	62.8	43.1	45.4	3	128.2	4
1442	6	44	35	62.0	42.5	36.3	10	100.0	22
12101	6	43	5	62.5	42.2	41.7	4	131.1	2
11673	6	43	5	61.6	41,5	39.4	7	120.0	8
12146	5	41	15	63.1	40.9	--	1	96.2	23
6251	6	45	15	62.9	40.6	37.7	10	101.2	21
12134	6	44	5	62.0	40.5	40.8	3	118.7	10
12128	6	42	5	62.4	39.9	41.7	3	122.7	7
12501	7	43	30	63.4	39.7	--	1	93.4	24
12145	6	42	10	62.3	39.2	--	1	92.2	25
12122	5	41	25	63.9	39.1	40.2	4	131.1	2
12140	6	45	5	62.5	38.8	38.9	2	107.0	17
12141	5	42	2	60.5	38.7	32.0	2	88.0	26
12000	5	42	15	63.4	37.9	41.1	4	126.6	6
12135	6	43	10	60.6	37.6	38.6	3	114.2	13
12110	6	43	0	61.0	37.3	37.2	4	109.8	15
12133	5	41	2	62.6	36.8	40.0	3	116.7	11
11952	5	41	5	61.7	35.3	35.9	6	119.3	9
12148	2	39	0	62.9	34.3	--	1	80.7	27
12120	5	38	0	63.0	34.2	33.9	4	114.3	12
12500	6	42	5	62.0	32.7	--	1	76.9	29
12116	5	41	0	62.5	32.4	34.9	4	110.4	14
11669	6	41	5	62.0	31.8	33.2	9	127.0	5
12136	6	43	5	61.0	29.8	33.8	3	106.5	18
12149	6	42	5	62.0	28.2	--	1	66.4	30
12132	6	38	0	61.0	22.7	28.6	3	80.3	28
8856	1	40	5	62.0	22.3	29.0	10	103.5	20

Notes: All were ripe July 14 except 12148, 11669 and 8856 which were marked ripe July 11. These early varieties and others such as 12132 and 12500 were damaged by frost at flowering time.

Lodging taken July 15 from border rows.

Standard error of a difference between the mean yields of any two varieties = 2.79 bushels.

Table 19.--(Concluded)

Alliance, Nebraska

(Three plots; seed September)

C. I. No.	Winter Survival	Date Headed	Date Ripe	Stem rust	Lodging	Weight per bushel	Av. acre yield	Average yield 1946-7	No. years grown	Percent of Kharkof	Rank
	%	June	July	%	%	Lbs.	Bu.	Bu.			
12133	83	9	25	10	8	61.2	54.7	38.9	3	120.7	1
12129	91	11	26	32	52	61.8	43.8	32.6	3	107.4	2
12142	92	11	27	30	83	58.8	42.1	31.8	2	99.2	6
1442	94	13	26	63	93	59.9	41.8	32.1	12	100.0	5
12501	98	13	26	25	97	58.3	39.7	--	1	95.0	11
12101	82	10	26	33	67	60.3	37.4	29.2	6	101.8	3
11952	75	8	25	17	20	61.1	37.0	28.9	8	95.6	10
12500	77	10	25	0	67	60.4	36.9	--	1	88.3	15
12122	83	9	25	33	92	61.6	35.7	28.1	3	97.3	8
12116	92	8	24	18	37	61.6	35.6	26.6	4	77.9	21
12148	72	7	25	6	13	61.6	32.6	--	1	78.0	20
12141	70	9	25	0	7	59.9	32.2	24.2	2	75.4	23
12000	87	8	26	32	92	61.2	31.6	26.5	6	94.6	12
12147	77	11	26	23	82	58.1	31.5	--	1	75.4	23
12128	78	10	25	32	42	61.0	31.1	26.9	3	97.5	7
12149	82	8	26	8	67	61.5	31.1	--	1	74.4	25
8856	80	7	24	28	30	60.5	30.9	24.2	12	83.6	17
11673	77	10	25	47	78	59.0	30.7	25.5	9	94.0	13
12110	83	10	26	57	70	61.0	30.4	25.6	5	101.3	4
11669	90	8	24	27	12	61.0	29.8	22.9	9	97.2	9
6251	85	13	26	43	95	58.0	29.5	25.8	12	91.6	14
12140	87	10	26	T	30	61.0	28.2	24.5	2	76.4	22
12134	72	11	25	23	47	59.5	27.3	23.9	3	87.5	16
12135	63	12	27	2	17	54.5	22.2	21.6	3	81.1	18
12150	58	16	27	83	92	54.5	21.1	--	1	50.5	28
12120	52	9	27	62	5	60.0	18.8	18.8	3	79.8	19
12146	58	10	26	5	43	58.0	17.8	--	1	42.6	29
12136	48	12	28	T	18	56.0	16.6	18.0	3	71.1	27
12132	42	8	26	20	20	57.5	15.6	16.9	3	71.7	26
12145	7	17	30	T	3	55.5	12.2	--	1	29.2	30

Standard error of a difference between the mean yields of any two varieties = 5.64 bushels.

STANDARD ERRORS

The procedure described for calculating errors in the plot series was used on the uniform yield nursery. A summary of the number of plots, average yield of the 30 varieties, and various standard error values are given for the 15 cooperating stations in table 20.

Table 20.--Number of plots, average yield, and standard errors for the uniform yield nursery at the various stations in 1947.

Station	No. of Plots	Av. yield All entries	Standard error of a			
			Single plots	Difference between means	Mean in bushels	Mean in Percent
		Bus.	Bus.	Bus.		
Texas:						
Denton	4	24.82	4.00	2.83	2.00	8.06
Chillicothe	4	36.86	5.96	4.21	2.98	8.08
Bushland	8	26.19	4.64	2.32	1.64	6.26
Oklahoma:						
Stillwater	4	36.45	3.01	2.14	1.51	4.14
Cherokee	4	30.02	3.61	2.56	1.81	6.03
Woodward	4	18.14	2.62	1.85	1.31	7.22
Kansas:						
Manhattan	3	31.76	4.24	3.46	2.45	7.71
Hays	3	53.76	3.39	2.77	1.96	3.65
Colorado:						
Akron	5	29.22	4.64	2.94	2.08	7.12
Ft. Collins	5	32.34	7.63	4.82	3.41	10.54
Hesperus	5	26.86	6.28	3.97	2.81	10.46
Iowa:						
Ames	3	32.24	4.22	3.45	2.44	7.57
Nebraska:						
Lincoln	5	29.37	4.39	2.77	1.96	6.67
North Platte	3	37.37	3.42	2.79	1.97	5.27
Alliance	3	30.85	6.91	5.64	3.99	12.93

SUMMARY OF NURSERY YIELDS

The yields for 1947 by stations and averages by states are shown in table 21. The 30 varieties are ranked in declining order of average yield derived from the 15 stations. Two selections from the cross Chiefkan x Oro-Tenmarq (C. I. 12133 and 12148) were highest in average yield for the 15 stations with Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128) ranking third. All of these are in more advanced tests for 1948 in the central and southern districts and small increase plantings were made. C. I. 12128 ranked first in yield in 1946 as an average of 13 stations while C. I. 12133 ranked fifteenth.

The rank and yields are shown by states in table 21. In Texas C. I. 12148 and C. I. 12122 were highest with Cimarron third. In Oklahoma, Cimarron, Triumph, and Wichita had the best averages. Kharkof, Blackhull, and late maturing varieties averaged lowest in these two states. Westar was at the top in yield in the Kansas tests followed by C. I. 12116 and C. I. 12149. The Colorado yields point to two late wheats for top yields (C. I. 12142 and C. I. 12101) and to C. I. 12133. In Iowa, C. I. 12142 ranked first. The three Nebraska tests show that C. I. 12133, C. I. 12142, and C. I. 12129 had the best state-wide performance.

The two-year averages available for 22 varieties are shown in table 22. Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128) had the best average among those compared. In second and third places were C. I. 12133 and C. I. 12122.

Table 21.--Summary of the average yields in bushels per acre of the 30 varieties grown as uniform yield nurseries at 15 stations in the hard red winter wheat region in 1947.

Variety	C. I. No.	Texas					Oklahoma					Kansas			
		Denton	Chillicothe	Bushland	Av.	Rank	Stillwater	Chero-kee	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank
Chiefkan x Oro-Tenq.	12133	23.6	46.5	24.2	31.4	7	39.2	33.4	18.1	30.2	6	37.8	58.0	47.9	4
Chiefkan x Oro-Tenq.	12148	31.4	49.7	27.4	36.2	1	40.0	31.4	19.2	30.2	6	39.8	53.3	46.6	7
Kawv.-Mqo. x Kawv.-Tenq.	12128	24.7	44.7	26.0	31.8	6	41.1	32.1	19.3	30.8	5	27.9	60.3	44.1	16
Cheyenne x Chiefkan	12129	24.0	35.2	31.5	30.2	14	35.2	30.6	16.4	27.4	20	30.7	55.6	43.2	18
Chey. x E. Blackhull	12122	27.0	47.6	25.8	33.5	2	42.5	31.7	20.3	31.5	4	35.9	55.8	45.9	10
Blackhull x Cheyenne	12101	24.6	35.8	33.1	31.2	8	33.7	31.6	19.7	28.3	14	34.5	55.1	44.8	13
Quivira x Tenmarq	12116	27.6	34.2	25.1	29.0	18	40.0	30.1	19.4	29.8	9	42.0	55.2	48.6	2
Martin-Tenq. x Kharkof	12147	31.0	32.9	29.4	31.1	9	35.8	29.3	18.7	27.9	16	30.7	58.1	44.4	14
Medit.-Hope x Pawnee	12141	25.5	45.2	20.9	30.5	13	36.9	30.9	17.1	28.3	14	32.9	58.6	45.8	11
Chey. x E. Blackhull	12000	28.4	40.6	28.8	32.6	4	39.6	26.8	20.2	28.9	12	28.0	54.7	41.4	20
Westar	12110	23.0	27.9	27.9	26.3	25	37.0	29.7	16.5	27.7	18	43.4	54.5	49.0	1
Cheyenne x Turkey	12142	18.5	23.2	29.0	23.6	30	31.7	28.4	20.5	26.9	22	25.4	44.6	35.0	28
Cimarron	12120	24.3	47.9	27.8	33.3	3	39.5	35.7	22.9	32.7	1	24.9	54.1	39.5	23
Chiefkan x Oro-Tenq.	12134	25.7	38.1	23.2	29.0	18	34.5	30.5	18.5	27.8	17	34.6	53.9	44.3	15
Com.-Hon.-Fwd. x H-M-Com.	12145	23.8	39.0	24.8	29.2	17	37.6	31.2	17.8	28.9	12	27.6	58.2	42.9	19
Pawnee	11669	25.8	37.4	26.6	29.9	15	37.0	30.6	21.7	29.8	9	39.3	55.3	47.3	5
Comanche	11673	28.5	38.3	25.9	30.9	11	38.0	32.9	19.1	30.0	8	25.8	54.0	39.9	21
Nebr. 60 x Medit.-Hope	12500	25.5	42.2	25.2	31.0	10	38.6	29.3	15.1	27.7	18	35.1	59.1	47.1	6
Kawv.-Tenq. x Comanche	12149	23.8	39.9	24.9	29.5	16	40.6	30.8	18.1	29.8	9	35.3	61.6	48.5	3
Martin-Tenq. x Chiefkan	12146	27.7	39.2	29.2	32.0	5	37.5	27.1	17.3	27.3	21	35.5	56.8	46.2	9
Wichita	11952	21.9	35.6	22.0	26.5	24	39.1	36.9	20.7	32.2	2	35.0	53.1	44.1	16
Triumph	12132	22.1	40.4	22.0	28.2	20	42.1	32.4	22.1	32.2	2	36.7	54.9	45.8	11
Kharkof	1442	23.4	26.0	26.5	25.3	26	34.0	26.0	12.8	24.3	29	24.6	51.9	38.3	25
Compound Hybrid	12501	21.3	23.8	29.2	24.8	27	33.4	28.8	15.9	26.0	24	25.7	48.6	37.2	26
Oro x Medit.-Hope	12140	23.0	33.8	25.5	27.4	22	35.1	25.8	14.7	25.2	27	29.8	49.8	39.8	22
Early Blackhull	8856	34.3	38.6	19.1	30.7	12	34.4	24.9	20.1	26.5	23	35.7	57.1	46.4	8
Turkey (Colo.)	12150	21.4	31.3	31.8	28.2	20	30.6	31.3	15.7	25.9	26	20.5	42.2	31.4	30
Blackhull	6251	21.9	33.4	26.7	27.3	23	32.6	26.9	18.6	26.0	24	29.1	44.7	36.9	27
Kanred x Hope-Hd. Fed.	12135	18.0	29.5	26.3	24.6	28	25.4	26.6	13.4	21.8	30	23.3	40.4	31.9	29
" " " "	12136	23.0	28.2	21.3	24.2	29	31.1	27.4	14.5	24.3	28	25.6	53.2	39.4	24

Table 21.--(Concluded)

C. I. No.	Colorado					Iowa		Nebraska					Average of 15 Stations
	Akron	Ft. Collins	Hesperus	Average	Rank	Ames	Rank	Lincoln	North Platte	Alliance	Average	Rank	
12133	34.4	45.0	23.9	34.4	3	34.6	7	32.4	36.8	54.7	41.3	1	36.2
12148	40.8	17.6	32.6	30.3	16	33.9	11	39.0	34.3	32.6	35.3	10	34.9
12128	26.7	39.3	26.0	30.7	15	36.4	3	40.0	39.9	31.1	37.0	4	34.4
12129	26.7	48.0	25.8	33.5	4	36.7	2	29.5	43.1	43.8	38.8	3	34.2
12122	37.0	27.7	30.6	31.8	11	30.3	22	24.5	39.1	35.7	33.1	15	34.1
12101	29.5	41.9	32.0	34.5	2	30.0	23	27.8	42.2	37.4	35.8	6	33.9
12116	29.0	33.0	36.9	33.0	5	29.6	25	33.3	32.4	35.6	33.8	12	33.6
12147	26.9	39.5	32.6	33.0	5	26.7	29	29.8	44.9	31.5	35.4	9	33.2
12141	27.4	38.7	17.7	27.9	20	33.1	17	36.3	38.7	32.2	35.7	7	32.8
12000	33.3	30.2	25.8	29.8	18	34.3	8	27.2	37.9	31.6	32.2	18	32.5
12110	25.6	31.1	28.5	28.4	19	33.4	15	39.2	37.3	30.4	35.6	8	32.4
12142	26.4	40.0	39.9	35.4	1	29.6	1	25.4	49.9	42.1	39.1	2	32.3
12120	32.0	31.1	27.5	30.2	17	33.9	11	30.2	34.2	18.8	27.7	29	32.3
12134	22.9	32.8	37.0	30.9	13	31.7	20	31.0	40.5	27.3	32.9	16	32.1
12145	27.5	40.6	30.7	32.9	7	32.5	19	38.9	39.2	12.2	30.1	22	32.1
11669	25.7	30.5	25.2	27.1	22	35.5	4	26.5	31.8	29.8	29.4	24	31.9
11673	29.2	19.2	27.7	25.4	24	32.6	18	32.6	41.5	30.7	34.9	11	31.7
12500	26.4	27.9	16.9	23.7	27	29.1	27	30.8	32.7	36.9	33.5	14	31.4
12149	28.8	22.0	15.1	22.0	30	34.7	6	32.1	28.2	31.1	30.5	21	31.1
12146	28.7	23.0	21.4	24.4	26	33.7	14	29.1	40.9	17.8	29.3	25	31.0
11932	29.1	28.7	12.6	23.5	28	33.4	15	19.9	35.3	37.0	30.7	19	30.7
12132	37.6	33.3	11.4	27.4	21	34.8	5	31.4	22.7	15.6	23.2	30	30.6
1442	25.5	37.7	33.0	32.1	10	29.2	26	24.0	42.5	41.8	36.1	5	30.6
12501	28.2	31.3	35.2	31.6	12	34.1	9	21.9	39.7	39.7	33.8	13	30.5
12140	31.2	34.4	31.3	32.3	9	28.5	28	25.2	38.8	28.2	30.7	20	30.3
8856	31.8	21.3	21.5	24.9	25	33.9	11	23.2	22.3	30.9	25.5	28	29.9
12150	25.1	37.8	35.2	32.7	8	34.0	10	22.9	46.0	21.1	30.0	23	29.8
6251	25.6	28.3	26.1	26.7	23	31.1	21	27.5	40.6	29.5	32.5	17	29.5
12135	29.5	37.2	25.6	30.8	14	21.1	30	23.7	37.6	22.2	27.8	26	26.7
12136	28.2	21.2	20.2	23.2	29	29.8	24	25.7	29.8	16.6	24.0	29	26.4

Table 22.--Summary of 2-year average yields in bushels per acre of 22 varieties grown in uniform yield nurseries at 13 stations in 1946 and 1947.

Variety	C. I. No.	Texas				Oklahoma				Kansas			
		Denton	Chillicothe	Average	Rank	Stillwater	Woodward	Average	Rank	Manhattan	Hays	Average	Rank
Kawv.-Mqo. x Kawv.-Tenq.	12128	28.9	31.9	30.4	2	33.6	30.7	32.2	1	40.7	43.8	42.3	1
Chiefkan x Oro-Tenq.	12133	25.6	30.9	28.3	5	26.0	29.1	27.6	12	39.0	41.1	40.1	4
Chey. x E. Blackhull	12122	27.2	32.6	29.9	3	30.4	33.3	31.9	3	36.0	40.0	38.0	8
Cheyenne x Chiefkan	12129	22.5	28.4	25.5	14	26.6	25.9	26.3	17	34.9	38.8	36.9	11
Blackhull x Cheyenne	12101	26.8	27.9	27.4	7	24.4	30.1	27.3	13	35.9	38.2	37.1	10
Quivira x Tenmarq	12116	24.8	25.1	25.0	15	27.5	29.8	28.7	10	44.6	36.7	40.7	3
Cheyenne x Turkey	12142	20.0	20.7	20.4	22	25.8	28.2	27.0	14	31.9	32.7	32.3	20
Medit.-Hope x Pawnee	12141	29.9	32.2	31.1	1	30.9	26.6	28.8	8	41.3	42.0	41.7	2
Pawnee	11669	25.7	28.5	27.1	8	30.8	27.7	29.3	7	41.4	38.6	40.0	5
Westar	12110	27.2	24.3	25.8	13	28.1	28.0	28.1	11	44.2	35.5	39.9	6
Chiefkan x Oro-Tenq.	12134	26.1	26.4	26.3	12	25.4	28.2	26.8	15	38.5	39.5	39.0	7
Chey. x E. Blackhull	12000	26.5	27.6	27.1	8	28.8	31.1	30.0	5	35.4	36.0	35.7	14
Comanche	11673	27.3	28.6	28.0	6	25.7	27.6	26.7	16	34.6	38.2	36.4	13
Oro x Medit.-Hope	12140	26.9	26.9	26.9	11	24.5	26.7	25.6	18	39.0	35.3	37.2	9
Cimarron	12120	25.5	32.1	28.8	4	31.7	31.7	31.7	4	30.4	39.5	35.0	15
Early Blackhull	8856	28.2	25.7	27.0	10	28.5	30.7	29.6	6	31.2	38.7	35.0	15
Triumph	12132	22.2	26.4	24.3	16	29.8	34.4	32.1	2	33.6	39.5	36.6	12
Kharkof	1442	24.7	22.1	23.4	18	21.1	23.5	22.3	21	28.7	37.0	32.9	19
Wichita	11952	19.2	26.7	23.0	19	28.6	28.9	28.8	8	36.1	32.8	34.5	17
Blackhull	6251	22.5	25.7	24.1	17	24.2	26.6	25.4	19	33.1	33.4	33.3	18
Kanred x Hope-Hd. Fed.	12135	19.4	22.8	21.1	21	16.5	25.3	20.9	22	27.5	30.3	28.9	22
Kanred x Hope-Hd. Fed.	12136	21.8	22.6	22.2	20	22.9	24.8	23.9	20	28.2	35.8	32.0	21

Table 22.--(Concluded)

C. I. No.	Colorado					Iowa		Nebraska					Average of 13 Stations
	Akron	Ft. Collins	Hesperus	Average	Rank	Ames	Rank	Lincoln	North Platte	Alliance	Average	Rank	
12128	23.6	41.2	42.5	35.8	12	35.9	8	47.7	41.7	26.9	38.8	2	36.1
12133	30.0	48.2	33.0	37.1	7	36.7	5	39.1	40.0	38.9	39.3	1	35.2
12122	29.3	38.6	48.2	38.7	5	36.5	7	34.5	40.2	28.1	34.3	9	35.0
12129	26.8	48.9	44.7	40.1	3	38.2	3	36.2	45.4	32.6	38.1	4	34.6
12101	27.6	45.7	49.0	40.8	2	34.7	13	35.5	41.7	29.2	35.5	5	34.4
12116	25.6	42.4	49.0	39.0	4	34.6	15	39.3	34.9	26.6	33.6	11	33.9
12142	23.5	51.4	47.9	40.9	1	40.9	1	35.1	49.0	31.8	38.6	3	33.8
12141	23.5	42.8	30.9	32.4	18	36.9	4	42.5	32.0	24.2	32.9	14	33.5
11669	22.9	37.3	49.5	36.6	8	38.4	2	37.6	33.2	22.9	31.2	17	33.4
12110	21.6	38.1	46.4	35.4	15	33.4	16	42.6	37.2	25.6	35.1	6	33.2
12134	23.5	39.6	45.8	36.3	10	33.0	17	39.3	40.8	23.9	34.7	7	33.1
12000	27.7	39.4	39.8	35.6	14	35.8	9	34.5	41.1	26.5	34.0	10	33.1
11673	24.2	31.7	52.0	36.0	11	31.7	19	39.1	39.4	25.5	34.7	7	32.7
12140	26.7	43.7	42.1	37.5	6	34.7	13	35.8	38.9	24.5	33.1	13	32.7
12120	17.9	36.7	39.0	31.2	19	35.0	10	39.0	33.9	18.8	30.6	19	31.6
8856	27.0	26.6	49.8	34.5	16	34.8	11	31.3	29.0	24.2	28.2	21	31.2
12132	31.2	37.2	31.1	33.2	17	34.8	11	34.2	28.6	16.9	26.6	22	30.8
1442	23.7	45.5	40.1	36.4	9	30.2	21	31.1	36.3	32.1	33.2	12	30.5
11952	24.7	34.3	33.1	30.7	21	36.6	6	28.1	35.9	28.9	31.0	18	30.3
6251	20.2	34.7	37.4	30.8	20	31.2	20	34.3	37.7	25.8	32.6	15	29.8
12135	29.1	44.0	34.4	35.8	12	27.2	22	34.5	38.6	21.6	31.6	16	28.6
12136	24.0	33.8	33.6	30.5	22	32.4	18	34.5	33.8	18.0	28.8	20	28.2

SUMMARY OF AGRONOMIC DATA

Data on seven characters other than yield were recorded at two or more stations. These are summarized for the current season in table 23.

The data show that Early Blackhull and Triumph were the earliest wheats in the nursery with Wichita, C. I. 12000 and C. I. 12148 slightly later. Turkey, Kharkof, and C. I. 12501 were latest. The relative ripening dates are in general accord with the heading notes. Height of plant was noted at 12 stations with Cimarron and Triumph the shortest and Blackhull and Turkey tallest.

Lodging showed that C. I. 12148 and Cimarron had the stiffest straw while C. I. 12122 was one of the weakest. For this reason, the latter selection was discarded from the tests for 1948.

Leaf rust notes show the best resistance was exhibited by C. I. 12145, C. I. 12128, and C. I. 12140. The most susceptible varieties were Triumph and Early Blackhull. Stem rust readings showed the Hope hybrids had the best resistance although certain early wheats tended to escape injury.

Weight per bushel brings to light the excellent performance of Cimarron which averaged 61.4 pounds at 15 stations. Early Blackhull and its hybrids, the Chiefkan hybrids, and C. I. 12116 had good averages also.

Table 23.--Summary of agronomic data other than yield for the varieties grown in the uniform yield nursery in the hard red winter wheat region in 1947.

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Lodging	Rust Leaf	Rust Stem	Weight per bushel
		May		In.	%	%	%	lbs.
Number of stations		11	11	12	9	10	5	15
Kharkof	1442	27	7/4	41	47	45	33	57.8
Blackhull	6251	25	7/3	42	47	46	17	59.0
Early Blackhull	8856	18	6/28	40	48	58 1/	9	60.4
Comanche	11673	22	7/1	40	40	39	16	58.4
Pawnee	11669	23	6/30	39	26	29	16	59.0
Wichita	11952	20	6/28	40	37	56 1/	11	60.1
Chey. x E. Blackhull	12000	20	6/30	40	58	49	15	60.3
" " "	12122	21	6/30	39	59	49	13	60.4
Blackhull x Cheyenne	12101	24	7/3	40	32 1/	50	18	59.1
Westar	12110	24	7/2	41	32	10	43	58.7
Quivira x Tenmarq	12116	21	6/30	41	26	29	14	60.1
Cimarron	12120	21	7/1	38	14	42	22	61.4
Kawv.-Mqo. x Kawv.-Tenq.	12128	22	7/1	39	39	3	21	59.6
Cheyenne x Chiefkan	12129	24	7/2	41	43	36	15	59.8
Triumph	12132	19	6/27	38	24	62 1/	5	60.1
Chiefkan x Oro-Tenq.	12133	22	6/30	40	17	49	5	60.1
" " "	12134	22	6/30	41	25 1/	50	12	59.9
Kanred x Hope-Hd. Fed.	12135	23	7/2	40	31	47	7	56.4
" " " "	12136	22	7/1	40	26	43	7	57.3
Oro x Medit.-Hope	12140	24	7/2	41	29	6	1	58.7
Medit.-Hope x Pawnee	12141	22	7/1	39	15	21	T	58.9
Cheyenne x Turkey	12142	26	7/3	40	43 1/	46	12	58.2
Com.-Hon.-Fwd. x H-M-Com.	12145	24	7/3	39	34	2	1	58.6
Martin-Tenq. x Chiefkan	12146	22	7/1	39	42	35	9	58.6
Martin-Tenq. x Kharkof	12147	25	7/2	40	48	40	12	57.7
Chiefkan x Oro-Tenq.	12148	20	6/29	39	12	36	8	60.9
Kawv.-Tenq. x Comanche	12149	23	7/1	40	48	26	8	59.9
Turkey (Colo.)	12150	28	7/4	42	56	50	44	57.8
Neb. 60 x Medit-Hope	12500	22	7/1	39	44 1/	24	3	59.5
Compound Hybrid	12501	27	7/3	40	50 1/	56	15	58.2

1/ One fewer stations than indicated.

DATA FROM THE DISEASE NURSERIES

UNIFORM RUST NURSERIES

The following is a summary report of results obtained in the 1947 winter wheat uniform rust nurseries in cooperative studies conducted by members of the Divisions of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, and the Plant Disease Control, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, and State Agricultural Experiment Stations. This report, prepared by H. A. Rodenhiser, is preliminary to a more complete one in which the data will be presented on the basis of coefficients of infection and will contain information on the physiologic races identified from the rust collections made in the different nurseries.

Data on leaf rust infection presented in table 24 were obtained on 30 varieties and selections in each of 23 nurseries. For the area as a whole the leaf rust epidemic was exceptionally heavy and good differential reactions were obtained. In the soft red wheat group the average percentages for the different varieties and selections ranged from 1 to 62.7. Trumbull x Frondoso, tested in these nurseries for the first time, was the most resistant and Fulcaster the most susceptible. Of the semi-hard red wheats Hope x Hussar had the lowest average percent leaf rust, 12.6 percent as compared with 46.5 for Minturki. There were marked differences in reaction to leaf rust among the 15 hard red winter wheats tested. Four selections had averages of less than 4 percent, namely: Hd. Fed.-Kawvale x Med.-Hope (2.5), Oro x Med.-Hope (2.9), Marquillo-Oro x Oro-Tenmarq, (C. I. 12407) (3.3), and Kawvale-Marquillo x Kawvale-Tenmarq (3.9). Minter is on the average moderately susceptible in reaction with 25 percent infection. Kharkof (40.6 percent) was the most susceptible of the group.

Good stem rust data were obtained in 8 of the 14 nurseries recorded in table 25. Trumbull x Frondoso was the most resistant of the soft red wheats with an average of 6.5 percent infection as compared with 41.2 for the most susceptible of the wheats tested, namely, Trumbull x Hope-Hussar. Only 5 semi-hard red wheats were tested. Hope-Hussar was the most resistant of the group with an average of 3.4 percent infection as compared with 38 percent for Hussar. Average infection percentages in the hard red group ranged from 0.4 for the most resistant selection, namely, Hd.Fed.-Kaw. x Med.-Hope to 24.8 for Westar the most susceptible. Seven other wheats had averages of less than three percent, namely, Comanche x Med.-Hope (0.6), Nebred x Med.-Hope (0.9), Oro x Med.-Hope (2.0), Comanche x Hope-Hussar (2.1), H44 x Minturki^2 (2.2), Marquillo-Oro x Oro-Tenmarq, (C. I. 12406) (2.4) and Minter (2.8).

A few wheats had fairly low average percentages of infection to both leaf and stem rust. In this respect Trumbull x Frondoso had the best performance record of the 10 soft wheats tested. Of the hard red wheats Hd. Fed.-Kaw. x Med.-Hope and Oro x Med.-Hope had averages of less than 3 percent infection with the two rusts. It should be noted, however, that the former has as high as 25 percent leaf rust in the nursery at Whytheville, Va. and the latter 15 percent stem rust at College Station, Texas.

Table 24.--Severity of leaf rust infection on winter wheat varieties grown in uniform rust nurseries in 1947.

Variety or Cross	C. I. No.	Percent severity of leaf rust infection at: Manhattan Kans.	Stillwater Okla.	Denton Tex.	Col. Sta. Tex.	Columbia Mo.	Lincoln Nebr.	Ames, Iowa
Soft Red								
Trumbull	5657	100	100	60	70	75	75	60
Fulcaster	6471	100	100	40	70	75	85	65
Mediterranean	3332	85	100	25	40	65	75	50
Wabash	11384	25	60	25	25	7	1	3
Trumbull x Hope-Hussar	12458	5	3	5	15	8	5	3
Trumbull^3 x Hope-Hussar	12457	65	100	40	25	50	50	10
Trumbull^2 x Wabash-Hope-Hussar	12456	15	35	40	15	35	20	21
Trumbull x (W38 x Fultz-Hung. 128)	12454	T	5	25	15	5	T	1
do	12530	2	3	5	10	3	T	1
Trumbull x Frondoso	12461	T	T	5	5	2	T	2
Semi-hard Red								
Hussar	4843	45	50	65	90	7	40	10
Kawvale	8180	80	65	65	30	5	25	10
Minturki	6155	85	80	50	30	60	90	40
Hope-Hussar	11682	25	40	25	10	10	40	3
Harvest Queen x Kawvale	12284	45	80	50	35	20	25	20
Hard Red								
Kanred	5146	65	65	35	30	10	90	2
Karkof	1442	85	100	40	50	40	90	5
Malakof	4898	85	100	40	50	30	75	40
Med.-Hope x Pawnee	12287	25	25	65	5	3	50	1
Comanche x Med.-Hope	12329	25	10	65	2	3	40	1
Kawvale-Marquillo x Kawvale-Tenmarq	12331	5	25	5	5	3	T	1
Hd. Fed.-Kv. x Med.-Hope	12459	T	3	5	T	T	T	T
Oro x Med.-Hope	12460	5	20	T	5	T	5	1
Nebred x Med.-Hope	12404	5	65	25	5	7	5	5
Comanche x Hope-Hussar	12405	10	40	5	T	5	10	5
Marquillo-Oro x Oro-Tenmarq	12406	5	10	10	10	5	T	10
do	12407	5	5	5	5	5	T	3
Minter	12138	25	50	40	25	10	45	5
H_{44} x Minturki^2	12532	25	55	40	25	40	40	15
Westar	12110	10	5	10	10	T	10	5

Table 24.--(Continued)

Variety or Cross	C. I. No.	Percent severity of leaf rust infection at: Kana-wha, Iowa	Madi-son, Wis.	East Lansing, Mich.	Ur-bana, Ill.	Lafay-ette, Ind.	Evans-ville, Ind.	Bed-ford, Ind.
Soft Red								
Trumbull	5657	45	60	5	70	75	95	100
Fulcaster	6471	60	70	5	70	75	95	100
Mediterranean	3332	35	40	5	80	75	95	100
Wabash	11384	3	15	5	40	15	20	35
Trumbull x Hope-Hussar	12458	1	2	20	10	1	T	0
Trumbull^3 x Hope-Hussar	12457	10	15	0	5	5	1	35
Trumbull^2 x Wabash-Hope-Hussar	12456	5	20	5	10	10	5	25
Trumbull x (W38 x Fultz-Hung. 128)	12454	3	10	20 1/	20	5	T	15
do	12530	T	5	13 1/	10	2	T	15
Trumbull x Frondoso	12461	T	1	0	T	2	T	0
Semi-hard Red								
Hussar	4843	5	50	5	40	20	5	10
Kawvale	8180	25	60	5	10	60	75	25
Minturki	6155	50	70	5	25	60	85	40
Hope-Hussar	11682	15	3	5	30	10	T	T
Harvest Queen x Kawvale	12284	15	60	10	40	25	65	10
Hard Red								
Kanred	5146	20	50	5	70	50	15	15
Karkof	1442	25	40	5	70	65	50	15
Malakof	4898	20	25	5	10	25	5	10
Med.-Hope x Pawnee	12287	5	3	0	5	5	T	1
Comanche x Med.-Hope	12329	5	2	0	T	1	T	T
Kawvale-Marquillo x Kawvale-Tenmarq	12331	T	T	0	T	25	T	T
Hd. Fed. Kv. x Med.-Hope	12459	1	1	5	T	5	0	T
Oro x Med.-Hope	12460	2	T	5	5	1	0	T
Nebred x Med.-Hope	12404	5	20	5	T	T	T	2
Comanche x Hope-Hussar	12405	5	15	5	T	10	T	2
Marquillo-Oro x Oro-Tenmarq	12406	5	1	5	10	20	T	5
do	12407	T	3	5	5	20	T	T
Minter	12138	5	15	5	5	50	50	T
H_{44} x Minturki^2	12532	15	20	5	10	25	15	2
Westar	12110	3	40	5	10	25	25	2

1/ Segregating

Table 24.--(Continued)

Variety or Cross	C. I. No.	Percent severity of leaf rust infection at: Lexington, Ky.	Wooster, Ohio	Wolf Creek, W. Va.	Whythe-ville, Va.	Raleigh, N. C.	West-minster, S. C.
Soft Red							
Trumbull	5657	40	20	25	40	50	25
Fulcaster	6471	60	60	25	40	35	10
Mediterranean	3332	40	25	25	40	50	5
Wabash	11384	10	10	15	65	T	2
Trumbull x Hope-Hussar	12458	T	5	5	75	T	2
Trumbull^3 x Hope-Hussar	12457	20	5	10	25	2	2
Trumbull^2 x Wabash-Hope-Hussar	12456	15	20	25	10	3	5
Trumbull x (W38 x Fultz-Hung. 128)	12454	5	5	10	10	T	2
do	12530	5	5	1	25	T	2
Trumbull x Frondoso	12461	1	0	T	1	T	2
Semi-hard Red							
Hussar	4843	5	5	2	40	2	2
Kawvale	8180	60	20	5	10	T	2
Minturki	6155	40	30	2	70	5	65
Hope-Hussar	11682	5	2	1	5	T	2
Harvest Queen x Kawvale	12284	40	20	5	2	T	2
Hard Red							
Kanred	5146	50	30	25	5	3	10
Karkof	1442	60	30	10	5	3	5
Malakof	4898	15	30	25	5	1	5
Med.-Hope x Pawnee	12287	T	3	2	T	T	2
Comanche x Med.-Hope	12329	T	3	T	0	T	1
Kawvale-Marquillo x Kawvale-Tenmarq	12331	T	3	T	0	T	1
Hd. Fed. Kv. x Med.-Hope	12459	1	3	T	25	T	1
Oro x Med.-Hope	12460	T	1	T	0	1	1
Nebred x Med.-Hope	12404	2	3	T	0	1	1
Comanche x Hope-Hussar	12405	T	5	1	10	T	1
Marquillo-Oro x Oro-Tenmarq	12406	T	5	--	5	T	1
do	12407	T	5	--	0	T	1
Minter	12138	25	10	10	60	10	2
H44 x Minturki^2	12532	2	10	15	0	5	2
Westar	12110	20	20	T	0	T	1

Table 24.--(Concluded)

Variety or Cross	C. I. No.	Percent severity of leaf rust infection at: Experiment Georgia	Quincy Florida	St. Paul Minnesota	Average
Soft Red					
Trumbull	5657	20	60	100	59.6
Fulcaster	6471	15	95	92	62.7
Mediterranean	3332	10	85	87	53.8
Wabash	11384	T	5	--	17.4
Trumbull x Hope-Hussar	12458	5	5	--	8.0
Trumbull^3 x Hope-Hussar	12457	T	80	--	25.2
Trumbull^2 x Wabash-Hope-Hussar	12456	5	20	--	16.5
Trumbull x (W38 x Fultz-Hung. 128)	12454	0	3	--	7.3
do	12530	0	T	--	4.9
Trumbull x Frondoso	12461	0	T	--	1.0
Semi-hard Red					
Hussar	4843	0	40	55	25.8
Kawvale	8180	5	50	45	32.1
Minturki	6155	5	50	33	46.5
Hope-Hussar	11682	0	40	18	12.6
Harvest Queen x Kawvale	12284	T	40	45	28.5
Hard Red					
Kanred	5146	5	10	20	29.6
Karkof	1442	5	75	60	40.6
Malakof	4898	5	70	68	32.3
Med.-Hope x Pawnee	12287	0	25	--	10.3
Comanche x Med.-Hope	12329	0	15	--	7.9
Kawvale-Marquillo x Kawvale-Tenmarq	12331	0	10	--	3.9
Hd. Fed.-Kv. x Med.-Hope	12459	0	T	5	2.5
Oro x Med.-Hope	12460	T	3	10	2.9
Nebred x Med.-Hope	12404	0	10	30	8.6
Comanche x Hope-Hussar	12405	0	T	40	7.4
Marquillo-Oro x Oro-Tenmarq	12406	T	30	8	6.6
do	12407	0	T	--	3.3
Minter	12138	5	60	63	25.0
H_{44} x Minturki^2	12532	10	40	83	21.7
Westar	12110	T	T	--	9.2

Table 25.--Severity of stem rust infection on winter wheat varieties grown in uniform rust nurseries in 1947.

Variety or cross	C. I. No.	Percent severity of stem rust infection at: Manhattan, Kans.	Denton, Tex.	Col. Sta., Tex.	Lincoln, Nebr.	Ames, Iowa	Kanawha, Iowa	Madison, Wis.
Soft Red								
Trumbull	5657	T	60	80	50	5	40	2
Fulcaster	6471	T	80	90	40	3	40	5
Mediterranean	3332	T	80	70	65	5	40	5
Wabash	11384	T	80	80	80	5	65	5
Trumbull x Hope-Hussar	12458	10	60	90	65	10	60	10
$Trumbull^3$ x Hope-Hussar	12457	0	80	90	15	2	20	7
$Trumbull^2$ x Wabash-Hope-Hussar	12456	0	80	60	5	T	5	T
Trumbull x (W38 x Fultz-Hung. 128)	12454	1	80	70	50	5	65	15
do	12530	5	80	70	25	1	60	15
Trumbull x Frondoso	12461	0	T	25	5	0	5	T
Semi-hard Red								
Hussar	4843	1	80	100	50	T	60	15
Kawvale	8180	T	50	80	10	T	10	3
Minturki	6155	0	20	80	20	T	5	2
Hope-Hussar	11682	0	25	10	0	0	5	T
Harvest Queen x Kawvale	12284	T	50	90	15	0	5	2
Hard Red								
Kanred	5146	T	60	60	25	T	30	1
Karkof	1442	T	80	80	30	0	20	2
Malakof	4898	T	80	80	5	0	20	5
Med.-Hope x Pawnee	12287	0	30 1/	5	0	0	10	T
Comanche x Med.-Hope	12329	0	T	1	0	0	5	T
Kawvale-Marquillo x Kawvale-Tenmarq	12331	T	30	80	5	0	5	3
Hd. Fed.-Kv. x Med.-Hope	12459	0	0	T	0	0	5	T
Oro x Med.-Hope	12460	0	0	15	0	0	5	T
Nebred x Med.-Hope	12404	0	0	5	0	0	5	T
Comanche x Hope-Hussar	12405	0	15	10	0	0	1	T
Marquillo-Oro x Oro-Tenmarq	12406	T	T	20	T	0	5	T
do	12407	T	40	15	T	T	1	T
Minter	12138	0	5	25	0	0	1	T
H_{44} x $Minturki^2$	12532	0	5	20	0	0	1	T
Westar	12110	2	90	80	45	5	40	T

1/ Segregating

Table 25.--(Concluded)

Variety or Cross	C. I. No.	Percent severity of stem rust infection at: Urbana, Ill.	Lafayette, Ind.	Wolf Creek, W.Va.	Whythe, Va.	St. Paul, Minn.	Chatham, Mich.	Average	Rank
Soft Red									
Trumbull	5657	40	35	25	50	8	--	29.3	5
Fulcaster	6471	40	35	40	40	5	--	34.9	6
Mediterranean	3332	25	35	65	40	8	--	36.5	9
Wabash	11384	10	35	40	50	5	3	35.2	7
Trumbull x Hope-Hussar	12458	40	35	65	65	1	25	41.2	10
Trumbull^3 x Hope-Hussar	12457	10	15	25	30	3	2	23.0	3
Trumbull^2 x Wabash-Hope-Hussar	12456	T	2	1	5	1	T	12.3	2
Trumbull x (W38 x Fultz-Hung. 128)	12454	25	35	35	25	-	30	36.3	8
do	12530	25	35	T	10	-	15	28.4	4
Trumbull x Frondoso	12461	20	15	T	5	-	2	6.5	1
Semi-hard Red									
Hussar	4843	40	35	15	40	18	40	38.0	5
Kawvale	8180	10	10	10	20	5	5	16.4	3
Minturki	6155	T	15	T	5	2	5	11.9	2
Hope-Hussar	11682	T	T	0	0	3	0	3.4	1
Harvest Queen x Kawvale	12284	40	10	1	5	2	10	17.7	4
Hard Red									
Kanred	5146	65	15	0	10	2	1	20.7	12
Karkof	1442	70	25	T	10	3	T	24.7	14
Malakof	4898	60	20	T	15	5	0	22.3	13
Med.-Hope x Pawnee	12287	15	T	0	0	8	0	5.3	10
Comanche x Med.-Hope	12329	0	T	0	0	1	0	0.6	2
Kawvale-Marquillo x Kawvale-Tenmarq	12331	5	25	T	5	2	T	12.4	11
Hd. Fed.-Kv. x Med.-Hope	12459	0	T	0	0	0	0	0.4	1
Oro x Med.-Hope	12460	0	T	0	0	4	--	2.0	4
Nebred x Med.-Hope	12404	0	T	0	0	1	--	0.9	3
Comanche x Hope-Hussar	12405	0	T	0	0	1	0	2.1	5
Marquillo-Oro x Oro-Tenmarq	12406	T	T	0	1	2	--	2.4	7
do	12407	T	5	0	0	0	--	5.2	9
Minter	12138	T	2	T	2	1	0	2.8	8
H_{44} x Minturki^2	12532	0	2	0	1	0	0	2.2	6
Westar	12110	T	25	0	10	0	--	24.8	15

UNIFORM BUNT NURSERIES

The complete report of the uniform bunt nurseries is appended to this report without change in the table number. Twenty-one of the entries averaged less than one percent bunt at the six stations from which data were available.

DATA FROM THE QUALITY LABORATORY

Grain harvested from the uniform plots and yield nurseries 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.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

(NOT FOR PUBLICATION)

SUMMARY OF RESULTS OF THE GREAT PLAINS UNIFORM WINTER WHEAT BUNT NURSERIES, 1947

By C. O. Johnston, Pathologist, and L. P. Reitz, Agronomist,
Division of Cereal Crops and Diseases

The Great Plains uniform winter wheat bunt nurseries were continued in 1947 in the same manner outlined in the reports for the four preceding years. Nine nurseries were sown, but no data were obtained in the ordinary bunt and dwarf bunt nurseries at Bozeman, Mont., and infections were so low at North Platte, Nebr., that the data are not included. This report summarizes the data from 6 nurseries and presents the averages for certain varieties and selections grown in uniform bunt nurseries for periods of varying length during the period 1932 to 1947, inclusive.

A total of 56 varieties and selections was grown in 8-foot rows in two replications at the various stations in 1947. All of the nurseries except that at Beltsville, Md., were in the hard red winter wheat growing area. Each station represents a state or a distinct area including parts of several states. The selections grown in the nurseries included several standard varieties of hard red winter wheat and many promising hybrid lines produced at the various agricultural experiment stations in the area. The data are presented and summarized in table 1.

Only ordinary bunt was used to inoculate the seed for the nurseries shown in table 1, the dwarf bunt nursery at Bozeman, Mont., having failed. The inoculum used on the seed for each nursery was composed of a mixture of approximately equal parts of the physiologic races known to be present in the State or area represented by the station, except at Beltsville, Md., where it was a composite of races of both species common to the Hard Red Winter Wheat area. 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. (A mixture of races of T. foetida and T. caries was used for the Beltsville, Md., nursery.) The composites of races were prepared and the seed was inoculated at Manhattan, Kans. Sowings were made by cooperators at the various stations. Data on infection at most of the stations were recorded by L. P. Reitz.

The average infections for all varieties at each station, shown at the bottom of table 1, indicate that light infection was obtained at Lincoln, Nebr., and only moderate infections were obtained at Denton, Tex., Manhattan, Kans., and Beltsville, Md., although heavy infections were obtained on the very susceptible Red Chief at the last three stations. The highest average infection was obtained at Stillwater, Okla., although infections also were high at Fort Collins, Colo. In general, infections were lower at most stations in 1947 than

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Manhattan, Kansas
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in 1946 as shown by the fact that 21 selections had average infections of less than 1.0 percent, while no selection had an average of less than 1.0 percent in 1946.

The data in table 1 show that Hussar (C. I. 4843) had the lowest average infection in 1947 with no smutted plants noted at any station. It is notable that the first 29 selections all had less than 5 percent infection at all stations, while the first 35 selections had less than 10 percent infection at all stations. It also is interesting that 41 selections had average infections of less than 10 percent and that 28 of these, which also were grown in 1946, had 2-year average infections of less than 10 percent. In view of the 2-year average infection of 71.6 percent for Red Chief, it is clear that promising progress is being made in the program of breeding for bunt resistance.

In general there was greater uniformity in the reaction of the selections at the various stations in 1947 than in previous years. There are a few notable exceptions, however. For example, Marquillo x Oro selections (N. 392616 and K. 383464), Nebred (C. I. 10094), Hope-Turkey x Turkey (K. 44771), and Hope x Minturki^2 (C. I. 12506) had higher infections at Stillwater, Okla. (where physiologic race L10 is an important constituent of the inoculum), than at the other five stations. In a similar manner Marquillo-Oro x Pawnee (45RN2024) exhibited considerable resistance at all stations except Fort Collins, Colo., where race L8 was included in the inoculum. It is encouraging that many selections that were resistant to other physiologic races also apparently are resistant to the virulent race L8. Some caution should be exercised in such an interpretation, however, since Oro and Nebred, which are somewhat susceptible to L8, were not heavily smutted at Fort Collins in 1947.

Only 10 of the varieties shown in table 1 have been grown in the uniform bunt nurseries for the 5-year period 1943 to 1947. Three of these were the susceptible checks Cheyenne, Kharkof, and Red Chief. The remaining 7 were the varieties Hussar, Relief, Oro, Ridit, Comanche, Minturki, and Nebred, all of which were bred or selected for resistance to bunt. All of this group except Relief and Comanche have been included in the uniform bunt nursery for the 16-year period 1932 to 1947 and have low average infections for that period. The fact that varieties bred or selected for resistance to bunt have maintained their resistance for periods of 5 to 16 years indicates that resistance to ordinary bunt in the hard red winter wheat area of the United States is relatively stable.

Table 1.--Summary of bunt infection in 56 varieties and strains of winter wheat grown in the Great Plains uniform winter wheat bunt nursery at 6 stations in 1947 and average bunt infections for various periods from 1932 to 1947.

Variety or cross	C. I. or selection No. 1/	Average percentage of bunt at -						Weighted av.			
		Denton Tex.	Stillwater Okla.	Manhattan Kans.	Lincoln Nebr.	Fort Collins Colo.	Beltsville Md.	1947 av.	1946 & 1947	1943 to 1947	1932 to 1947
Hussar	4843	0	0	0	0	0	0	0	0.2	2.2	2.9
Chiefkan x Oro-Tenmarq	H. C. 46-52	0	0	T	T	0	0	T	...	...	...
Relief	10082	T	0	0	0	1	0	0.2	1.1	1.5	...
(29-34-275 x Front.) x (29-34-275 x Com.)	T.172-43-210	T	0	0	0	1	0	0.2	...	...	...
Marquillo-Oro x Comanche	K.431625	0	1	T	0	T	0	0.2	...	...	...
Kawvale-Tenmarq x Comanche	K. 2791	0	1	0	0	0	0	0.2	...	...	...
Blackhull-Oro x Pawnee	W.43h1-89	T	1	0	T	0	0	0.2	3.6	...	...
Blackhull-Oro x Pawnee	W.43h1-400	T	0	0	0	1	0	0.2	4.4	...	...
(29-34-275 x Front.) x (29-34-275 x Com.)	T.172-43-211	T	0	0	0	2	0	0.3	...	...	...
Comanche x Blackhull-Hd. Federation	W.43h2-329	1	T	0	0	T	1	0.3	4.1	...	...
Comanche x Cheyenne-Blackhull	W.43h3-86	2	0	T	T	T	0	0.3	7.6	...	...
Marquillo-Oro x Oro-Tenmarq	12406	T	1	1	0	1	0	0.5	...	...	...
Chiefkan x Oro-Tenmarq	12134	T	3	0	0	0	0	0.5	5.5	...	...
Chiefkan x Oro-Tenmarq	12148	2	T	0	0	T	1	0.5	5.4	...	...
Blackhull-Oro x Pawnee	W.43h1-399	2	0	0	0	1	0	0.5	5.4	...	...
(29-34-275 x Front.) x (29-34-275 x Com.)	T.172-43-205	2	0	0	0	1	1	0.7	...	...	...
Turkey x Turkey-Cheyenne	N. 383130	T	2	1	0	1	0	0.7	1.4	...	...
Chiefkan x Oro-Tenmarq	H.C. 43-111	2	T	1	0	1	0	0.7	5.1	...	...
(Com. x Honor-Fwd.) x (Hope-Med. x Com.)	T.171-43-263	1	1	1	1	1	0	0.8	...	...	...
Oro	8220	T	1	2	0	1	1	0.8	4.6	6.5	7.6
Hope-Turkey x Turkey	K.44767	2	1	T	0	1	1	0.8	2.2	...	...
Ridit	6703	T	2	1	0	3	0	1.0	1.6	9.5	5.5
Chiefkan x Oro-Tenmarq	12133	3	1	0	0	2	0	1.0	9.1	...	...
Comanche x Med.-Hope	K.44712	2	3	0	0	2	0	1.2	...	...	...
Comanche	11673	4	1	1	0	1	1	1.3	8.2	7.1	...
(Com. x Honor-Fwd.) x (Hope-Med. x Com.)	12145	3	3	0	0	1	1	1.3	...	...	...
Hope-Turkey x Cheyenne	N.436333	1	4	2	0	1	0	1.3	...	...	...
Cheyenne x Turkey 1062	12142	1	2	1	0	2	2	1.3	4.5	...	...
Oro x Med.-Hope	12460	1	4	0	0	1	2	1.3	4.0	...	...
Comanche x Blackhull-Hd. Fed.	W.43h2-315	5	0	2	0	1	0	1.3	6.9	...	...
Comanche x Cheyenne-Blackhull	W.43h3-81	2	1	2	0	1	2	1.3	9.9	...	...

Table 1.--(Concluded.)

Variety or cross	C. I. or selection No. 1/	Average percentage of bunt at - Den-ton Tex.	Still-water Okla.	Man-hattan Kans.	Lin-coln Nebr.	Fort Collins Colo.	Belts-ville Md.	1947 av.	Weighted av. 1946 & 1947	1943 to 1947	1932 to 1947
Marquillo-Oro x Oro-Tenmarq	K.43636	2	4	1	0	1	1	1.5	2.6	...	...
Chiefkan x Martin-Tenmarq	T.160-42-333	1	6	1	T	T	2	1.7	11.2	...	...
Minturki	6155	3	2	3	0	6	1	2.5	5.3	6.3	6.0
Marquillo x Oro	N.392616	5	9	2	T	3	1	3.3	6.6	...	...
Comanche x Blackhull-Hd. Federation	W.43h2-123	12	4	1	T	4	1	3.7	8.4	...	...
Marquillo x Oro	K.383464	4	8	T	5	5	1	3.8	7.8	...	...
Nebred	10094	2	12	T	T	5	8	4.5	7.6	5.7	3.8
Hope-Turkey x Turkey	K.44771	2	22	T	T	3	4	5.2	5.4	...	...
Hope x Minturki[2]	12506	5	14	2	0	6	5	5.3	7.5	...	...
Marquillo-Oro x Pawnee	45RN2024	2	6	11	1	36	0	9.3	...	...	...
Chiefkan x Martin-Tenmarq	T.160-42-318	12	26	4	2	22	6	12.0	22.9	...	...
Med.-Hope x Pawnee	K. 2790	7	38	6	3	40	4	16.3	11.6	...	...
Blackhull-Oro x Pawnee	W.43h1-86	9	46	T	2	39	3	16.5	...	...	...
Compound cross	N. 422404	9	55	13	3	30	2	18.6	...	...	...
Blackhull-Oro x Pawnee	W.43h1-323	19	53	5	3	29	7	19.3	...	...	...
Blackhull-Oro x Pawnee	W.43h1-61	12	55	6	5	33	10	20.2	...	...	...
Comanche x Hope-Hussar	12405	13	44	12	5	46	1	20.2	12.8	...	...
Med.-Hope x Pawnee	12141	18	58	9	5	46	14	25.0	21.9	...	...
Nebred x Med.-Hope	Ok. 42	18	60	10	2	41	24	25.8	...	...	...
Comanche x Cheyenne-Blackhull	W.43h3-194	17	77	13	7	42	14	28.3	...	...	...
Oro x Med.-Hope	12140	14	75	31	7	44	9	30.0	...	...	...
Kawvale-Marquillo x Kawvale-Tenmarq	12128	32	55	15	3	41	35	30.2	...	...	...
Cheyenne	8885	21	67	26	5	49	20	31.3	41.9	42.2	43.3
Kharkof	1442	34	68	29	8	46	13	33.0	39.6	39.7	41.3
Red Chief	12109	80	90	67	15	59	88	66.5	71.6	69.4	...
Station average		7.0	17.6	5.1	1.5	12.6	5.1	8.1	...	...	...

1/ Letters preceding selection numbers refer to the following stations: H.C., Hays, Kans.; T., Denton, Texas; K., Manhattan, Kans.; W., Woodward, Okla., N., Nebraska; Ok., Stillwater, Okla.

UNITED STATES DEPARTMENT OF AGRICULTURE
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(NOT FOR PUBLICATION)

SUMMARY OF MILLING AND BAKING RESULTS ON HARD RED WINTER WHEAT GROWN IN UNIFORM PLOT AND UNIFORM YIELD NURSERY EXPERIMENTS IN 1947

By Karl F. Finney, Chemist,
Division of Cereal Crops and Diseases

Chemical, milling, and bread-baking data for the Uniform Plot and Uniform Yield Nursery composites are presented in tables 1 and 2. Grain for these tests was supplied by the stations in the hard red winter wheat region of the Great Plains where cooperative wheat variety tests were grown in 1947. From the baking standpoint loaf volume is one of the most important characteristics recorded. The "as received" loaf volume for even comparably grown varieties usually is biased due to differences in flour protein content, a characteristic or property of the variety dependent largely on the environment; however, loaf volume corrected to a constant protein basis is a reliable index of protein quality, an inherited property for the most part. Loaf volume corrected to a constant protein basis is by no means the only property which determines the suitability of a variety for bread-baking purposes, although it is probably the most important. It has been considered in conjunction with other important properties in evaluating the varieties reported here such as wheat hardness and millability, dough mixing, oxidation, water requirements, and bread-crumb grain and color scores.

In an attempt to condense and simplify the reporting and evaluating of the Uniform Plot and Nursery varieties, the desirability of each variety with respect to each of the properties constituting general quality or over-all suitability is indicated by a "Q" for questionable and a "U" for unsatisfactory just opposite the data pertaining to the property in question. No letter indicates satisfactory. For example, Red Chief in the Southern District was too hard to have satisfactory milling properties and also was characterized as having unsatisfactory protein quality. All other properties were satisfactory. Only data for the most important properties are given. One unsatisfactory rating, in general, would characterize a variety as undesirable for bread-making purposes.

Hard Winter Wheat Quality Laboratory
Manhattan, Kansas
April, 1948

United States Department of Agriculture
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering

(For Non-Publication)

Bureau of Medical and Surgical Research of Aged and Infirm
Veterans Bureau in Uniform Rice and Cotton Waste Disposal
Specifications in 1924

by Earl G. Hughes, Chemist,
Division of Cereal Crops and Diseases

Chemical, milling and bread-baking tests for the [illegible] and Durham Wheat Variety Committees are presented in Table 4 and 5. Grain for these tests was supplied by the chairmen in the usual pro rata [illegible] of the Soy Bean Variety Committee were [illegible] given in 1923? [illegible] or the Spring Wheat Nurseries is one of the most important objectives recommended. For a previously [illegible] even considerable annual variations usually be found due to differences in minor unnoted factors, a more intensive or thorough [illegible] Other investigations on the varieties reported here [illegible] [illegible] practicability. Foods making, considered, were [illegible] and bread-dough yield and water content.

In an attempt to determine and simplify the [illegible] at the Durham Wheat Variety [illegible], the [illegible] variety with respect to each of the properties [illegible] [illegible] or several [illegible] [illegible] [illegible]

Table 1.--Chemical, milling, and baking data for Uniform Plot Nursery varieties, 1947 crop.[1/]

Variety	C. I. No.	Wheat				Flour						
		Weight per bu.	Ash	Protein	Flour yield[2/]	Ash	Protein	Absorption	Mixing time	$KBrO_3$ requirement	Loaf volume[3/]	Loaf volume corrected to 11½% protein
		Lbs.	%	%	%	%	%	%	Min.	Mg.	CC.	CC.
Southern District Composites												
Kharkof	1442	58.7	1.73	12.3	74.7	.46	11.4	61.2	2 5/8	3	870	876
Blackhull	6251	61.3	1.73	12.1	75.4	.43	11.3	59.3	2 1/8	4	830	842
Tenmarq	6936	59.3	1.68	11.8	75.2	.45	10.8	62.9	3	1	837	879
Early Blackhull	8856	62.0	1.71	12.0	74.7	.41	11.2	59.6	2 1/4	5	831	846
Pawnee	11669	60.6	1.57	11.8	76.2	.44	10.8	59.8	2 1/4	3	840	882
Comanche	11673	60.3	1.68	12.6	76.0	.47	11.8	65.4	3 1/4	2	897	879
Wichita	11952	61.6	1.71	11.8	75.4	.48	10.9	61.0	3	2	872	908 ✓
Red Chief	12109	62.6	1.60	12.1	75.0 U[4/]	.48	11.4	67.0	2 1/2	3	791	796 U
Westar	12110	60.3	1.59	11.6	77.2	.48	10.7	63.7	2 5/8	2	846	894
Cimarron	12120	63.0	1.63	12.5	73.8	.43	11.2	61.4	2 3/8	2	825	843
Chey. x E.Blackhull	12122	60.9	1.67	12.4	75.3	.46	11.2	66.5	2 3/4	2	843	861
Triumph	12132	61.2	1.66	12.0	74.9	.40	11.0	60.5	2 5/8	2	816	846
Central District Composites[5/]												
Kharkof	1442	59.6	1.76	12.4	76.7	.43	11.5	65.1	2 1/2	3	867	867
Blackhull	6251	62.1	1.81	12.6	76.7	.42	11.7	61.8	2 1/4	4	811	800
Tenmarq	6936	59.7	1.72	12.2	76.3	.44	11.3	63.8	3	1	838	850
Cheyenne	8885	60.3	1.71	11.6	76.3	.40	10.5	62.1	3 3/4	1	798	858
Pawnee	11669	62.0	1.64	13.0	77.0	.41	11.7	62.2	2 3/8	3	820	808
Comanche	11673	60.7	1.81	13.1	77.0	.42	12.3	66.5	2 5/8	2	868	820
Wichita	11952	62.2	1.84	12.7	77.3	.43	11.6	62.5	2 1/2	3	833	827
Red Chief	12109	63.8	1.64	12.7	76.7 U[4/]	.43	11.7	68.2	2 1/4	2	764	752 U
Chey. x E.Blackhull	12122	62.5	1.80	12.9	77.0	.41	11.8	65.7	2 1/2	2	825	807
Chiefkan x Oro-Tenq.	12133	61.8	1.73	13.1	79.3	.44	12.2	67.1	2 1/2	2	867	825
Northern District Composites												
Minturki	6155	59.8	1.71	13.6	74.6	.42	12.1	60.4	2 3/8	3	931	895
Marmin	11502	60.4	1.67	13.7	77.6	.43	12.5	60.5	2 1/4	3	871	811 Q
Minter	12138	59.4	1.75	14.2	75.5	.47	13.1	63.9	2 5/8	3	977	881
H44 x Minturki[2]	12139	57.6	1.70	13.4	73.2	.45	11.8	61.0	2 1/2	3	915	897

1/ 14% moisture. 2/ Q and U = questionable and unsatisfactory quality with respect to property in question.
3/ All crumb grains and colors are satisfactory. 4/ Unsatisfactory milling properties - too hard.
5/ High temperatures during the fruiting period at certain stations contributed to the lower corrected loaf volumes for all varieties compared to those for the corresponding varieties in the Southern District.

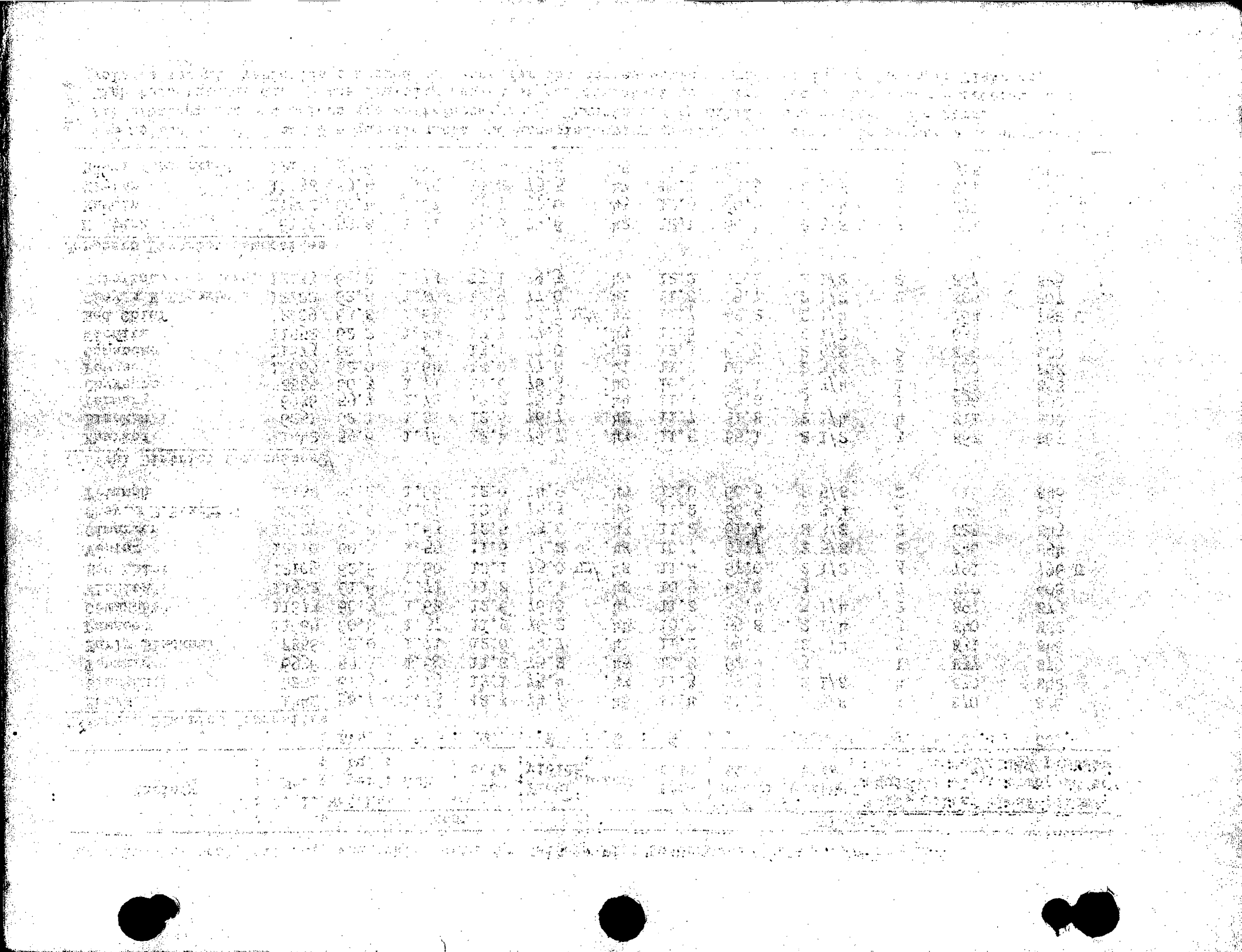

Table 2.--Chemical, milling, and baking data for Uniform Yield Nursery varieties, 1947 crop.[1] (Results based on a composite of grain submitted from cooperating stations.)

Variety	C. I. No.	Wheat				Flour						
		Weight per bu.	Ash	Protein	Flour yield[2]	Ash	Protein	Absorption	Mixing time	$KBrO_3$ requirement	Loaf volume[3]	Loaf volume corrected to 12½% protein
		Lbs.	%	%	%	%	%	%	Min.	Mg.	CC.	CC.
Kharkof	1442	59.4	1.72	13.1	77.7	.50	12.1	65.4	2 1/4	4	890	914
Blackhull	6251	60.9	1.77	13.1	77.0	.47	12.4	63.5	2	4	870	876
Early Blackhull	8856	62.1	1.85	13.2	77.0	.45	12.6	64.7	2 1/4	4	815	809 U
Pawnee	11669	60.7	1.67	13.2	78.7	.47	12.3	64.4	1 7/8	3	855	867
Comanche	11673	60.3	1.78	13.3	77.3	.51	12.7	66.0	2 3/4	3	915	903
Wichita	11952	62.0	1.75	12.9	78.3	.51	12.2	63.8	2 3/8	3	893	911
Chey. x E. Blackhull	12000	61.7	1.74	13.1	77.3	.47	12.1	66.5	2 1/2	2	870	894
Blackhull x Cheyenne	12101	60.9	1.66	11.8	77.3	.48	11.1	67.0	3 1/8	2	840	924
Westar	12110	60.2	1.65	12.6	78.0	.49	11.8	66.5	2 1/2	3	870	912
Quivira x Tenmarq	12116	61.8	1.68	13.3	76.3	.48	12.4	68.2	3	3	908	914
Cimarron	12120	63.4	1.68	12.9	77.3	.44	12.0	65.8	2 3/8	3	828	858 Q
Chey. x E. Blackhull	12122	62.0	1.71	13.1	78.0	.46	12.2	70.0	2 1/2	3	858	876
Kaw.-Mqo. x Kaw.-Tenq.	12128	61.2	1.67	13.7	77.7	.49	12.4	69.5	2 7/8	2	885	891
Cheyenne x Chiefkan	12129	61.4	1.63	12.6	78.0 U[4]	.55	11.7	71.5	3	1	820	868
Triumph	12132	61.5	1.68	13.4	76.7	.46	12.4	63.9	2 1/8	3	825	831 U
Chiefkan x Oro-Tenq.	12133	61.5	1.64	13.7	77.0	.47	12.7	70.1	2 3/8	3	915	903
Chiefkan x Oro-Tenq.	12134	61.1	1.74	13.3	77.0	.45	12.5	71.4	2 1/2	1	905	905
Kanred x Hope-Hd.Fed.	12135	57.9	1.90	13.3	76.0	.48	12.3	66.9	2 1/8	3	933	945
Kanred x Hope-Hd.Fed.	12136	59.1	1.86	13.4	76.0	.46	12.3	68.0	2 1/4	3	915	927
Oro x Medit.-Hope	12140	60.4	1.78	13.9	76.0	.44	13.0	69.8	2 3/8	2	905	875
Medit.-Hope x Pawnee	12141	60.4	1.73	13.3	75.3	.43	12.3	69.5	2 3/8	3	835	847 U
Cheyenne x Turkey	12142	59.6	1.78	12.8	75.7	.45	11.7	68.8	2	2	838	886
Com-Hon-Fwd x H-Med-Com	12145	60.0	1.79	14.1	76.7	.49	12.9	67.6	2 7/8	3	930	906
Martin-Tenq. x Chiefkan	12146	60.0	1.67	12.7	76.0	.41	11.7	65.0	1 7/8	2	888	936
Martin-Tenq. x Kharkof	12147	59.2	1.72	13.2	73.0	.44	12.3	64.3	2 5/8	3	938	950
Chiefkan x Oro-Tenmarq	12148	62.1	1.66	13.7	76.7	.49	12.6	70.9	1 7/8	3	830	824 U
Kaw.-Tenq. x Comanche	12149	61.4	1.70	14.5	76.7	.44	13.1	68.9	1 7/8	3	873	837 U
Colorado Turkey	12150	59.8	1.69	12.4	76.7	.44	11.4	64.7	2 1/2	2	878	944
Nebr.60 x Medit.-Hope	12500	61.2	1.77	13.5	77.3	.42	12.2	66.2	2 1/8	3	870	888
Compound Hybrid	12501	59.5	1.70	13.5	76.3	.51	11.9	69.2	2	3	880	916

1/ 14% moisture basis. 2/ Q and U = questionable and unsatisfactory quality with respect to property in question.

3/ All crumb grains and colors are satisfactory. 4/ Unsatisfactory milling properties - too hard.