UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
Bureau of Plant Industry,
Soils, and Agricultural Engineering

(NOT FOR PUBLICATION WITHOUT PERMISSION)

****

COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1949

****

Lincoln, Nebraska
January, 1950

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
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Soils, and Agricultural Engineering

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COMPARISON OF

WHITE WHEAT VARIETIES GROWN IN COOPERATIVE

PLOT AND BURSTLY EXPERIMENTS IN THE

HARD AND WINTER WHEAT REGION

OF 1949

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Lincoln, Nebraska
January, 1950

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Agricultural Research Administration
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By

L. P. Reitz, Agronomist, 1/

Division of Cereal Crops and Diseases

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

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IN 1949

by

D. R. Reitz, Agronomist.[1]

Division of Cereal Crops and Diseases

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Uniform Winter Wheat Dust Nurseries
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EXPERIMENTS IN 1949

The present report is the nineteenth consecutive annual summary of research on improvement of hard red winter wheat conducted under the coordinated program. The uniform experiments have continually pointed quickly to the superior varieties and to the region of best adaptation for each. Frequently new strains have slight faults which become apparent only when these are magnified by tests at numerous points. Conversely, it is seldom necessary to grow a strain at more than a few stations to establish its susceptibility to rust or some other pest. Hence, a coordinated program may become wasteful of effort when everyone is testing the same strains and none of them have particular merit. Careful testing in early generations and in limited state-wide or regional tests is recommended before strains are entered in the more extensive regional tests. This policy is being followed by most of the breeders. There is a continuing need for more effort at the breeding level in wheat improvement. Greater diversity of germ plasm probably should be explored and utilized in the breeding of new strains. This, coupled with greater use of the backcross and more critical and efficient tests in early generations, might lead to the development of strains which would have a margin of superiority over old varieties which nature could not overcome in as short a time as seems apparent in the case of some varieties.

The report for 1949 is similar in style to those which have preceded it and contains data on the uniform tests. Period summaries of yield and certain other data have been made. Yield summaries by states are not included for plot tests this year.

Many workers and stations cooperate to make this work effective. Many give only a small fraction of time to collecting data for this report or in wheat improvement work, while others have wheat as a major project. Numerous people in research agencies both public and private, Crop Improvement Associations,

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farmers, businessmen, and others assist from time to time in the execution of various aspects of the work. All such help and interest is gratefully acknowledged. The stations and workers most closely associated with the program in 1949 are given in the following list.

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 J. F. McCammon
TEXAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Corn and Small Grains)		J. E. Adams
College Station	Agricultural Exp. Station	E. S. McFadden
Denton	Substation No. 6	I. M. Atkins
Chillicothe	Substation No. 12	J. R. Quinby, I. M. Atkins
Bushland	Amarillo Experiment Station	K. B. Porter
OKLAHOMA AGRICULTURAL EXPERIMENT STATION		
Field Crops and Soils		H. F. Murphy
*Lawton	U. S. Dry Land Field Station 2/	W. M. Osborn
Stillwater	A. & M. College	A. M. Schlehuber, T. H. Johnston
Cherokee	Wheatland Conservation Station	A. M. Schlehuber, A. A. Garrett
*Woodward	Southern Great Plains Field Sta. 2/	A. M. Schlehuber, R. Hunter
Goodwell	Panhandle Agr. Exp. Station	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, A. J. Casady
Colby	Colby Branch Station	E. H. Coles, Don Crumbaker
Garden City	Garden City Agr. Exp. Station	A. E. Lowe, A. B. Erhart
COLORADO AGRICULTURAL EXPERIMENT STATION:		
Agronomy		D. W. Robertson
*Akron	U. S. Dry Land Field Station 2/	J. F. Brandon, T. E. Haus
Fort Collins	State Agricultural College	T. E. Haus,
Hesperus	Fort Lewis Substation	D. W. Koonce
IOWA AGRICULTURAL EXPERIMENT STATION:		
Ames	Iowa State College	L. C. Burnett, R. E. Atkins
NEBRASKA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		F. D. Keim
Crops Research		T. A. Kiesselbach
Lincoln	Agricultural Experiment Sta.	L. P. Reitz, O. J. Webster
North Platte	North Platte Substation	L. L. Zook, M. Greenwood
Alliance	Box Butte Experiment Farm	Harold Chapman, L. P. Reitz

farmers, businessmen, and others seeking information on this conservation o-
ventions secede civil work. All such help and interest is greatly appre-
ciated. Two weeks and workers most closely associated with the project
[illegible] are given in the following list.

[illegible] (The asterisk (*) indicates Cooperative Field observers)

[illegible] Division of Plant Industry, Soils, and Agricultural Engineering:

Division of Control Crops and Diseases

Plant Pathology
Truck Investigations
Fruit and Vegetable Crops and Diseases
Rust and Smut
Cotton and Peanuts

[illegible] Agricultural Experiment Stations:

Agronomy (Corn and Small Grains)
College Station Agricultural Experiment Station
Dorton Substation No. 6
Calhoun Substation No. 12
Sandland Americus Substation

Georgia Agricultural Experiment Stations:

Agronomy
Experiment Substation
Tifton
Griffin
Blackshear
Coastal Plain Experiment Station
Eastman
Georgia Forest Research Council
Macon
Statesboro
Georgia Forest Nursery
Midville

Georgia Agricultural Experiment Stations:

Agronomy
Experiment Substation
Athens
Plant Pathology
Tifton
Coastal Plain Experiment Station
Blackville
Clay Experiment Substation
Calhoun
Truck Experiment Station
Cairo
Bainbridge
Attapulgus
Pecan Experiment Field
Albany

Georgia Agricultural Experiment Stations:

Agronomy
Tifton
Coastal Plain Experiment Station
Experiment Substation
Plains
Georgia Mountain Experiment Station
Blairsville
Horticulture
Athens
Georgia Coastal Plain Experiment Station
Tifton
Forestry
Athens
Georgia Mountain Experiment Station
Blairsville
Georgia Piedmont Experiment Station
Watkinsville

WYOMING AGRICULTURAL EXPERIMENT STATION:

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

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

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

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy and Plant Genetics		H. K. Hayes
St. Paul	University Farm	E. E. 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	T. J. Conlon

MONTANA AGRICULTURAL EXPERIMENT STATION:

Agronomy		A. H. Post
Bozeman	Montana Experiment Station	E. R. Hehn
Moccasin	Judith Basin Branch Station	Ralph Williams
Havre	North Montana Branch Station	M. A. Bell, L. O. Baker

CANADIAN DOMINION OF AGRICULTURE:

Lethbridge, Alta.	Agr. Experiment Station	B. C. Jenkins, W. D. Hay

---

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

A few changes in personnel occurred during the year resulting in new names on the roster of cooperators. V. C. Hubbard died July 23 and in his passing the wheat project lost a faithful and productive worker.

ACCESSION NUMBERS ASSIGNED

Cereal Investigation (C. I.) numbers of the Division of Cereal Crops and Diseases were assigned this season to several strains of winter wheat. When such a number is assigned, that strain is no longer referred to by its State number in these reports. New accessions were as follows:

MYSTIC AGRICULTURAL EXPERIMENT STATION:

Laramie
Superintendent

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Brookings
Agricultural Experiment Station

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Lincoln
Agricultural Experiment Station

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Fargo
Agricultural Experiment Station

NORMAN AGRICULTURAL EXPERIMENT STATION:

Norman
Agricultural Experiment Station

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Stillwater
Agricultural Experiment Station

3/ Cooperation with division of Soil Management and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, as well as with the Bureau experiment stations.

A new operator in personnel occurred during the year resulting in more or less the reduction of cooperators. W. C. Rhoades died during the growing season.

Where project just started and productive actual

ADDITIONAL NUMBERS ASSIGNED

Cereal Investigations (C. I.) numbers at the Division of Cereal Crops and Diseases are designed this season to several periods of winter wheat. When number is assigned, then strain is no longer referred to by its Cereal number in these reports. The necessary note is as follows:

C. I. No.	Name	State No.
12524	Kawvale-Tenmarq x Comanche	Kans. 451689
12525	Quivira x (Kanred-Hard Federation x Prelude-Kanred)	Kans. 373963
12701	Sinvalocho-Wichita x Hope-Cheyenne	Texas 208-46-22
12702	(Sinvalocho-Wichita x Hope-Cheyenne) x Wichita^2	Texas 237-46-22
12703	do.	Texas 237-46-23-1
12704	~~Blue x Minhardi~~ H44-Minhard. X Marmin	Minn. 2785
12705	Turkey x Oro	Mont. 221
12706	Stafford	S.E. Blackburn

NEW VARIETIES

Two varieties were named during the year and several strains were increased in special seed plots. Apache is the name given to Cheyenne x Early Blackhull (C. I. 12122) by the New Mexico Agricultural Experiment Station. That state released 165 bushels to farmers in the Clovis area in the fall of 1949. Apache was tested widely in the region during the period 1944 to 1947 and at fewer stations in later years. It is a selection made at Hays from a hybrid which originated at Woodward. Quanah was named by the Texas Agricultural Experiment Station but seed is still being multiplied under control. It has been tested widely in the region during the last 3 years under the designation of Comanche Doublecross (C. I. 12145). It was bred and selected at Denton from a hybrid of Comanche-Honor-Forward x Hope-Mediterranean x Comanche. Small increases of C. I. numbers 12133, 12128, 12142, and others were made but names and release dates have not been determined. Stafford, a selection from Blackhull, was of Stafford county Kansas. distributed by the originator, S.E Blackburn. Approximately 1,000 bushels were sold in central Kansas and nearby areas.

Cr. I. No.	Name	State Co.
12524	Kawvale-Lemmard x Comanche	Kans. 451603
12525	Quivira x (Kanred-Hard Federation x Prelude-Kanred)	Kans. 375969
12701	Sinvalocho-Wichita x Hope-Cheyenne	Texas 208-[illegible]
12702	(Sinvalocho-Wichita x Hope-Cheyenne) x Wichita	Texas 237-[illegible]-22
12703	[illegible]	Texas 237-[illegible]-23-1
12704	[illegible]	Kans. 2785
12705	Turkey x Oro	Mont. 221

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UNIFORM VARIETIES IN PLOTS

Districts for dividing the region were based on the same areas used a year ago as shown on the accompanying map. Such districts are convenient but are too large to constitute an ecological unit. Uniform testing of varieties in these districts, however, provides data by which the area of adaptation of a strain is rather readily determined. Entries in the field plot or advanced nursery tests for 1949 and 1950 are as follows:

Variety	C. I. No.	1949 S	1949 C	1949 NE	1949 NW	1950 S	1950 C	1950 NE	1950 NW
Kharkof	1442	x	x		x	x	x		x
Tenmarq	6936	x	x			x	x		
Early Blackhull	8856	x				x			
Comanche	11673	x	x			x	x		
Pawnee	11669		x				x		
Red Chief	12109	x	x			x	x		
Wichita	11952		x				x		
Triumph	12132	x				x			
Cimarron	12120	x	x						
Chiefkan x Oro-Tenq.	12133	x	x			x	x		
Kv.-Mqo. x Kv.-Tenq.	12128	x	x			x	x		
Quanah	12145	x				x			
Minturki	6155			x				x	
Yogo	8033				x				x
Marmin	11502			x	x			x	
Minter	12138			x	x			x	x
Marmin x H44-Mint.	12508			x				x	
Hope x Minturki^2	12506			x					
H44 x Minturki^2	12532			x				x	
H44 x Minturki^3	12519			x					
Marmin x H44-Minh.	12520			x				x	
Iohardi	12510			x				x	
H44 x ~~Minturki~~ Miohardi x Marmin	12704							x	
Ridit x Kharkof	12521				x				x
Martin x Tenmarq^3	11824				x				x
Turkey x Oro	12705								x

It will be noted that several varieties of commercial importande are not included. Several cooperators have suggested that when strains pass into commercial production, after having been tested many years, there is no need to continue them as uniform varieties except as checks. Local option therefore has been adopted as the basis for including certain named strains when not included in the list of uniform varieties. Permanent checks for the southern district are Kharkof, Tenmarq, and Early Blackhull and for the central district

WINTER VARIETIES IN TRIAL

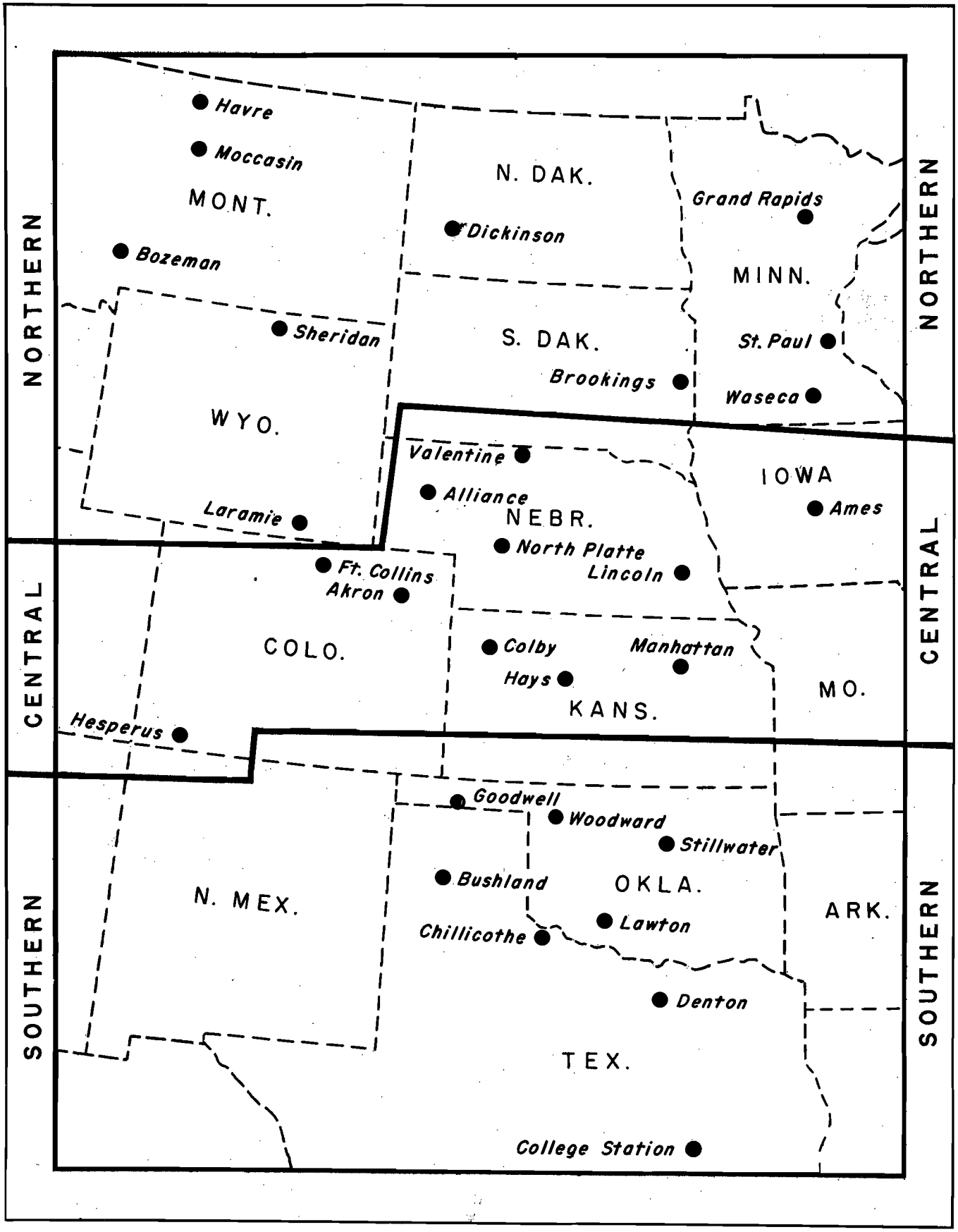
Distinctness for purposes of registration is based on the same areas used for recommendation. Such distinctness is considered sufficient to be recognizable in ecological unit. Uniform testing of varieties in these districts, however, provides data by which the degree of variation of a certain trait can be determined. Entries in the Field Plot or Advanced Nursery tests for 1949 and 1950 are as follows:

Variety	1948		1949		1950	
	Co.	U.	Co.	U.	Co.	U.
Admiral	1948	x	x	x	x	x
Tennessee	1946	x	x			
Early Gladiola	1944	x				
Commando	1947		x	x	x	x
Fortune	1946		x		x	
Medallist	1939		x		x	
Minerva	1929				x	
Triumph	1938				x	
Charlton	1920		x	x		
Old Glory x Van-Tenn	1939		x	x	x	x
Ky.-Mo. x Ky.-Tenn.	1938		x	x	x	x
Wabash	1938					x
Winchell	0[illegible]					
Zoro	1943					x
Marmin	1938			x		
Tasker (Mo.)	1938		x	x		x
Granny's Hybrid	1938			x		
Hope x Rainbow	1938			x		
Hall x Marshall	1938			x		
Hall x Winter Wheat	1938			x		
Lorrain x Van-Tenn.	1938			x		
Leonard	1938			x		
[illegible]	1938			x		
Waldo x Kanred	1938			x		
Martin x Dawson	1938			x		
Durbee x Ore.	1938					

It will be noted that several varieties of commercial importance are not included. Several do not consistently have adequate winter hardiness, although some, after many years, there is no reason to consider them unadapted. Local cooperators sometimes grow certain varieties because they occupied the land previously. Sometimes others for the southern districts, however, are early maturing and for the central district are included in the list of uniform varieties. Permanent checks for the southern districts, however, are early maturing and for the central district are

are Kharkof, Tenmarq, and Pawnee. In the northeast Minturki and in the northwest section Kharkof have been designated permanent checks. New varieties should be included in the uniform plot series of the district of expected adaptation for a year or more before they are named and released. This provides an abundance of information on a strain and permits cooperators in nearby states to test the variety before it reaches commercial channels.

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


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

PLOT DATA

Data on varieties and selections tested in advanced plot or nursery experiments are reported in table 1 from some 22 stations involving work in 9 states. The crop varied from failure or nearly that to production exceeding 50 bushels to the acre. Many hazards of wheat culture were encountered this season pointing to the fact that wheat breeding is still in its infancy in this region. Much improvement remains to be made. Drought at seeding time so delayed or destroyed stands at Denton and Havre that no results are available from these stations.

Leaf rust was widespread in the region this season entering every state and damaging the wheat in all with the possible exception of Montana. Pathologists say this was the worst year since 1938. Spore showers in April and early May were extremely heavy in Texas and Oklahoma, exceeding 2 million spores per square foot on certain days. This was repeated over and over as the disease spread northward. Races to which Pawnee and the Hope hybrids are susceptible were abundant. Stem rust was a minor disease this year but was widespread.

Aphids became abundant in the wheat in May and June. They caused damage in the central district but the extent of this damage is impossible to estimate until the relation of certain species to the transmission and symptoms of mosaic is clarified by further research. Mosaic was ruinous or nearly so to many thousands of acres of wheat in western Kansas and nearby states, extending from Guymon, Oklahoma, to McCook and Chappell, Nebraska, and into eastern Colorado. The hessian fly was abundant in western Nebraska and nearby [illegible] in Kansas and Oklahoma. Grasshoppers were a local menace in many communities. Leaf hoppers and red spider did some damage in Texas.

The winter was severe enough to cause differential survival among the varieties compared at several stations. In eastern Nebraska and portions of Kansas and Iowa, excessive mid-winter rain which froze to form an ice sheet,

PART III

Data on varieties and selections tested in advanced plot or nursery experiments are reported in table 1 from some 25 stations having work in 9 states.

The crop varied from failure or nearly that to production exceeding 30 bushels to the acre. Many degrees of wheat culture were encountered and season points to the fact that wheat breeding is still in its infancy in this region.

Much improvement remains to be made. Drought at seeding time so delayed or destroyed stands at Dentin and Hardy that no results are available from these stations.

Leaf rust was widespread in the region while scattering over stands throughout the summer in all with the possible exception of Montana. Pathologists say this was the worst rust year since 1918. Spore showers in April and early May were extremely heavy in Texas and Oklahoma, exceeding 2 million spores per square foot on certain days. This was repeated over and over as the disease spread northward. Races to which Pawnee and the Hope hybrids are susceptible were abundant. Stem rust was a minor disease this year but was widespread.

Aphids became abundant in the wheat in May and June. They caused damage in the central districts but the extent of this damage is impossible to estimate until the relation of certain species to the transmission and symptoms of mosaic is clarified by further research. Mosaic was ruinous or nearly so to many thousands of acres of wheat in western Kansas and Hardy, extending from Dayton, Oklahoma, to Woodward and Chanopelli, Hereford, and Lubbock, Colorado. The heaviest rain was abundant in western Nebraska and nearly across in Kansas and Oklahoma. Grasshoppers were a local menace in many communities.

Leaf hoppers and red spider did some damage in Texas.

The winter was severe enough to cause differential survival among the varieties commonly at several stations. In eastern Nebraska and portions of Kansas and Iowa, excessive mid-winter rainfall froze to form an ice sheet.

low temperatures when the wheat was unprotected by snow, and drowning caused abandonment of many thousands of acres of wheat especially in Nebraska.

Such conditions as those described above coupled with excessive rainfall in May and June caused a progressive decline in the wheat and resulted in low yields, low test weights, and disappointment in the affected areas. Even so, much wheat was produced, nearly all stations got results in the variety tests and rather good yields appear in table 1. However, the data from Lawton, Hays, and Lincoln reflect the situation rather well as it existed in the areas devastated by the maladies enumerated. The western portion of the high plains area had good wheat in general and many reports of high yields and high test weights were noted. Hail destroyed the crop at Colby.

Westar, C. I. 12702, and C. I. 12128 were the highest yielding varieties at Chillicothe. These strains along with five others had the greatest resistance to leaf rust and formed an unbroken group for high production in this test. Weight per bushel as well as yield shows an inverse correlation with leaf rust infection. The four-year and two-year averages of yield favor Westar with C. I. 12128 second among two-year averages. Quanah has a good record also. Comanche leads among 12-year comparisons, exceeding Kharkof by 20 per cent.

At Bushland, Pawnee was the highest yielding named variety this year but was surpassed slightly by five experimental entries. Leaf rust was abundant but did not build up early enough apparently to show a strong correlation with yields of grain. Comparisons in yield for two years favor C. I. 12146, Pawnee, Red Chief, and C. I. 12133 while six-year averages favor Pawnee, Westar, Comanche, and Blackhull.

The wheat at Lawton was described as a miracle rootless crop since a large proportion of the plants never developed crown roots at all or did so quite late in the growing season. In places, 5 to 6 inches of ice covered the wheat from January 24 to February 7. Leaf rust developed early in May with readings of 25% infection being recorded before the wheat was headed and readings of 90% by full

low temperatures when the wheat was unprotected by snow, and drowning ...

Abandonment of many thousands of acres of wheat especially in Jefferson.

Such conditions as those described above combined with excessive rainfall in May and June caused a progressive decline in the wheat and resulted in low yields, low test weights, and disappointment in the affected areas. Even so, much wheat was produced, nearly all stations got results in the variety tests and rather good yields appear in table 1. However, the data from Denton, Hays, and Lincoln reflect the situation rather well as it existed in the areas devastated by the maladies enumerated. The western portion of the high plains area had good wheat in general and many records of high yields and high test weights were noted. Hail destroyed the crop at Colby.

Webster, C. I. 15202, and C. I. 15128 were the highest yielding varieties at Chillicothe. These strains along with five others had the greatest resistance to leaf rust and formed an umbrella group for high production in this test. Weight per bushel as well as yield above an inverse correlation with leaf rust infection. The four-year and two-year average of yield favor Webster with C. I. 15128 second among two-year averages. Kanred has a good record also.

Comanche leads among 15-year comparisons, exceeding Kanred by 20 per cent.

At Kennard, Kanred was the highest yielding named variety this year but was surpassed slightly by five experimental entries. Leaf rust was abundant but did not build up early enough apparently to show a strong correlation with yields of grain. Comparisons in yield for two years favor C. I. 15145, Kanred Chief, and C. I. 15139 while six-year averages favor Kanred, Webster, Comanche, and Blackhull.

The wheat at Denton was described as a miracle rootless crop since a large proportion of the plants never developed storm roots at all or did so quite late in the growing season. In places, 3 to 5 inches of ice covered the ground from January 24 to February 7. Leaf rust developed early in May with readings of 25% infection being recorded before the wheat was headed and readings of 60% by full

heading or before. Reliant, moderately resistant to leaf rust, and C. I. 12128 and Quanah, highly resistant, gave the best yields. Comanche and Red Chief scarcely produced half as much grain as Reliant and C. I. 12128. The same three varieties which led in 1949 have the best two-year averages. Comanche, Pawnee, Wichita, and Westar have the best long-time records at this station.

Westar led all varieties at Stillwater followed closely by C. I. 12128 and Blue Jacket. Here again leaf rust was plentiful, attacking all varieties, even Quanah and Westar. Best two-year yields have been made by Westar while longer testing periods favor Reliant and Pawnee.

Comanche, Triumph, and Red Chief were the highest yielding varieties at Cherokee in the current year and for the two-year period. Triumph has the best four-year average. Test weights were low this year on all varieties except Red Chief and Blue Jacket.

Pawnee, Westar, Wichita, and C. I. 12128 appeared best in the Woodward test. Two-year averages favor Westar and Wichita while longer periods point to Pawnee, Comanche, and Red Chief as highly productive varieties. Leaf rust was prominent but appeared rather late in the season.

Half of the varieties tested at Goodwell fall within the standard error of the difference of about 2 bushels. Early wheats were injured by drought. The six-year averages indicate that Comanche, Wichita, and Westar are best adapted at this station. Leaf rust was light.

At Manhattan, strains with leaf-rust resistance generally exceeded the yield of susceptible varieties. Westar, Triumph, and Pawnee were the only named varieties among the leading 14 entries. Kharkof was uncommonly poor this year appearing thin, very late, and damaged by root rots and leaf diseases. Two-year averages favor Wichita, K. 2799, Pawnee, K. 2798, K. 2795, Westar, K. 2800, and C. I. 12128. During the five-year period 1945-49, Pawnee, C. I. 12128, and Westar have nearly doubled the grain yields made by Kharkof, Kanred, and Turkey.

Leaf rust and mosaic appeared in the experiment at Garden City and while

bearing or before. Reliant, moderately resistant to leaf rust and C. I. 12128 and Quantum, highly resistant, have the best yields. Comanche and Red Chief superficially produced half as much grain as Reliant and C. I. 12128. The same three varieties which led in 1940 have the best two-year average. Comanche, Pawnee, Wichita, and Waster have the best long-time records at this station.

Waster led all varieties at Hollowater followed closely by C. I. 12128 and Blue Jacket. Here again leaf rust was plentiful, attacking all varieties, even Comanche and Waster. Best two-year yields have been made by Waster while longer bearing periods favor Reliant and Pawnee.

Comanche, Triumph, and Red Chief were the highest yielding varieties at Cherokee in the current year and for the two-year period. Triumph has the best four-year average. Test weights were low this year on all varieties except Red Chief and Blue Jacket.

Pawnee, Waster, Wichita, and C. I. 12128 compared best in the Woodward test. Two-year average favor Waster and Wichita while longer periods point to Pawnee, Comanche, and Red Chief as highly productive varieties. Leaf rust was prominent but appeared rather late in the season.

Each of the varieties seeded at Goodwell fail within the standard error of the difference of about 2 bushels. Early wheats were injured by drought. The six-year average indicate that Comanche, Wichita, and Waster are best adapted at this station. Leaf rust was light.

At Kenneton, drought with leaf-rust reinfluence severely exceeded the yield of susceptible varieties. Waster, Triumph, and Pawnee were the only named varieties among the leading 14 entries. Chief was uncommonly poor this year appearing thin, very late, and damaged by root-rots and leaf diseases. Two-year averages favor Wichita, K. 2290, Pawnee, K. 2298, K. 2295, Waster, K. 2290, and C. I. 12128. Among the five-year period 1936-40, Pawnee, C. I. 12128, and Waster have nearly doubled the grain yields made by Kharkof, Kanred, and Turkey.

Leaf rust and rosata appeared in the experiment at Garden City and while

there seemed to be some relationship between the farmer and yield of grain, the latter showed no correlation with yield. C. I. 12128, K. 2795, and Westar were the high yielding entries. C. I. 12133, Comanche, Westar, and C. I. 12128 have the best two-year records while Pawnee must be added to the list of superior varieties when more years are considered.

The Hays wheat emerged late in the fall and winter, and in the spring months it was damaged by aphids, leaf rust, and perhaps mosaic. C. I. 12128 and K. 2795 were highest in yield and appeared moderately resistant to leaf rust. Blue Jacket ranked third in yield but exceeded the other two varieties several pounds in test weight. Six varieties yielded below 8 bushels to the acre. Lodging at broken straw occurred on 10 varieties to the extent of 50 percent or more although 6 varieties were 5 percent or less. Two-year averages favor Blue Jacket and Westar and four-year averages point up the merit of C. I. 12128, Westar, Red Chief, and C. I. 12133. Longer records show that Kharkof has been exceeded 15 percent or more by Comanche, Early Blackhull, Pawnee, and Red Chief with Pawnee showing the greatest margin, namely 27 per cent.

Yields on fallow at Akron were from 10 to 23 bushels to the acre but after corn the range was 2 to 8. In the former, stands were good while in the latter the stands ranged from 35 to 60 per cent of what might be called normal. Dry seedbed conditions caused the poor stands rather than winterkilling. C. I. 12128 and Pawnee had the highest average yield followed closely by four other varieties. Two-year averages are rather close but C. I. 12128 and Red Chief rank highest. In the 8-year averages Red Chief and C. I. 11970 are best while for 11 or more years of comparisons C. I. 11970, Early Blackhull, and Comanche rank at the top. This leaves considerable doubt as to the best variety for the Akron area although medium early varieties generally are the most dependable since early varieties may be damaged by frost at flowering time and late ones suffer from drought.

Growth at Ft. Collins was rank and a storm near harvest time caused severe lodging. Leaf and stem rust were abundant but in spite of this Cimarron and

there seemed to be some relationship between the lower and yield of grain, the latter showed no correlation with yield. C. I. 1212S, K. 2295, and Wooster were the high yielding entries. C. I. 1213, Commercial, Wooster, and C. I. 1212S have the best two-year records while Kanred must be added to the list of superior varieties when more years are considered.

The Kaye wheat emerged late in the fall and winter, and in the spring months it was damaged by aphids, leaf rust, and powdery mildew. C. I. 1212S and K. 2295 were highest in yield and appeared moderately resistant to leaf rust. Fine leaf rusted during in yield but exceeded via other two varieties several pounds in test weight. Six varieties yielded below 6 bushels to the acre. Lodging or shatter occurred on 10 varieties to the extent of 50 percent or more although 6 varieties were 5 percent or less. Two-year average Lower Kine Dodger and Wooster and four-year averages point to the merit of C. I. 1212S, Wooster, Red Chief, and C. I. 1213. Longer records show that Kanred has been exceeded 15 percent or more by Commander, Early Blackhull, Pawnee, and Red Chief with Pawnee showing the greatest merit, nearly 27 per cent.

Yields on Inflow at Akron were from 10 to 25 bushels to the acre but after corn the range was 2 to 8. In the former, stands were good while in the latter the stands ranged from 35 to 60 per cent of what might be called normal. The seeded conditions caused the poor showing rather than winterkilling. C. I. 1212S and Pawnee had the highest average yield followed closely by four other varieties. Two-year averages are rather close but C. I. 1212S and Red Chief rank highest.

In the 6-year averages Red Chief and C. I. 1212S are best while for 11 or more years of comparisons C. I. 1212S, Early Blackhull, and Commander rank at the top. This leaves considerable doubt as to the best variety for the Akron area although medium early varieties generally are the most dependable since early varieties may be damaged by frost at flowering time and late ones suffer from drought.

Growth at Mt. Gilead was rank and planting near harvest time caused severe lodging. Leaf rust even were abundant but in spite of this Cimarron and

Wichita produced 60.4 and 50.1 bushels to the acre, respectively. Test weights were high. Cimarron, Wichita, and C. I. 12133 have the best two-year averages, whereas A149 and C. I. 11972 have the best four-year records. Among varieties compared six years, Wichita, C. I. 11972, Comanche, and Pawnee exceeded Kharkof 10 to 18 percent.

Five plots each variety were sown at Lincoln but one replication was abandoned because of irregular spots which winterkilled. The varieties showed a range in average survival on the other plots from 40 to 95 percent, with Minter and Iohardi the most hardy varieties and C. I. 12133 least hardy. Leaf rust came on before heading time and damaged all varieties with the possible exception of C. I. 12128 and C. I. 12523. Lodging as broken straw was intense in all but a very few varieties. All stems in Red Chief broke over. Yields and test weights were rather low. Pawnee was the highest yielding named variety but C. I. 12523, 12500, and 12128 were good also. Minter, which survived best, ranked fifth in yield. The seven-year averages give Pawnee a 10-bushel margin over Kharkof, Red Chief a 5-bushel margin, Cheyenne and Comanche about 4 bushels. Tested for three years, C. I. 12507, C. I. 12523, and C. I. 12500 exceed Kharkof 31, 27, and 26 percent, respectively.

Leaf rust damaged the varieties slightly at North Platte and aphids were abundant. C. I. 12128, C. I. 12500, Pawnee, and C. I. 12523 performed best. C. I. 12500 has the best two-year record but several other strains are close. For a seven-year period Pawnee, and the North Platte strain of Turkey have been highest in yield. During 17 years of testing, Cheyenne has surpassed Kharkof 9 percent in yield of grain.

Alliance had the worst winter in 40 years but the wheat survived with full stands and produced one of the heaviest crops in the history of the station. Lodging was pronounced but no diseases appeared. Hessian fly was present and caused some straw to go down. C. I. 12523, 459812, Wichita, and C. I. 12142

Florida produced 60.4 and 50.1 bushels to the acre, respectively. Test weights were fine. Chesterton, Wichita, and C. I. 1257 have the best two-year averages, whereas Alba and C. I. 12572 have the best four-year records. Among varieties compared six years, Wichita, C. I. 11272, Comanche, and Pawnee exceeded Turkey 10 to 16 percent.

Kite plots were sown at Minot's but the replication was abandoned because of irregular seeds which winterkilled. The varieties showed a range in average survival on the other plots from 40 to 92 percent, with Minturki and Kanred most nearly resistant and C. I. 1253 least hardy. Leaf rust came on before heading time and damaged all varieties with the possible exception of C. I. 12528 and C. I. 12521. Pawnee or Brulen survived in all but a very few varieties. Pawnee was the highest yielding named variety but C. I. 12530, 12500, and 12528 were good also. Minturki, which survived best, reduced rilth in yield. Five seven-year averages give Pawnee's 10-nursel margin over Turkey; Red Chief's 9-bushel margin. Chevenne and Comanche about 4 bushels. Tested for three years, C. I. 12500, C. I. 12523, and C. I. 12530 exceed Pawnee 21, 27, and 29 percent, respectively.

Leaf rust damaged the varieties slightly at North Platte and equally severely at Sidney. C. I. 12528, C. I. 12500, Pawnee, and C. I. 12529 performed best. C. I. 12500 has the best two-year record but several other strains are close. For a seven-year period Pawnee, and the North Platte strain of Turkey have been highest in yield. During 17 years of testing, Cheyenne has surpassed Kharkof 5 percent in yield of grain.

Alliance and Whitney, under 20 years but the wheat survived 15 to 16 years, and produced one of the heaviest crops in the history of the station. Dodging was prominent but no diseases appeared. Session fly was present and caused some alarm to go down. C. I. 12523, Pawnee, Wichita, and C. I. 12502

surpassed the 50 bushels to the acre mark. C. I. 12523 and C. I. 12142 have the best two-year averages with C. I. 12128 a close third. Among 7-year averages Cheyenne and Nebred rank highest and for 12 years Cheyenne has a 9.5 percent advantage over Kharkof.

Nine varieties were in the Ames test in addition to the entries in the uniform yield nursery. Conditions during the winter resembled those at Lincoln but survivals were higher. Moderately heavy leaf rust developed but dry weather in May and June advanced the wheat and probably retarded diseases normally associated with higher rainfall such that a remarkably fine crop of grain was produced. Blackhawk and Pawnee were especially productive. Long-time averages on most of these varieties are not available.

Winterkilling was severe at Waseca and the entire experiment was over-planted in the spring with oats to reduce weeds which might come up in the thin places. Comparable areas from each replication were harvested for yield so the full effect of the killing is not shown. Blackhawk produced 29.5 bushels to the acre followed by Marmin, Minter, and C. I. 12506. Winterhardiness largely governs the performance of varieties in Minnesota. Best two-year averages were made by Blackhawk and C. I. 12506 while Minter has the best average since 1942.

At St. Paul, survivals ranged from 60 percent for Minter down to 12 percent for Iohardi and these varieties occupy first and last places, respectively, for yield. Minter and Minn. 2794 have the best two-year records, whereas Minter has the best record since 1942.

Yields were very high at Grand Rapids where little winterkilling or other depressing factor were reported. Lodging notes indicated that no strain was sufficiently stiff. Iohardi and Blackhawk exceeded other varieties by a slight margin. Minter ranked fourth. Blackhawk and Minter have good two-year averages, whereas Minter seems definitely best among varieties compared three and four years.

Some killing at Brookings probably affected yields but yield differences this year were not significant. Among two-year records C. I. 12506 seems outstanding whereas five-year records favor Minter. Leaf rust readings show that infection was heavy.

Yield. Minter and Minn. 1936 have the best two-year records. Whereas Minter has
for Ionland and these varieties occupy first and last places, respectively, for
Yield. Minter entrivals ranges from 60 percent for Minter down to 12 percent
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1950. Minterhardiness largely governs the performance of varieties in Minnesota.
Blackhawk produced 29.5 bushels to the acre followed by Marmin, Minter, and C. I.
in the spring with oats to reduce weeds which might come up in the thin places.

Minterkilling was severe at Waseca and the entire experiment was over-planted
on most of these varieties are not available.

Conditions during the Minter resembled those at Lincoln
Minter varieties were in the same test in addition to the entries in the
advantage over Kharkof.

Quevenne and Kapred rank highest and for 12 years Quevenne has a 3.5 percent
the best two-year averages with C. I. 1950 a close third. Among 4-year averages
surpassed the 50 bushels to the acre mark. C. I. 1950 and C. I. 1952 have

Ten strains of wheat and one of rye were compared at Sheridan. Yields were very high with Nebred and Cheyenne going over 50 bushels to the acre. Nebred and Kanred have the best two-year records and Cheyenne and Kanred have the best five-year averages. During 15 years of tests Cheyenne has surpassed the Kharkof check by 8 percent.

A variety test was grown near Albin in eastern Wyoming. While detailed notes on the 16 entries are not reported here, yet the yields are of interest. Turkey x Turkey-Cheyenne (N. 383130), Nebred, Kharkof, and Cheyenne x Turkey (C. I. 12142) made 37.1, 37.0, 36.9, and 36.2 bushels to the acre, respectively. Ridit x Kharkof (C. I. 12521) and Minter ranked 5th and 6th. Minturki and Yogo were lowest with yields of 29.0 and 22.8 bushels. Results were highly significant since the standard error of a difference between means was 2.6 bushels.

The Moccasin test included a large number of unnamed strains of local breeding. A selection of Ridit x Yogo, Yogo, Kanred-Minhardi x Oro, Ridit x Montana 36, Kharkof, and Yogo x N487 produced 28 or more bushels to the acre. Wichita yielded least in the test. No winterkilling or diseases were reported. Yogo has the best long-time average, Nebred the best 5-year average, and Yogo the best 2-year average.

Ten strains of wheat and one of rye were compared in Sheridan. Yields were very high with Bered and Chevenne going over 50 bushels to the acre. Bered and Kanred have the best two-year records and Chevenne and Kanred have the best five-year average. During 15 years of tests Chevenne has outyielded the Sheridan check by 3 percent.

A variety test was grown near Alden in eastern Pawnee. While detailed notes on the identities are not reported here the yields are of interest. Turkey x Turkey-Chevenne (K. 39310), Bered, Pawnee, and Chevenne x Turkey (C. I. 1214-2) made 37.0, 36.9, and 36.2 bushels to the acre, respectively. Hybrid x Kanred (C. I. 12521) and Minsturdi 5th and 6th, Minturki and Yogo were lowest with yields of 29.0 and 28.8 bushels. Results were highly significant since the standard error of a difference between means was 2.9 bushels.

The Rodenheim test included a large number of named strains of local interest. A selection of Hybrid x Yogo, Yogo, Kanred-Minhardi x Oro, Hybrid x Kanhoma 36, Kanred, and Yogo x 4497 produced 28 or more bushels to the acre. Florida Yielded least in the test. No winterkilling or diseases were reported. Yogo has the best long-time average. Behind the best 3-year average, and Yogo the best 2-year average.

Table 1. Yield of grain and other data for winter wheat varieties grown in replicated plots in cooperative experiments at stations in the hard red winter wheat region in 1949, with average yields for various periods.

Chillicothe, Texas
(ten plots; rod rows)

Variety	C.I. No.	Date headed	Top Growth	Leaf rust	Weight per bushel	Average Acre Yield			No. Yrs. Grown	Percent of Kharkof	Rank
						1949	1948-49	1946-49			
		May	%	%	lbs.	Bus.	Bus.	Bus.			
Westar	12110	4	120	15	60	39.0	38.9	33.2	6	129.7	4
(Sinvalocho X Wichita X Hope-Cheyenne) X Wichita 2	12702	4	120	T	62	38.5	-	-	1	-	-
Kawv.-MQo. X Kawv.-Tena.	12128	6	110	5	62	37.4	36.4	-	2	125.1	5
Sinvalocho X Wichita 201-46-45		4-30	120	0	64	36.9	-	-	1	-	-
MQo.-Oro X Wichita 218-46-5		10	130	5	60	36.3	-	-	1	-	-
29-34-275 D. Cross	12511	4	120	2	62	35.7	-	-	2	161.4	1
Quanah	12145	4	130	5	62	35.4	33.8	-	3	130.0	2
29-34-275 D. Cross	12504	4	120	T	62	33.2	30.8	-	3	117.8	10
Red Chief	12109	4	110	65	63	30.5	33.6	30.5	8	116.3	11
Wichita	11952	4-30	110	95	63	30.4	33.2	30.5	8	121.6	7
Early Blackhull	8856	2	100	75	63	29.4	31.4	29.5	12	113.3	12
Martin-Tena. X Chiefkan	12146	6	90	65	59	29.2	34.2	31.9	4	124.5	6
Triumph	12132	4-30	110	95	62	28.7	32.8	30.2	4	118.0	9
Cimarron	12120	2	120	85	62	28.0	31.4	-	3	129.9	3
Kanred	5146	12	110	40	57	27.3	27.2	26.2	12	102.6	16
Comanche	11673	6	100	65	57	26.5	31.2	30.6	12	120.8	8
Chiefkan X Oro-Tenmarq	12133	4	100	95	58	25.7	32.0	-	2	109.8	14
Kharkof	1442	12	110	75	57	25.2	29.1	25.6	12	100.0	17
Tenmarq	6936	10	100	75	57	21.9	26.5	26.2	12	111.1	13
Blackhull	6251	6	110	75	58	20.8	27.8	27.2	12	109.4	15

Standard error of a difference = 1.73 bus.

Bushland, Texas
(Ten plots; rod rows; 6 planted Sept. 23, 4 Nov. 10)

Variety	C.I. No.	Date headed 1/	Plant height 1/	Leaf rust 2/	Weight per bushel	Average acre yield			No. yrs. Grown	Percent of Kharkof	Rank
						1949	1948-49	1942-49 3/			
		May	Ins.	%	Lbs. 1/	Bus. 1/	Bus.	Bus.			
29-34-275 D. Cross	12511	12	37	10	57.5	43.2	—	—	1	—	—
Mao.-Oro X Pawnee	12505	11	34	25	60.0	42.9	—	—	1	—	—
Martin-Tenq. X Chiefkan	12146	12	37	60	59.0	42.7	28.1	-	2	124.7	1
Comanche X Blkh.-Nd. Fed.	12517	12	36	25	59.5	42.0	—	—	1	—	—
29-34-275 D. Cross	12512	14	37	5	59.0	41.2	—	—	1	—	—
Pawnee	11669	13	35	75	59.5	41.1	26.9	24.4	10	116.5	2
Mao.-Oro X Oro-Tenq.	12406	13	40	20	58.5	41.0	—	—	1	—	—
Blackhull-Oro X Pawnee	12516	13	38	25	59.5	40.6	—	—	1	—	—
Blue Jacket	12502	15	41	80	61.5	40.0	—	—	1	—	—
Red Chief	12109	15	41	80	62.0	39.7	26.5	23.3	6	111.7	7
Orienta	12522	16	42	20	59.0	39.6	—	—	1	—	—
Comanche	11673	12	37	65	58.0	39.3	25.8	24.3	10	114.4	5
Nebr. 60 X Medit.-Hope	12500	12	36	70	58.5	39.2	—	—	1	—	—
Cheyenne X Turkey	12142	16	39	80	58.5	38.8	—	—	1	—	—
Chiefkan X Oro-Tenq.	12133	11	36	85	59.5	38.8	26.1	-	2	115.8	3
Martin-Tenq. X Kharkof	12147	15	38	80	58.0	38.6	25.8	-	2	114.7	4
Early Blackhull	8856	5	39	75	59.5	38.0	24.5	21.3	12	96.8	15
Quanah	12145	11	35	5	58.0	37.7	24.2	—	2	107.3	8
Triumph	12132	6	33	65	59.0	37.1	25.2	-	3	99.1	14
Tenmarq	6936	15	39	50	57.5	37.1	23.7	22.8	13	105.7	10
Wichita	11952	8	35	70	59.0	36.9	23.9	21.0	6	100.6	11
Blackhull	6251	15	39	80	59.5	36.9	25.1	24.3	13	106.4	9
Chiefkan X Oro-Tenq.	12518	12	38	80	59.5	36.3	—	—	1	—	—
29-34-275 D. Cross	12504	14	38	5	59.5	36.0	22.6	—	2	100.2	12
Westar	12110	13	39	20	57.5	35.1	23.1	23.4	6	112.3	6
Kharkof	1442	19	41	80	57.0	34.1	22.5	20.9	13	100.0	13

Standard error of a difference = 2.32 bus.

1/ Mean of averages for two plantings. 2/ Late date only. 3/ No crop in 1945, 1946.

Lawton, Oklahoma
(Three 1/60 acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Plant ht.	Leaf rust 5/2	Leaf rust 5/8	Leaf rust 5/12	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1944-49 3/	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	%	%	lbs.	Bus.	Bus.	Bus.			
Reliant 1/	12144	7	10	34	10	65	90	61	18.9	25.1	—	3	125.2	2
Kawv.-Mqo. XKawv.-Tenq.	12128	8	9	31	T	T	T	59	18.9	25.6	—	2	127.7	1
Quanah	12145	8	10	32	T	T	5	57	17.4	23.1	—	2	115.0	6
Blue Jacket	12502	8	9	34	25	65	90	60	14.6	21.9	—	2	109.0	9
Early Blackhull	8856	3	5	29	25	65	90	60	13.6	19.5	—	14	105.6	12
Westar 2/	12110	8	9	30	T	T	25	57	13.5	19.2	26.0	5	114.8	7
Pawnee	11669	8	8	29	25	65	90	56	13.2	22.9	27.7	9	121.1	5
Wichita	11952	4	2	31	25	65	90	58	12.5	21.7	25.6	8	124.0	3
Chiefkan XOro-Tenmara	12133	5	8	27	25	65	90	57	12.4	20.7	—	2	103.2	14
Kharkof	1442	14	10	31	25	65	90	56	11.3	20.1	22.6	15	100.0	15
Cimarron	12120	8	8	25	25	65	90	58	11.3	19.0	—	3	111.9	8
Cheyenne	8885	15	10	30	25	65	90	56	11.1	18.6	22.8	15	104.7	13
Triumph	12132	1	2	26	25	65	90	57	10.8	19.5	—	3	107.3	11
Tenmara	6936	10	10	30	10	50	90	55	10.6	20.2	22.8	15	108.3	10
Comanche	11673	8	8	29	25	65	90	56	9.7	16.8	26.2	9	122.5	4
Red Chief	12109	8	8	34	25	65	90	59	9.1	15.5	20.1	7	92.7	16

1/ Loose smut 1%.
2/ Stem rust 5%.
3/ No crop in 1946.

Standard error of a difference = 1.84

Stillwater, Oklahoma

(Four 1/68 acre plots - Perkins)

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1943-49	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
Westar	12110	5	7	34	49	60.5	24.9	23.4	—	4	114.0	3
Kawv.-Mqo.X Kawv.-Tenq.	12128	4	6	33	53	59.9	24.5	21.5	—	2	103.4	11
Blue Jacket	12302	5	8	37	61	62.4	24.0	22.2	—	3	106.6	10
Early Blackhull	8856	4/28	3	37	55	61.7	23.5	22.8	22.8	17	81.1	20
Reliant	12144	6	8	35	53	60.9	23.5	22.3	23.6	7	114.4	2
Cimarron	12120	3	6	33	57	62.6	22.2	22.3	-	3	111.5	4
Comanche	11673	4	6	34	43	59.0	22.2	21.2	22.8	9	111.3	5
Triumph	12132	4/27	2	33	60	59.7	21.9	21.5	22.1	7	107.3	9
Pawnee	11669	4	6	32	65	59.5	21.6	21.0	23.6	9	114.7	1
Chiefk. X Oro-Tenq.	12133	4	6	33	60	60.3	21.4	22.7	-	2	109.4	6
Red Chief	12109	5	8	36	66	61.3	21.3	21.8	22.1	7	107.4	8
Kharkof	1442	8	8	33	40	59.8	20.9	20.8	20.6	17	100.0	14
Clarkan	8858	7	8	38	68	60.3	20.8	21.7	21.4	13	102.8	12
Quanah	12145	5	7	33	33	59.7	20.7	20.2	-	2	97.1	17
Moking	12556	7	8	39	70	60.7	20.5	22.5	-	3	99.4	15
Tenmarq	6936	6	8	34	51	59.5	20.2	20.8	19.9	17	98.9	16
Cheyenne	8885	9	8	30	40	59.5	20.0	20.5	22.5	17	102.8	12
Austin	12346	6	7	34	59	56.6	18.2	19.4	—	3	108.6	7
Fulcaster	6471	7	8	38	66	58.6	17.1	17.6	—	12	91.7	18
Wichita	11952	4/30	3	35	65	60.3	16.9	19.2	—	5	91.2	19

Standard error of a difference = 1.24 bus.

Cherokee, Oklahoma
(Four plots; rod rows)

Variety	C.I. No.	Plant height	Weight per bushel	Average acre yield			No. Yrs. Grown	Percent of Kharkof	Rank
				1949	1948-49	1946-49			
		Ins.	Lbs.	Bus.	Bus.	Bus.			
Comanche	11673	45	54.7	37.5	31.5	29.4	4	118.3	4
Triumph	12132	38	55.1	36.9	32.8	32.2	4	129.3	1
Red Chief	12109	49	60.6	35.6	33.9	31.7	4	127.5	2
Pawnee	11669	42	53.4	33.4	28.9	28.9	4	116.3	7
Kawv.-Mqo. X Kqwv.-Tenq.	12128	44	55.9	32.9	29.6	-	2	110.2	13
Blue Jacket	12502	48	59.0	32.7	30.4	-	3	111.6	12
Cheyenne	8885	46	54.2	32.4	29.9	28.8	4	115.8	8
Chiefk. X Oro-Tenq.	12133	43	54.7	31.6	30.3	-	2	112.8	10
Reliant	12144	45	55.1	31.2	29.7	29.8	4	119.7	3
Wichita	11952	43	54.9	30.6	30.3	29.2	4	117.2	5
Westar	12110	44	53.2	30.2	27.8	29.0	4	116.6	6
Cimarron	12120	40	57.0	29.3	28.3	-	3	111.7	11
Kharkof	1442	44	53.5	27.4	26.9	24.9	4	100.0	15
Quanah	12145	40	53.9	27.1	23.3	-	2	86.6	16
Early Blackhull	8856	43	56.4	27.0	28.0	28.8	4	115.8	8
Tenmarq	6936	43	52.2	26.1	25.3	25.0	4	100.5	14

Standard error of a difference = 2.94 bus.

Woodward, Oklahoma

(Four 1/51 acre plots, two each after fallow and crop)

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1942-49	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
Pawnee	11669	7	11	37	58.1	31.8	27.5	33.1	12	126.5	1
Westar	12110	10	13	40	57.6	30.5	28.1	-	6	111.7	9
Wichita	11952	5	8	36	58.1	29.6	28.4	33.7	8	121.7	2
Kawv.-Mao. X Kawv.-Tena.	12128	7	12	37	58.8	29.4	26.6	-	2	113.0	7
Triumph	12132	4	7	35	58.4	27.6	26.1	-	5	114.0	6
Reliant	12144	10	13	40	59.5	26.9	27.9	-	3	119.4	3
Red Chief	12109	9	12	40	60.0	26.8	27.2	32.2	8	116.4	5
Cheyenne	8885	12	14	38	57.6	25.8	25.6	31.8	18	107.9	10
Blue Jacket	12502	10	14	43	61.1	25.1	25.3	-	3	106.1	12
Cimarron	12120	6	11	34	60.0	24.6	25.4	-	7	112.6	8
Early Blackhull	8856	3	6	37	59.6	23.8	24.6	28.9	18	98.2	15
Chief k. X Oro - Tena.	12133	7	11	35	58.6	23.5	24.2	-	2	102.8	13
Comanche	11673	7	11	37	57.5	22.8	23.2	32.0	12	117.2	4
Kharkof	1442	11	14	40	57.4	22.7	23.5	27.7	18	100.0	14
Tenmarq	6936	10	12	38	57.9	21.8	23.3	29.8	18	106.6	11
Quanah	12145	8	12	38	58.0	21.5	22.8	-	2	96.8	16

Standard error of a difference = 2.02 bus.

Goodwell, Oklahoma
(Five plots; rod rows)

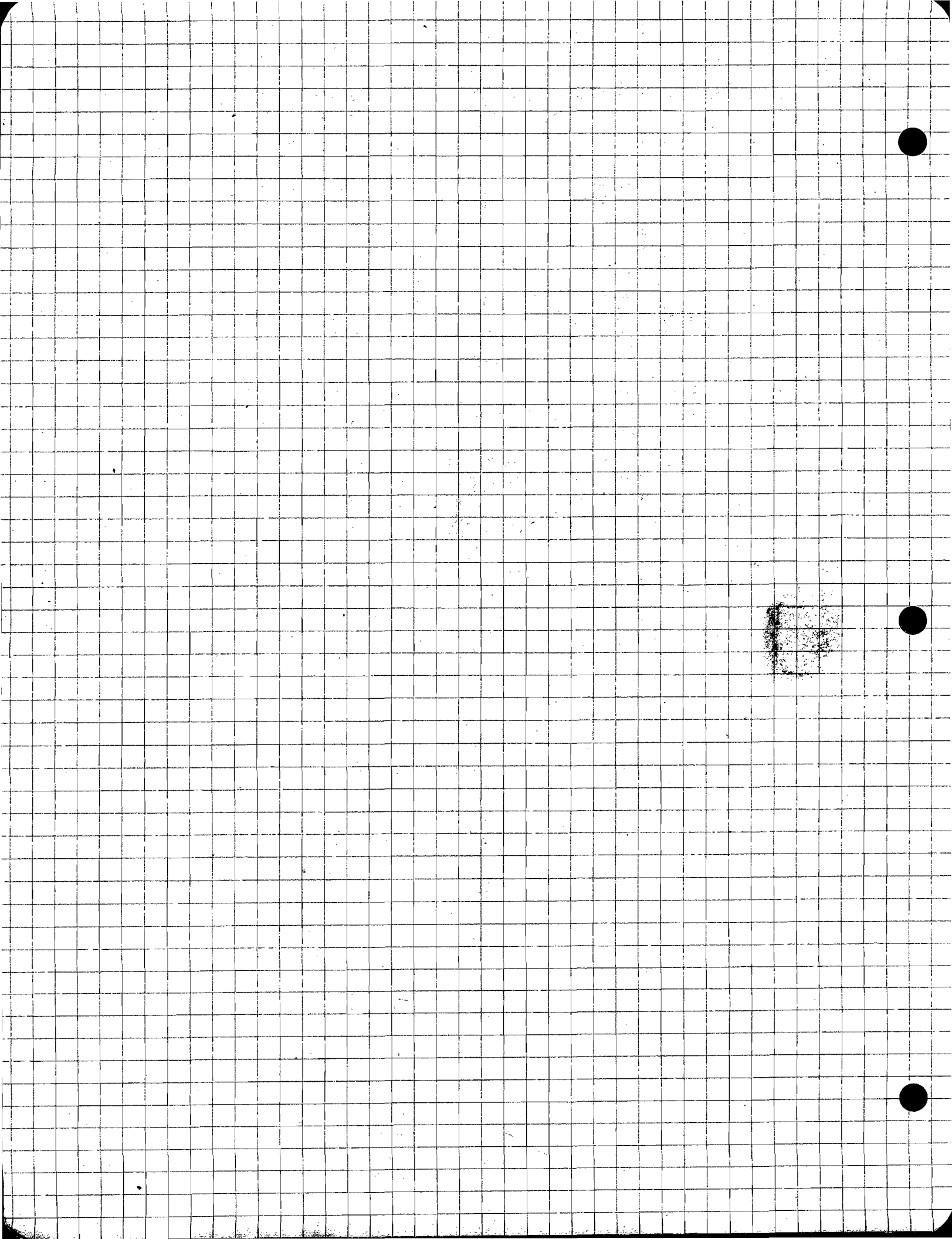
Variety	C.I. No.	Weight per bushel	Average acre yield			No. Yrs. Grown	Percent of Kharkof	Rank
			1949	1948-49	1944-49			
		Lbs.	Bus.	Bus.	Bus.			
Reliant	12144	57.6	23.3	26.7	-	3	107.9	6
Westar	12110	58.1	22.9	28.6	25.9	6	123.7	2
Red Chief	12109	62.0	22.5	26.5	24.5	6	117.1	4
Chiefk. XOro-Tenq.	12133	58.6	22.5	26.9	-	2	102.9	10
Comanche	11673	58.6	22.2	27.5	26.0	8	122.4	3
Blue Jacket	12502	60.1	22.2	26.9	-	2	103.1	9
Cheyenne	8885	58.2	21.8	25.7	24.5	11	103.4	8
Wichita	11952	57.1	21.2	25.3	26.6	6	127.1	1
Early Blackhull	8856	57.5	20.8	25.4	22.1	12	89.8	15
Kharkof	1442	58.9	20.4	26.1	20.9	12	100.0	11
Cimarron	12120	60.1	20.3	26.2	-	3	116.5	5
Pawnee	11669	56.3	19.6	25.1	22.4	8	107.8	7
Triumph	12132	56.0	18.8	23.0	-	4	98.8	13
Kawv.-Mqo. XKawd.-Tenq.	12128	58.0	18.2	24.8	-	3	99.3	12
Quanah	12145	58.1	18.0	22.7	-	2	86.8	16
Tenmarq	6936	58.3	17.3	25.3	21.8	12	96.4	14

Standard error of a difference = 1.98 bus.

Manhattan, Kansas
Three 1/40 Acre plots

Variety	C.I. or Sel. No.	Date Headed	Date Ripe	Plant height	Lodging	No. culms per acre	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	0000	Lbs.	Bus.	Bus.	Bus.			
Mgo.-Oro X Comanche	K.2796	15	23	44	22	254	60.8	40.4	–	–	1	–	–
Westar 1/	12110	18	24	47	28	233	58.4	39.3	42.3	40.0	5	170.2	13
Mgo.-Oro X Pawnee	12505	17	24	44	T	263	60.1	38.5	–	–	1	–	–
Medit.-Hope X Pawnee	K.2800	16	21	42	87	276	58.5	38.5	42.2	–	2	212.1	2
Ku.-Mgo. X Ku.-Tq.	12128	17	22	44	5	273	60.2	38.1	42.1	40.2	5	170.7	12
Medit.-Hope X Pawnee	12141	16	22	44	70	278	58.5	38.0	40.3	–	4	176.9	9
Mgo.-Oro X Oro-Tq.	K.2795	16	23	46	13	277	58.0	37.8	42.8	–	3	193.0	3
Triumph	12132	14	21	41	100	230	60.5	37.5	40.1	–	4	172.8	11
Ku.-Tq. X Comanche	K.2798	17	22	43	63	233	60.4	37.1	42.1	–	3	191.7	4
Pawnee	11669	17	20	44	97	288	57.6	36.2	42.4	41.2	12	164.5	16
Mgo.-Oro X Oro-Tq.	K.2797	17	23	45	T	282	59.3	36.2	–	–	1	–	–
Ku.-Tq. X Comanche	K.2799	17	22	46	100	233	58.4	35.9	42.6	–	2	214.1	1
do	12524	18	23	43	97	268	58.4	35.9	–	–	1	–	–
do	12149	18	23	46	97	229	59.5	35.0	38.7	–	3	177.9	8
Red Chief	12109	18	23	48	87	237	60.7	34.2	39.0	33.5	9	132.1	19
Wichita	11952	15	20	42	100	222	59.0	34.0	43.6	37.1	10	149.7	17
Blue Jacket	12502	18	24	49	100	237	63.2	33.9	38.5	–	3	174.8	10
Moking 2/	12556	22	29	52	100	220	58.5	33.7	38.7	–	3	168.6	14
Ku.-Mgo. X Ku.-Tq.	K.2793	23	26	46	5-87	231	60.7	33.4	–	–	2	181.0	7
Clarkan 2/	8858	23	28	51	97	194	61.0	33.2	36.2	32.9	18	119.2	21
Comanche X Medit.-Hope	K.2801	16	22	46	67	249	57.6	31.9	37.4	–	2	187.7	6
Comanche	11673	19	23	46	73	206	54.8	30.2	38.7	36.2	12	144.7	18
Chiefk. X Oro-Tq.	12133	17	23	44	100	251	58.3	30.0	39.2	–	4	166.0	15
do	12518	18	23	44	97	243	57.4	28.6	–	–	1	–	–
Cimarron	12120	17	23	40	100	234	61.3	27.6	37.8	–	2	189.7	5
Turkey	1558	24	28	47	60	281	59.1	26.9	28.1	26.7	18	104.6	22
Tenmarq	6936	19	24	47	97	237	55.3	25.7	35.8	33.4	18	120.1	20
Kanred	5146	23	26	47	47	264	56.8	21.5	26.9	26.6	18	104.6	23
Kharkof	1442	28	28	45	93	234	55.6	15.3	19.9	23.5	18	100.0	24

1/ 10% stem rust; other varieties 0-2%. 2/ Soft wheats.
Standard error of a difference = 1.71 bus.



Garden City, Kansas
(three 1/45 acre plots on fallow)

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Mosaic 1/	Leaf rust	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1946-49	No. Yrs. Grown	Percent of Turkey	Rank
		May	June	Ins.		%	Lbs.	Bus.	Bus.	Bus.			
Kawv.-Mqo. X Kawv.-Tenq.	12128	15	24	36	2	10	57.7	39.4	36.3	—	3	128.9	4
Mqo.-Oro X Oro-Tenq. Ks. 2795		14	24	36	2	25	57.8	39.3	—	—	1	—	—
Westar	12110	16	25	37	1	5	59.3	38.8	36.9	30.9	4	114.7	11
Pawnee	11669	15	24	31	2	65	58.3	37.5	33.8	30.7	11	131.7	2
Mqo.-Oro X Pawnee	12505	15	24	34	3	25	58.7	36.6	36.0	—	2	131.1	3
Chiefk. X Oro-Tenq.	12133	14	24	35	1	100	59.2	36.4	37.2	34.2	4	126.8	5
Comanche	11673	15	24	36	1	65	57.4	35.9	36.5	33.7	11	135.7	1
Wichita	11952	12	23	36	2	65	59.3	35.8	30.7	26.8	9	114.7	10
Triumph	12132	11	23	33	2	100	60.3	35.5	30.0	28.5	4	105.8	13
Early Blackhull	8856	10	22	34	2	100	59.0	35.5	30.3	27.1	11	116.4	7
Blue Jacket	12502	18	27	42	1	100	62.6	33.8	32.0	—	3	111.2	12
Cimarron	12120	15	24	33	1	100	61.3	32.0	31.7	—	2	115.5	9
Tenmarq	6936	17	26	38	3	100	55.7	31.2	32.9	30.6	11	121.2	6
Red Chief	12109	17	26	39	1	100	61.9	29.8	28.8	28.7	8	115.8	8
Turkey	1658	22	28	41	1	100	57.4	25.4	27.5	26.9	11	100.0	14

1/ Grades of infection: 1, light; 3, moderate.

Standard error of a difference = 1.82 bus.

Hays, Kansas

(Four 1/56 acre plots, two each after fallow and crop)

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Lodging 1/	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1946-49	No. Yrs. Grown	Percent of Kharkof	Rank
		May	June	Ins.	%	%	Lbs.						
Kawv.-Mao.XKawv.-Tenq.	12128	28	30	33	15	4	57.3	13.6	21.4	25.0	4	97.7	13
Mao.-OroXOro-Tenq. Ks.2795		28	30	34	10	5	55.9	13.2	—	—	1	—	—
Blue Jacket	12502	30	29	36	100	4	61.0	12.5	23.5	—	3	101.5	9
Wichita	11952	25	24	34	100	50	56.4	12.1	19.6	22.2	9	112.0	6
Westar	12110	29	27	35	65	45	55.5	12.0	23.6	25.9	4	101.1	10
Red Chief	12109	28	29	35	100	4	60.3	11.7	22.6	25.0	9	118.3	3
Triumph	12132	21	24	32	100	75	51.1	11.0	18.9	24.1	4	94.0	14
Pawnee	11669	27	27	33	100	65	56.5	10.5	17.4	22.7	12	127.3	1
Early Blackhull	8856	24	24	34	100	75	53.1	10.4	18.0	23.2	18	118.4	2
Mao.-Oro X Pawnee Ks.462668		30	30	29	T	3	53.5	10.0	—	—	1	—	—
do Ks.462666		29	30	29	T	3	54.5	9.7	—	—	1	—	—
Chiefk.XOro-Tenq.	12133	28	27	33	100	65	54.0	9.1	22.2	25.7	5	111.5	7
Kharkof	1442	6-1	29	33	80	40	53.8	9.0	22.9	25.6	18	100.0	12
Chiefk.XOro-Tenq.	12518	29	27	32	100	65	52.3	7.9	—	—	1	—	—
Comanche	11673	28	27	34	90	85	52.1	7.3	16.6	22.5	13	116.5	4
Turkey	1558	6-1	29	32	80	40	53.5	7.0	20.5	24.1	18	100.2	11
Tenmarq	6936	30	27	34	100	90	50.0	5.7	17.0	22.8	18	114.3	5
Blackhull	6251	30	26	34	100	100	50.5	4.1	15.9	21.0	18	107.2	8
Cimarron	12120	29	26	33	100	100	52.8	4.0	18.3	—	2	79.7	15

1/ Broken straw.

Standard error of a difference = 1.44 bus.

Akron, Colorado
(Four 1/41 acre plots, two each on fallow and crop)

Variety	C.I. No.		Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1942-49	No. yrs. Grown	Percent of Kharkof	Rank
			Lbs.	Bus.	Bus.	Bus.			
Kawv.-Mqo. X Kawv.-Tenq.	12128		56.5	15.5	18.6	–	2	110.1	7
Pawnee	11669		57.5	15.1	16.1	20.4	11	110.9	4
Cimarron	12120		58.3	15.0	17.6	–	2	103.8	11
Red Chief	12109		59.8	14.9	18.5	21.2	8	110.0	8
Wichita	11952		58.5	14.1	15.7	20.5	9	108.8	9
Early Blackhull	8856		59.0	14.0	15.5	20.7	18	113.2	2
Chiefk. X Oro-Tenq.	12133		57.3	13.6	16.4	–	3	110.6	6
Kan.-Nd. Fed. X Minh.-Mint.	11970		56.3	12.6	16.5	21.5	11	114.3	1
Comanche	11673		55.5	12.4	15.9	20.8	11	112.3	3
Tenmarq	6936		53.5	11.1	16.9	20.3	18	110.9	4
Minturki	6155		55.5	11.0	17.5	18.8	18	94.0	13
Cheyenne	8885		54.0	10.8	17.5	20.5	18	108.7	10
Kharkof	1442		54.3	9.2	16.9	19.3	18	100.0	12
Alton	1438		52.8	5.8	15.3	15.3	18	81.1	14

Standard error of a difference = 1.46 bus.

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

Variety	C.I. No.	Date Headed 1/	Plant height	Lodging	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1946-49	No. yrs. Grown	Percent of Kharkof	Rank
		June	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.			
Cimarron	12120	4	41	40	100	20	64.4	60.4	60.6	-	2	129.5	1
Wichita	11952	4	44	100	100	35	62.5	50.1	59.5	45.4	6	113.8	6
Chiefk. X Oro - Tena.	12133	7	44	70	100	65	62.2	48.9	57.3	-	3	121.0	3
Cheyenne X Tenmara	11972	10	43	100	100	75	60.0	48.1	54.2	50.9	6	118.2	4
Comanche	11673	7	42	100	100	65	60.3	46.7	54.6	45.6	6	110.8	7
Pawnee	11669	7	43	100	100	65	61.8	44.7	54.2	47.4	6	117.1	5
Apache	12122	6	39	100	100	75	61.3	44.0	54.4	46.3	5	107.8	8
Red Chief	12109	6	43	40	75	75	64.1	43.7	48.9	44.6	5	104.3	11
E.Blk.-Marm. X Hope-Med. -25		10	43	100	T-100	10	61.1	38.2	47.2	41.3	4	95.7	17
do -76		10	43	100	100	10	60.3	38.1	47.6	44.7	4	103.5	12
do -73		10	40	100	75	1	59.4	37.7	47.2	43.8	4	101.5	14
do -15		9	43	100	T-100	20	61.5	35.6	43.1	36.4	4	84.3	20
Mutant 348 A910		10	45	100	100	75	59.5	37.2	49.7	45.7	4	106.0	9
Hd.Fed.-Mara.^{2} X Kan. A340		8	39	100	100	35	60.1	34.9	50.2	41.9	4	97.0	16
E.Blk.-Marm. X Hope-Med. - 5		8	40	100	75	T	58.7	31.7	38.0	35.9	4	83.2	21
Kharkof	1442	12	43	100	100	75	58.9	31.2	46.8	43.1	4	100.0	15
Eureka - Minh. X Kan. - H.F. A149		9	44	100	100	75	59.3	31.1	51.6	53.1	4	123.0	2
Kawv.-Mco. X Kawv.-Tena.	12128	7	41	100	100	75	60.6	31.0	44.3	-	2	94.7	18
E.Blk.-Marm. X Hope-Med. -10		9	46	100	T-100	10	60.1	30.2	41.3	40.5	4	94.0	19
Tenmara	6936	10	45	100	100	75	58.4	30.1	45.4	44.4	6	101.7	13
Cheyenne	8885	12	44	100	100	75	58.4	28.6	43.9	46.3	6	104.6	10

1/ All ripe July 16

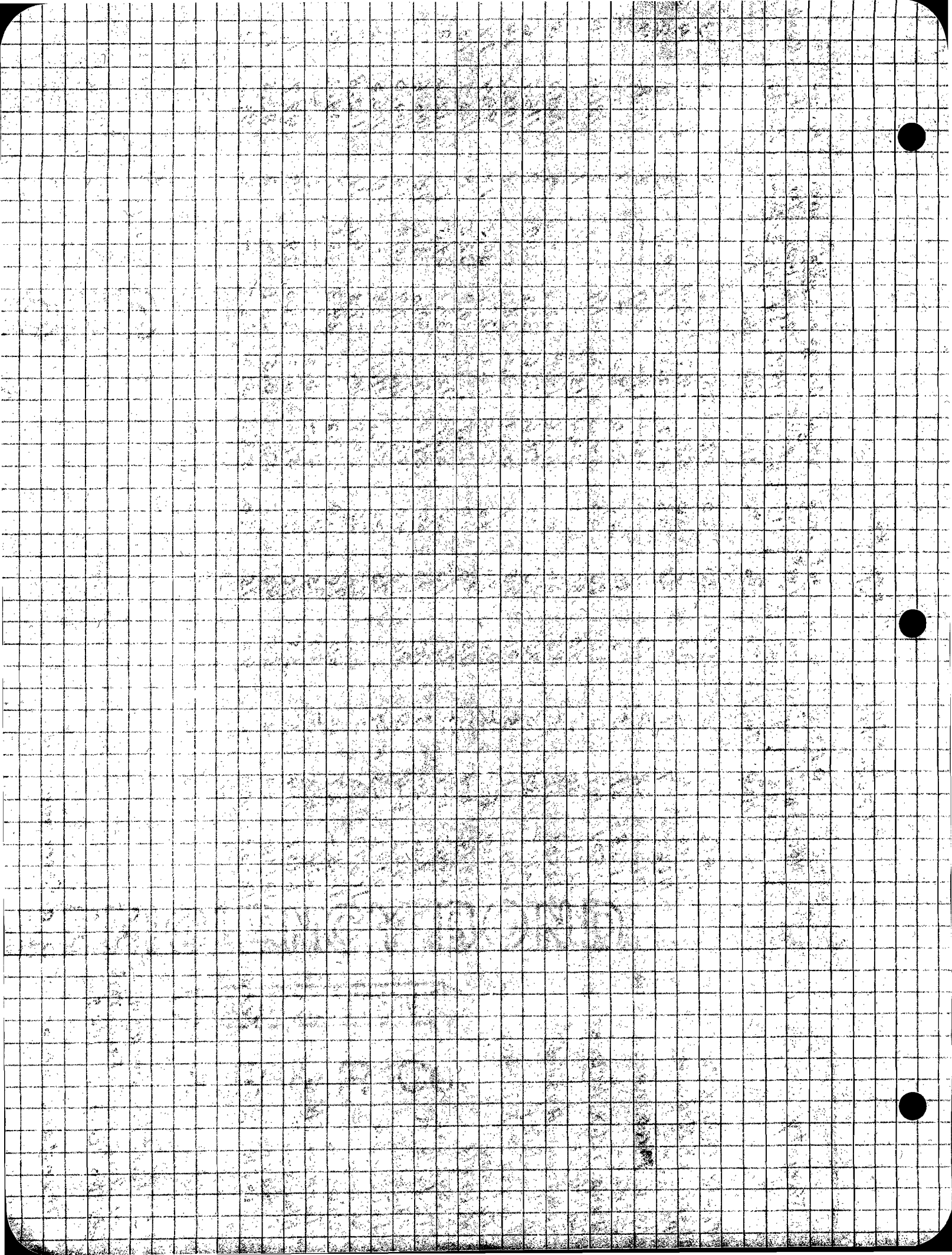
Standard error of a difference = 4.14 bus.

Lincoln, Nebraska
(Four 1/75 acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Spring survival	Leaf rust	Lodging 1/	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1942-49 3/	No. yrs. Grown	Percent of Kharkof	Rank
		May	July	%	%	%	Lbs.	Bus.	Bus.	Bus.			
Tk.-Tq.-Chey. X Tk.	12523	30	5	85	20	20	57.5	25.8	31.6	-	3	127.5	3
Nebr. 60 X Med.- Hope	12500	26	2	85	75	6	58.1	24.7	32.4	—	3	126.5	4
Pawnee	11669	27	1	80	75	25	55.7	22.2	31.7	40.4	13	131.2	2
Kawv.-Tenq. X Kawv.- Tenq.	12128	28	4	70	5	25	56.4	19.4	30.7	-	2	110.8	9
Minter	12138	31	5	95	80	55	54.0	19.0	—	—	1	—	—
Hung. Sel. X Nebred	12507	6-1	5	80	85	55	54.6	17.2	31.9	-	3	131.6	1
Johardi	12510	30	5	90	80	35	54.4	15.3	—	—	1	—	—
Compound Hybrid	12501	31	5	85	80	60	53.6	14.8	32.8	-	4	121.1	5
Red Chief	12109	30	5	75	95	100	58.6	13.6	30.2	35.9	7	116.7	6
Cheyenne X Turkey	12142	31	5	80	95	55	52.1	13.6	28.2	-	4	105.2	14
Turkey	12137	6-1	5	85	90	45	52.0	13.2	27.1	30.5	18	99.4	17
Nebred	10094	6-1	5	75	95	60	53.1	12.8	30.8	32.5	18	106.2	13
Cheyenne	8885	6-1	5	80	95	50	51.7	12.0	30.1	34.5	18	112.0	8
Tenmarq	6936	30	5	75	90	60	51.8	11.7	30.3	33.1	18	106.6	11
Kharkof	1442	6-4	5	80	90	40	50.3	11.2	27.7	30.8	18	100.0	15
Triumph	12132	23	6-29	55	75	25	56.3	11.1	24.8	-	4	106.5	12
Comanche	11673	30	3	65	75	35	50.9	10.1	27.3	34.1	11	112.8	7
Wichita	11952	27	6-30	60	90	70	57.2	9.7	24.3	33.6	7	109.2	10
Turkey, N.P. 2/	12143	6-2	5	70	95	80	47.4	6.9	—	—	1	—	—
Blackhull	6251	6-4	5	55	90	85	51.6	6.0	24.5	29.0	18	99.7	16
Cimarron	12120	30	2	55	90	75	53.8	5.5	23.1	-	2	83.5	19
Chiefk. X Oro - Tenq.	12133	6-1	3	40	75	20	53.4	5.5	26.2	-	2	94.6	18

1/ Mostly broken straw.
2/ Original stand thin.
3/ No crop in 1945.

Standard error of a difference = 9.21 bus.



North Platte, Nebraska
(Five 1/55 acre plots on fallow)

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Rust Leaf	Rust Stem [1]	Wt. per bu.	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1943-49	No. Yrs. Grown	Percent of Kharkof	Rank
		June	July	Ins.	%	%	Lbs.	Bus.	Bus.	Bus.			
Kawv.-Meo. X Kawv.-Tenq.	12128	9	13	39	10	20	58	25.5	25.4	–	2	112.6	5
Nebr. 60 x Med.-Hope	12500	4	12	38	70	0	58	25.1	26.6	–	2	117.7	1
Pawnee	11669	4	9	39	70	5	60	24.8	25.4	38.1	11	114.2	4
Th-Tq.-chey. X Tk.	12523	9	13	43	50	15	57	23.1	25.2	–	2	111.8	6
Red Chief	12109	10	14	42	60	2	62	21.5	23.8	36.0	7	115.1	3
Nebred	10094	11	14	39	80	10	58	20.9	25.8	34.0	15	107.5	11
Compound Hybrid	12501	11	12	41	60	2	58	20.9	24.8	–	2	110.0	8
Cheyenne X Turkey	12142	11	12	39	80	25	58	20.7	25.2	–	2	111.5	7
Wichita	11952	5/31	7	39	90	0	59	20.3	21.3	36.1	7	115.3	2
Chiefk. X Oro-Tenq.	12133	4	10	41	90	T	59	20.3	23.3	–	3	104.4	13
Comanche	11673	4	9	39	80	5	58	20.2	23.3	34.8	11	106.4	12
Cheyenne	8885	12	14	39	80	35	58	19.6	24.8	34.8	17	109.0	9
Tenmara	6936	9	13	40	70	10	58	19.1	23.6	33.1	17	101.6	15
Hung. Sel. X Nebred	12507	12	13	39	70	15	58	18.7	23.5	–	2	104.0	14
Turkey, N.P.	12143	11	13	39	80	20	56	18.5	23.7	37.0	17	108.7	10
Cimarron	12120	5	12	35	80	5	60	17.8	21.6	–	2	95.6	17
Kharkof	1442	12	15	40	70	15	57	17.4	22.6	31.3	17	100.0	16

[1] One replication.

Standard error of a difference = 1.98 bus.

Alliance, Nebraska
(Six plots; rod rows on fallow)

Variety	C.I. No.	Date Headed	Date Ripe	Lodging	Plant height	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1942-49 1/	No. yrs. Grown	Percent of Kharkof	Rank
		May	July	%	Ins.	Lbs.	Bus.	Bus.	Bus.			
Tk.-Tq.-Chey. X Tk.	12523	29	14	20	50	60.1	51.6	49.0	-	2	127.4	1
Nebred X Hope-Turkey 456812		27	14	25	49	59.4	50.3	-	-	1	-	-
Wichita	11952	27	12	45	48	61.1	50.2	45.1	35.6	7	98.9	14
Cheyenne X Turkey	12142	30	14	25	50	59.3	50.1	48.0	-	5	116.1	3
Hung. Sel. X Nebred	12507	31	14	5	51	59.7	49.8	42.6	-	4	95.9	17
Kawv.-Mqo. X Kawv.-Tena.	12128	27	14	10	47	60.6	48.1	47.2	-	2	122.6	2
Hope-Turkey X Turkey 456446		27	14	20	47	61.9	47.2	-	-	1	-	-
Pawnee	11669	28	13	30	47	59.8	47.1	45.2	36.1	9	101.9	10
Cheyenne	8885	6-1	15	5	50	58.6	46.5	44.1	38.9	12	109.5	6
Cimarron	12120	26	15	2	46	63.1	44.8	40.9	-	2	106.4	7
Chiefk. XOro-Tena.	12133	27	14	20	48	57.7	44.5	41.5	-	3	106.1	8
Comanche	11673	28	13	60	48	59.1	44.2	43.6	36.1	9	101.9	10
Turkey XCheyenne NP40672		28	14	30	48	59.7	44.2	-	-	1	-	-
Chiefk. XCheyenne 422123		30	14	35	50	59.4	44.0	42.9	-	3	115.0	4
Turkey, N.P.	12143	30	14	30	53	57.5	43.2	-	-	1	-	-
Blackhull	6251	29	14	70	50	61.3	42.9	41.5	34.4	12	97.1	16
Compound Hybrid	12501	6-2	15	45	51	59.5	42.6	43.6	-	4	112.3	5
Nebred	10094	31	15	45	48	59.9	42.2	44.2	37.1	10	103.9	9
Hope-Tk. XCheyenne NP44541		30	14	45	50	56.2	41.6	-	-	1	-	-
Tenmarq	6936	29	14	50	51	57.5	41.5	40.1	32.6	12	93.8	18
Red Chief	12109	27	15	2	54	63.1	40.1	36.5	31.5	7	87.5	19
Kharkof	1442	6-4	14	55	52	58.0	38.8	38.5	36.0	12	100.0	13
Nebr. 60 X Med.-Hope	12500	27	14	15	48	60.5	38.6	38.5	-	2	100.1	12
Turkey	12137	6-1	15	60	49	58.5	37.6	37.8	-	2	98.2	15

1/ No crop in 1944.

Standard error of a difference = 2.12 bus.

Ames, Iowa
(Three rod row plots)

Variety	C.I. No.	Spring Survival %	Date headed May	Date Ripe June	Plant height Ins.	Lodging %	Leaf rust %	Weight per bushel Lbs.	Average acre yield 1949 Bus.	Percent of Kharkof
Blackhawk	12218	100	30	30	47	0	5	60.4	49.0	117.5
Pawnee	11669	98	26	27	40	3	50	60.3	47.2	113.2
Kv.-Mqo.XKv.-Tq. Ks.2793		91	28	30	41	0	15	60.2	44.4	106.5
Iowin	10017	100	29	30	44	21	20	61.2	43.8	105.0
Iohardi	12510	99	28	30	47	5	55	61.0	43.6	104.6
Minter	12138	99	31	30	44	2	30	60.3	42.1	101.0
Kharkof	1442	99	31	30	41	3	35	59.3	41.7	100.0
Marmin	11502	89	30	7-1	44	7	35	60.5	40.6	97.4
Kawvale	8180	94	29	30	42	0	25	60.1	39.7	95.2

Standard error of a difference = 4.2 bus.

Waseca, Minnesota

one to Three 1/40 acre plots

Variety	C.I. or Sel. No.	Spring Survival	Leaf rust	Weight per bushel	Average acre yield 1949 1/	Average acre yield 1943-1949 2/	No. Yrs. Grown	Percent of Minturki	Rank
		%	%	Lbs.	Bus.	Bus.			
Blackhawk	12218	47	10	55.8	29.5*	19.3	6	99.4	6
Marmin	11502	55	100	55.1	28.2	19.8	14	103.1	2
Minter	12138	47	60	55.2	27.4	21.9	7	110.9	1
Hope X Minturki: 2	12506	60	50	55.4	27.4	—	3	92.5	11
H44 X Minturki: 2	12532	57	90	54.7	25.4	—	3	88.7	12
Marmin X H44-Minh.	12520	32	80	55.3	25.2*	—	2	100.5	4
Minturki	6155	63	100	54.9	25.2	19.8	16	100.0	5
H44-Minhardi X Marmin	12704	40	50	51.0	23.8*	—	2	101.0	3
H44 X Minturki: 3	M.2784	55	70	53.5	23.6	—	2	95.1	8
Johardi	12510	32	70	56.8	23.6*	—	1	—	—
H44 X Minturki: 3	12519	53	72	53.7	23.3*	—	2	96.2	7
Marmin X H44-Minh.	12508	42	85	52.8	21.2	—	3	94.2	9
Marmin X H44-Minturki: 2	M.2795	40	—	53.6	19.8*	—	1	—	—
H44-Minhardi X Minturki:	12509	52	50	52.7	19.4*	—	2	92.8	10
Marmin X H44-Minturki: 2	M.2794	10	—	54.1	16.4*	—	1	—	—

1/ Two replications for all except when starred, then one.

2/ No yields in 1948

St. Paul, Minnesota

Three 1/40 acre plots

Variety	C.I. or Sel. No.	Date headed	Plant height	Spring survival	Leaf rust	Weight per bushel	Average acre yield 1949	Average acre yield 1945-1949 [1]	No. yrs. Grown	Percent of Minturki	Rank
		June	Ins.	%	%	Lbs.	Bus.				
Minter	12138	11	36	60	40	57.8	23.6	34.2	5	106.0	4
Marmin X H44-Minturki 2	M. 2794	10	36	45	70	57.2	22.0	—	1	—	—
Minturki	6155	11	35	55	40	57.6	21.1	32.4	10	100.0	9
Marmin	11502	11	35	50	50	57.8	21.0	34.4	10	102.5	6
H44 X Minturki 2	12532	11	35	47	50	58.2	21.0	—	3	108.7	2
~~Marmin X~~ H44-Minh. X Marmin	12704	10	34	40	50	56.6	20.8	—	2	110.5	1
Marmin X H44-Minh.	12508	11	37	40	50	56.8	20.5	—	3	103.9	5
do	12520	12	36	35	60	57.6	20.5	—	2	100.7	7
H44 X Minturki 3	M 2784	11	36	42	60	56.3	18.6	—	2	98.2	10
Marmin X H44-Minturki 2	M. 2795	11	34	40	40	57.2	17.9	—	1	—	—
H44 X Minturki 3	12519	10	34	33	60	57.2	17.2	—	2	97.3	12
Blackhawk	12218	12	37	48	20	57.3	16.9	31.8	4	98.1	11
H44-Minh. X Minturki	12509	11	34	42	50	56.2	14.9	—	2	106.8	3
Hope X Minturki 2	12506	10	38	30	40	57.4	13.2	—	3	100.0	8
Johardi	12510	10	37	12	60	59.1	8.1	—	1	—	—

[1] No yields in 1948

Standard error of a difference = 6.62 bushels.

Grand Rapids, Minnesota

Three 1/40 acre plots

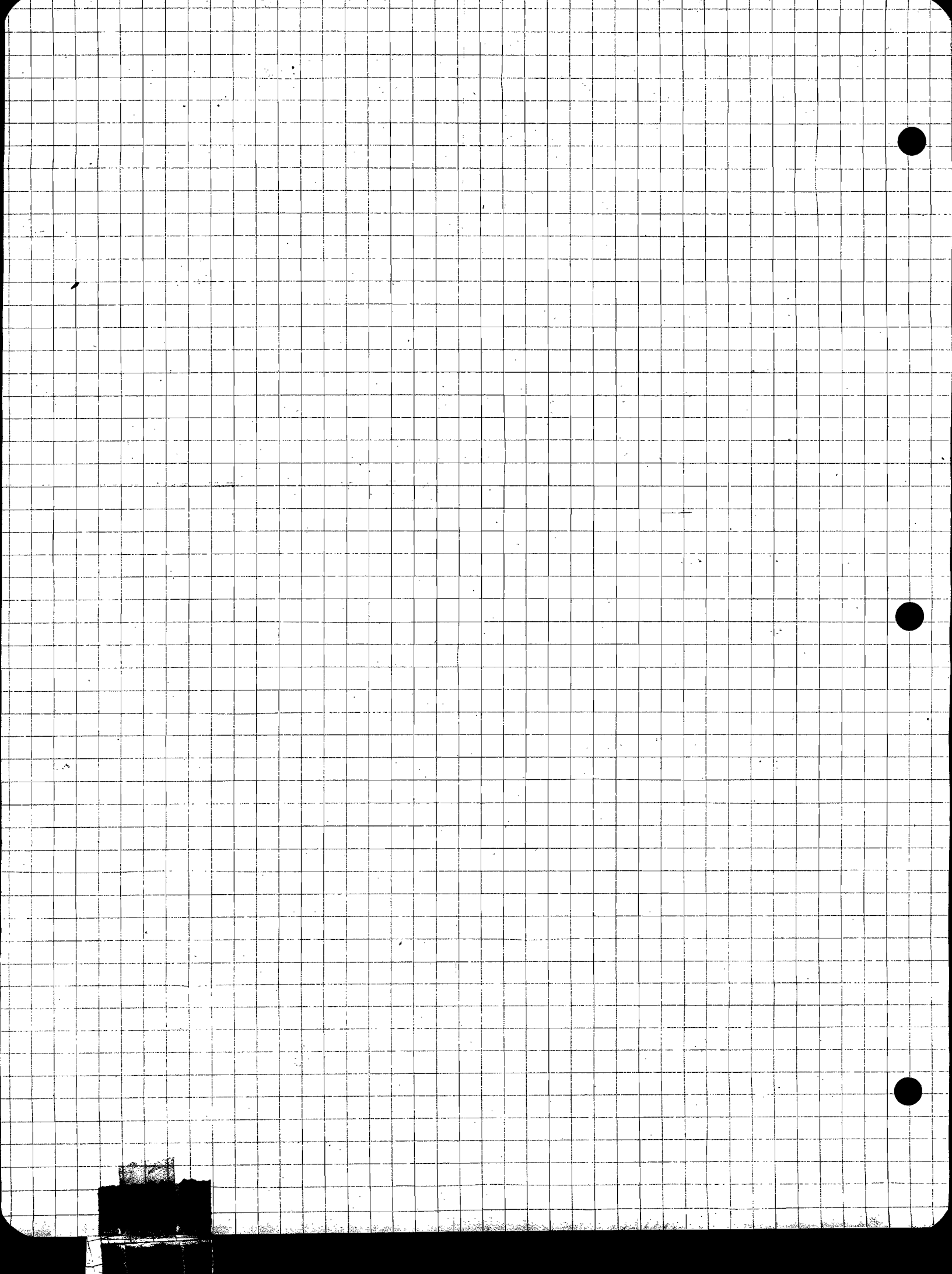
Variety	C.I. or Sel. No.	Date headed	Date Ripe	Spring Survival	Plant height	Lodging	Weight per bushel	Average acre yield 1949	Average acre yield 1948-1949	Average acre yield 1945-1949 [1]	No. Yrs. Grown	Percent of Minturki	Rank
		June	July	%	Ins.	%	Lbs.	Bus.					
Iohardi	12510	12	23	88	44	37	60.1	51.4	—	—	1	—	—
Blackhawk	12218	13	22	100	44	50	58.0	47.1	44.3	36.7	4	95.3	5
H44-Minh. X Minturki	12509	10	19	100	40	55	56.9	46.8	43.5	—	3	90.9	8
Minter	12138	12	18	100	41	53	57.4	46.6	50.2	44.0	5	113.0	1
Hope X Minturki 2	12506	12	20	98	42	57	58.2	46.1	46.3	—	3	98.9	3
H-44-Minh. X Marmin	12704	11	20	98	41	62	55.1	45.4	44.0	—	3	89.4	10
Minturki	6155	11	21	100	43	85	57.1	43.7	48.4	38.5	9	100.0	2
H44 X Minturki 3	12519	11	19	100	43	52	56.4	41.3	44.0	—	3	96.7	4
Marmin X H44-Minh.	12508	11	20	100	41	58	55.8	40.8	40.3	—	3	90.6	9
do	12520	12	20	99	42	45	57.4	40.7	44.5	—	3	87.3	12
H44 X Minturki 2	12532	12	21	98	41	62	56.7	40.6	43.5	—	3	88.8	11
H44 X Minturki 3	M.2784	13	21	99	44	65	53.5	40.1	42.8	—	3	93.3	6
Marmin	11502	11	20	97	41	53	57.1	39.5	42.4	35.4	9	93.0	7

[1] No yields in 1946

Moccasin, Montana

6 plots ; rod rows

Variety		C. I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. yrs. Grown	Percent of Kharkof	Rank
			June	July	Ins.	Lbs.	Bus.	Bus.	Bus.			
Ridit X Yogo	Mont. Sel. 3		18	29	35	60.8	31.3			1		
Yogo		8033	20	27	32	60.4	31.0	38.7	28.7	16	106.5	1
Kan.-Minh. X Oro	BH 114-43		17	29	35	61.8	29.0			1		
Ridit X Mont. 36	Mont. Sel. 1		16	29	34	59.4	28.5			1		
Kharkof		1442	17	27	32	60.2	28.1	38.1	28.8	16	100.0	4
Yogo X N487	Mont. Sel. 2		17	28	34	61.0	28.0			1		
Huntley Sel. 15A			17	26	33	60.0	27.7			1		
Yogo X Oro	Mont. Sel. 5		19	26	34	60.4	27.6	35.9	27.9	8	99.7	5
Huntley 16A			18	27	32	60.0	27.6			1		
Nebred		10094	16	29	31	61.2	27.5	37.4	29.6	11	98.2	6
Cheyenne X Tenmarq		11972	13	29	32	61.4	27.4			1		
Huntley 5B			15	28	33	59.6	27.4			1		
Ridit X Kharkof 4A		12521	16	27	34	59.6	27.2	38.1	-	4	95.7	8
Oro X 8034	Sel. 206		15	27	34	61.2	26.6			1		
Tenq. X Mint.	BH 84-13		16	28	33	60.4	26.6			1		
Karmont		6700	15	26	31	61.6	26.3	38.0	29.2	16	101.7	3
Huntley 11B			17	29	35	59.8	26.3			1		
N487 X Oro	Mont. Sel. 2		15	28	34	60.8	26.2			1		
Martin X Tenmarq[3]		11824	11	28	32	60.8	25.9	34.4	26.9	5	93.7	9
Pawnee		11669	11	28	32	60.8	25.7	30.8	-	3	81.2	13
Wasatch		11925	19	30	36	61.2	25.5	35.4	-	3	93.6	10
Marmin		11502	18	29	36	60.4	25.4	33.7	26.8	9	91.4	11
Newturk		6935	15	26	32	60.4	25.4	38.1	-	15	103.2	2
Winter		12138	18	27	33	61.8	25.2	36.8	27.6	5	96.1	7
Comanche		11673	9	26	32	61.4	25.1	34.7	-	3	86.4	12
Turkey X Oro		12705	15	30	34	60.8	24.8			1		
Huntley 10[illegible]A			13	28	35	60.8	24.2			1		
Turkey X Oro	Sel. 201		14	28	34	61.6	23.6			1		
do	Sel. 216		14	29	33	60.2	23.0			1		
do	Sel. 208		19	29	33	61.0	22.6			1		
do	Sel. 205		16	30	32	61.8	22.5			1		
Wichita		11952	9	26	32	60.0	21.1	30.5	—	3	79.4	14



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

Variety	C.I. No.	Spring Survival	Date headed	Plant height	Leaf rust	Weight per bushel	Average acre yield 1949 [1]	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Minturki	Rank
		%	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
Minter	12138	85	10	38	50	57.0	29.6	32.6	33.3	5	108.2	6
Hope X Minturki 2	12506	82	12	38	50	57.0	29.2	34.7	-	2	120.5	1
Marmin	11502	80	10	36	50	56.5	27.5	31.9	-	3	87.9	12
H44 X Minturki 3 Minn. 2784		88	12	38	80	55.5	25.8	33.1	-	2	114.8	2
Iowin	10017	55	10	36	40	59.0	25.2	25.1	-	3	85.1	13
H44 X Minturki 4	12532	80	12	35	50	57.0	25.0	31.1	-	2	108.0	7
~~H44 X Minturki 3~~ H-44-Minh. X Marmin	12704	88	11	33	80	54.0	25.0	32.6	-	2	113.2	3
H44 ~~&~~ XMinturki 3	12519	82	11	37	70	54.5	24.6	32.4	-	2	112.5	4
Marmin X H44 - Minhardi	12520	82	12	36	60	56.5	24.6	32.0	-	2	110.9	5
do	12508	88	10	36	60	56.0	23.5	30.4	-	2	105.6	8
~~H44 X Minturki 2~~ H44-Minh. X Minturki	12509	80	10	34	70	56.0	23.5	28.0	-	2	97.2	10
Iohardi	12510	60	8	36	80	58.0	21.9	-	-	1	-	-
Pawnee	11669	40	8	30	20	58.5	21.7	10.9	-	4	65.6	14
Nebred	10094	50	10	30	80	57.0	21.3	28.9	29.1	5	94.4	11
Minturki	6155	82	10	33	60	56.5	20.2	28.8	30.8	5	100.0	9

[1] Yield differences not significant by F test.

Sheridan, Wyoming
(Three 1/55 acre plots on fallow)

Variety	C.I. No.	Spring survival	Date Headed	Date Ripe	Plant height	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
		%	June	July	Ins.	Lbs.	Bus.	Bus.	Bus.			
Nebred	10094	100	11	24	44	58.3	52.4	50.0	44.2	13	102.6	3
Cheyenne	8885	100	13	23	46	60.3	50.4	42.0	46.5	15	108.0	1
Kanred	5146	100	12	23	49	60.7	49.8	44.9	47.1	19	105.7	2
Martin X Tenmarq[3]	11824	95	8	25	47	58.7	49.0	–	–	1	–	–
Minter	12138	97	15	25	46	58.7	46.3	43.2	41.0	5	94.6	7
Yogo	8033	97	16	25	49	58.7	45.4	42.8	42.7	19	100.2	4
Karmont	6700	98	15	25	47	57.3	44.0	40.8	41.4	19	97.4	6
Marmin	11502	95	13	25	44	58.0	43.1	39.4	40.5	14	93.6	8
Ridit X Kharkof	12521	100	13	23	49	57.0	42.9	–	–	1	–	–
Kharkof	1442	100	14	24	49	59.3	42.2	43.4	43.3	19	100.0	5
Rye # 2148		100	5/22	19	55	55.0	41.3	–	–	–	–	–

Standard error of a difference = 3.27 bus.

Begin New Page

STANDARD ERRORS

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

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

SUMMARY OF PLOT DATA

Summaries of yield data for 1949 and the recent two-year period appear in sections which follow along with an average of other agronomic data for 1949.

Yields by Districts

Yields of uniform varieties in the southern district are shown in table 3. The six-station average shows that Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128) is most productive for the area as a whole followed closely by Westar. Pawnee and Red Chief drop below these two by one and two bushels per acre while Kharkof and Tenmarq trail by six or seven bushels. C. I. 12128 was bred for hessian fly resistance, leaf rust resistance, and good general type. Its yield record has been made in the absence of hessian fly thus demonstrating its ability to produce as well as other varieties in normal circumstances; other tests have shown that it is superior to all other varieties listed in table 3 for fly reaction. Likewise in table 4 where records for 1948 and 1949 are combined, Westar, C. I. 12128, and Pawnee occupy the three top positions.

Table 2. Number of plots, average yield, and standard errors for the variety test at each cooperating station, 1949.

State and station	No. of plots	No. var.	Average yield all varieties	Standard error of a			
				Single plot	Difference between means	Mean in	
						Bushels	Percent
			Bus.	Bus.	Bus.		
Texas:							
Chillicothe*	10	20	30.80	3.86	1.73	1.22	3.96
Bushland*	10	26	38.66	5.20	2.32	1.64	4.24
Oklahoma:							
Lawton	3	16	13.09	2.25	1.84	1.30	9.93
Stillwater	4	20	21.31	1.76	1.24	.88	4.13
Cherokee*	4	16	31.20	4.16	2.94	2.08	6.67
Woodward	4	16	25.88	2.85	2.02	1.43	5.53
Goodwell*	5	16	20.77	3.12	1.98	1.40	6.74
Kansas:							
Manhattan	3	29	33.26	2.10	1.71	1.21	3.64
Garden City	3	15	34.85	2.23	1.82	1.29	3.70
Hays	4	19	19.52	2.04	1.44	1.02	10.76
Colorado:							
Akron	4	14	12.48	2.06	1.46	1.03	8.25
Ft. Collins*	7	21	39.15	7.75	4.14	2.93	7.48
Nebraska:							
Lincoln	4	22	12.81	3.12	2.21	1.56	12.20
North Platte	5	17	20.84	3.15	1.98	1.40	6.73
Alliance*	6	24	44.65	3.67	2.12	1.50	3.36
Wyoming:							
Sheridan	3	10	46.55	4.00	3.27	2.31	4.96
Minnesota:							
St. Paul	3	15	18.49	8.10	6.62	4.68	25.32
Waseca	3	15	23.96	—			
Grand Rapids	3	13	43.85	—			
South Dakota:							
Brookings	2	15	24.57	—	Not significant		
Montana:							
Moccasin*	6	32	26.26	3.53	2.04	1.44	5.48
Iowa:							
Ames*	3	9	43.57	5.14	4.20	2.97	6.82

* Nursery plots.

Table 3. Summary of average yields of winter wheat varieties grown uniformly in plot tests at ~~6~~ 5 stations in the southern district, 1949.

Variety	C.I. No.	Average yield in bushels per acre at: Chillicothe	Burkburnett	Lawton	Stillwater	Cherokee	Woodward	Goodwell	Six sta. Av.
Kv.-Mco. X Kv.-Tenq.	12128	37.4		18.9	24.5	32.9	29.4	18.2	26.9
Westar	12110	39.0		13.5	24.9	30.2	30.5	22.9	26.8
Pawnee	11669	34.5 1/		13.2	21.6	33.4	31.8	19.6	25.7
Red Chief	12109	30.5		9.1	21.3	35.6	26.8	22.5	24.3
Triumph	12132	28.7		10.8	21.9	36.9	27.6	18.8	24.1
Wichita	11952	30.4		12.5	16.9	30.6	29.6	21.2	23.5
Comanche	11673	26.5		9.7	22.2	37.5	22.8	22.2	23.5
Quanah	12145	35.4		17.4	20.7	27.1	21.5	18.0	23.4
Early Blackhull	8856	29.4		13.6	23.5	27.0	23.8	20.8	23.0
ChiefkanX Oro-Tq.	12133	25.7		12.4	21.4	31.6	23.5	22.5	22.9
Cimarron	12120	28.0		11.3	22.2	29.3	24.6	20.3	22.6
Kharkof	1442	25.2		11.3	20.9	27.4	22.7	20.4	21.3
Tenmarq	6936	21.9		10.6	20.2	26.1	21.8	17.3	19.7

4 replications; others in 10.

1/ Grown in ~~northern~~ ~~yield~~ nursery.

Table 4 Summary of varietal yields from plot tests at 8 stations in the southern district for all or part of the period 1948-49.

Variety	C. I. No.	Average yield in bushels per acre at Denton	Chillicothe	Bushland	Lawton	Stillwater	Cherokee	Woodward	Goodwell	Average
No. yrs. grown		1	2	1	2	2	2	2	2	14
Westar	12110	26.5	38.9	11.1	19.2	23.4	27.8	28.1	28.6	26.4
Ku.-Mao. X Ku.-Tq.	12128	21.2	36.4	11.6	25.6	21.5	29.6	26.6	24.8	25.8
Pawnee	11669	21.8	37.1	12.7	22.9	21.0	28.9	27.5	25.1	25.7
Red Chief	12109	24.7	33.6	13.3	15.5	21.8	33.9	27.2	26.5	25.4
Wichita	11952	24.3	33.2	10.9	21.7	19.2	30.3	28.4	25.3	25.1
Chieftan X Oro-Tq.	12133	26.2	32.0	13.3	20.7	22.7	30.3	24.2	26.9	25.2
Triumph	12132	24.2	32.8	13.3	19.5	21.5	32.8	26.1	23.0	24.9
Cimarron	12120	26.5	31.4	9.5	19.0	22.3	28.3	25.4	26.2	24.4
Comanche	11673	24.4	31.2	12.3	16.8	21.2	31.5	23.2	27.5	24.3
Early Blackhull	8856	23.4	31.4	10.9	19.5	22.8	28.0	24.6	25.4	24.1
Kharkof	1442	24.7	29.1	10.9	20.1	20.8	26.9	23.5	26.1	23.5
Quanah	12145	20.5	33.8	10.6	23.1	20.2	23.3	22.8	22.7	23.1
Tenmarq	6936	24.2	26.5	10.3	20.2	20.8	25.3	23.3	25.3	22.7

In the central district Pawnee led all other varieties in average yield at the eight stations in 1949 as can be seen from table 5. C. I. 12128 ranked second and Wichita third. Kharkof was lowest in yield. In table 6 are the yields for 1948 and 1949. The 17 station-years combined show that Pawnee, C. I. 12128, and C. I. 12133 have the best averages for the central district. Kharkof is the lowest although Tenmarq is not much better. Thus it is obvious that the new unnamed selections are highly productive strains. Release of them to farmers should be decided upon characteristics other than yield.

Table 7 shows the summary of yields for 1949 in the northeastern district. No crop was harvested at most of the stations in 1948 so a two-year summary is not feasible. The 1949 yields show that Minter, Marmin, and C. I. 12506 are productive strains. Minter is recommended in Minnesota and South Dakota where it seems to be gaining in favor with farmers and is replacing Marmin and Minturki.

In table 8 the yields are shown for the northwestern district for 1949 and 1948-49. Nebred ranked highest in both comparisons whereas Yogo ranked second. Marmin had the lowest yield, ranking below Minter rather consistently.

Summary of Agronomic Data

Data taken in 1949 other than yield of grain are summarized for uniform varieties in tables 9 to 12. In the southern district (table 9) the varieties were ranked in order of decreasing test weight which for six stations favors Red Chief and Cimarron. Five varieties averaged below 58 pounds which would make them grade as No. 3 wheat on the market. Triumph and Early Blackhull were earliest to head and mature. Red Chief was the tallest variety, whereas Cimarron

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and Triumph, the shortest ones, were only 33 inches tall. Leaf rust attacked all varieties. Quanah was most resistant; C. I. 12128 was a close second; and Westar, formerly highly resistant, a poor third, but far below common varieties in infection sustained.

In the central district summary (table 10) the varieties are listed in order of test weight. Red Chief and Cimarron along with Wichita head the list. The lowest test weight was 6.4 pounds below Red Chief. Wichita was earliest to head and ripen while Kharkof was latest. Height ranged from 38 to 43 inches. Lodging includes the usual type of straw bending and also breakage. The latter was quite pronounced at Hays and Lincoln. C. I. 12128 and Red Chief stood best. Leaf rust attacked all varieties heavily except C. I. 12128 which averaged 28 percent infection. Stem rust at two stations indicates that the most susceptible were C. I. 12128, Kharkof, and Tenmarq. Wichita and Cimarron showed slight resistance or escaped due to earliness.

Agronomic data for the northeastern district are shown in table 11. Iohardi had the highest average test weight followed by C. I. 12506 and Minter. The two lowest strains were about 4 pounds lighter than Iohardi. Iohardi and C. I. 12509 were earliest; C. I. 12509 and C. I. 12704 were shortest. Leaf rust attacked all varieties, but C. I. 12506 and Minter had the lowest readings. Survival was good on all varieties with the possible exception of Iohardi. Minturki and Minter survived best.

In table 12 are agronomic data for the northwestern district.

Table 5. Summary of average yields of the uniform varieties grown in plot tests at 8 stations in the central district, 1949.

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Garden City	Hays	[illegible]	Akron	Ft. Collins	Lincoln	North Platte	Alliance	8 sta. Average
Pawnee	11669	36.2	37.5	10.5		15.1	44.7	22.2	24.8	47.1	29.8
Ku.-Mao. X Ku.-Tq.	12128	38.1	39.4	13.6		15.5	31.0	19.4	25.5	48.1	28.8
Wichita	11952	34.0	35.8	12.1		14.1	50.1	9.7	20.3	50.2	28.3
Chiefkan X Oro-Tq.	12133	30.0	36.4	9.1		13.6	48.9	5.5	20.3	44.5	26.0
Cimarron	12120	27.6	32.0	4.0		15.0	60.4	5.5	17.8	44.8	25.9
Comanche	11673	30.2	35.9	7.3		12.4	46.7	10.1	20.2	44.2	25.9
Red Chief	12109	34.2	29.8	11.7		14.9	43.7	13.6	21.5	40.1	26.2
Tenmarq	6936	25.7	31.2	5.7		11.1	30.1	11.7	19.1	41.5	22.0
Kharkof	1442	15.3	25.4 1/	9.0		9.2	31.2	11.2	17.4	38.8	19.7

1/ Turkey

Table 6. Summary of varietal yields from plot tests at 9 stations in the central district for part or all of the period 1948-49.

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. yrs. grown		2	2	2	1	2	2	2	2	2	17
Chiefkan X Oro-Ta.	12133	39.2	37.2	22.2	39.6	16.4	57.3	26.2	23.3	41.5	33.3
Pawnee	11669	42.4	33.8	17.4	32.6	16.1	54.2	31.7	25.4	45.2	33.2
Ku.-Mqo. X Ku.-Tq.	12128	42.1	36.3	21.4	32.5	18.6	44.3	30.7	25.4	47.2	33.2
Cimarron	12120	37.8	31.7	18.3	40.3	17.6	60.6	23.1	21.6	40.9	32.0
Comanche	11673	38.7	36.5	16.6	31.7	15.9	54.6	27.3	23.3	43.6	32.0
Wichita	11952	43.6	30.7	19.6	28.8	15.7	59.5	24.3	21.3	45.1	32.3
Tenmarq	6936	35.8	32.9	17.0	35.6	16.9	45.4	30.3	23.6	40.1	30.6
Red Chief	12109	39.0	28.8	22.6	28.6	18.5	48.9	30.2	23.8	36.5	30.9
Kharkof	1442	19.9	27.5 1/	22.9	40.8 1/	16.9	46.8	27.7	22.6	38.5	28.6

1/ Turkey

Table 7. Summary of yields of varieties grown in the Northeastern District in 1949.

Variety	C.I. No.	Average yield in bushels per acre					
		Ames	Waseca	St. Paul	Grand Rapids	Brookings	Av. [1]
Minter	12138	42.1	27.4	23.6	46.6	29.6	31.8
Marmin	11502	40.6	28.2	21.0	39.5	27.5	29.1
Hope X Minturki-2	12506		27.4	13.2	46.1	29.2	29.0
~~H44 X Minturki-3~~ H44-Minh. X Marmin	12704		23.8	20.8	45.4	25.0	28.8
H44 X Minturki-4	12532		25.4	21.0	40.6	25.0	28.0
Marmin X H44-Minh.	12520		25.2	20.5	40.7	24.6	27.8
Minturki	6155		25.2	21.1	43.7	20.2	27.6
H44 X Minturki-3	M. 2784		23.6	18.6	40.1	25.8	27.0
do	12519		23.3	17.2	41.3	24.6	26.6
Marmin X H44-Minh.	12508		21.2	20.5	40.8	23.5	26.5
Iohardi	12510	43.6	23.6	8.1	51.4	21.9	26.3
Blackhawk	12218	49.0	29.5	16.9	47.1	—	—
~~H44 X Minturki-2~~ H44-Minh. X Minturki	12509		19.4	14.9	46.8	23.5	26.2

[1] Ames omitted.

Table 8 Summary of average yields of varieties grown uniformly in plot tests at 2 stations in the northwestern district, 1949 and for the 2-year period 1948-49.

Variety	C.I. No.	Average yield in bushels per acre in 1949			Average yield in bushels per acre in 1948-49		
		Sheridan	Moccasin	Av.	Sheridan	Moccasin	2 yr. Av.
Nebred	10094	52.4	27.5	40.0	50.0	37.4	43.7
Yogo	8033	45.4	31.0	38.2	42.8	38.7	40.8
Martin X Tenmara^3	11824	49.0	25.9	37.5	—	34.4	—
Minter	12138	46.3	25.2	35.8	43.2	36.8	40.0
Kharkof	1442	42.2	28.1	35.2	43.4	38.1	40.8
Karmont	6700	44.0	26.3	35.2	40.8	38.0	39.4
Rodit X Kharkof	12521	42.9	27.2	35.1	—	38.1	—
Marmin	11502	43.1	25.4	34.3	39.4	33.7	36.6

Table 9 Summary of agronomic data other than yield for varieties grown in plots in the southern district, 1949.

Variety	C.I. No.	Date Headed	Date Ripe	Av. ht.	Leaf rust	Weight per bushel
		May	June	Ins.	%	Lbs.
Number of stations		4	3	4	3	6
Red Chief	12109	7	9	40	74	61.0
Cimarron	12120	5	8	33	77	60.0
Early Blackhull	8856	2	5	37	73	59.7
Ku.-Mco. X Ku.-Tq.	12128	6	9	36	19	58.9
Wichita	11952	2	4	36	83	58.6
Quanah	12145	6	10	36	14	58.1
Triumph	12132	1	4	33	82	58.0
Chiefk. XOro-Tq.	12133	5	8	35	82	57.9
Westar	12110	7	10	37	30	57.7
Comanche	11673	6	8	36	66	57.1
Kharkof	1442	11	11	37	68	57.1
Tenmarq	6936	9	10	36	72	56.7

Table 10. Average agronomic data other than yield for varieties grown uniformly in the central district plots, 1949.

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Lodging 1/	Rust Leaf	Rust Stem	Weight per bushel
		June	July	Ins.	%	%	%	Lbs.
Number of stations.....		6	5	5	4	5	2	6
Red Chief	12109	4	6	43	37	86	39	61.4
Wichita	11952	1	1	40	66	89	18	59.1
Cimarron	12120	3	4	38	54	94	13	59.1
Pawnee	11669	3	3	39	55	82	35	58.5
Kv.-Mqo.X Kv.-Tq.	12128	4	5	39	35	28	48	58.2
Chiefkan X Oro-Tq.	12133	3	4	40	44	93	33	57.5
Comanche	11673	3	3	40	70	82	35	56.2
Kharkof	1442	9	6	42	59	88	45	55.7
Tenmarq	6936	5	5	42	75	92	43	55.0

1/ Includes broken straw

Table 11. Summary of agronomic data other than yield for varieties grown in the northeastern district, 1949.

Variety	C.I. No.	Date headed	Plant height	Leaf rust	Spring Survival	Weight per bushel
		June	Ins.	%	%	Lbs.
Number of stations		3	3	3	4	4
Iohardi	12510	10	39	70	48	58.5
Hope X Minturki 2	12506	11	39	47	68	57.0
Minter	12138	11	38	50	73	56.9
H44 X Minturki 2	12532	12	37	63	71	56.7
Marmin X H44-Minh.	12520	12	38	67	62	56.7
Marmin	11502	11	37	67	71	56.6
Minturki	6155	11	37	67	75	56.5
H44 X Minturki 3	12519	11	38	68	67	55.5
H44-Minhardi X Minturki	12509	10	36	57	69	55.5
Marmin X H44-Minh.	12508	11	38	65	68	55.4
H44 X Minturki 3	M. 2784	12	39	70	71	54.7
H44-Minhardi X Marmin	12704	11	36	60	67	54.2

Summary of

Table 12.—Agronomic data for varieties grown in plots in the northwestern district, 1949.[6]

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel
		June	July	Ins.	Lbs.
No. stations		2	2	2	1
Kharkof	1442	16	26	40	59.3
Karmont	6700	15	26	39	57.3
Yogo	8033	18	26	41	58.7
Nebred	10094	13	26	38	58.3
Marmin	11502	16	28	40	58.0
Martin X Tenmarq[3]	11824	10	27	40	58.7
Minter	12138	17	27	40	58.7
Rid:f XKharkof	12521	15	26	41	57.0

UNIFORM YIELD NURSERY

The uniform yield nursery was grown to maturity at 14 stations in the central and southern districts in 1949 and the results obtained appear in the following pages. Most of the tests were arranged as randomized 4-row plots of 16 square feet each with three or more replications. The entries in 1949 were the following:

No.	Variety or cross	State No.	C. I. No.
1	Kharkof		1442
2	Blackhull		6251
3	Early Blackhull		8856
4	Pawnee		11669
5	Comanche		11673
6	Triumph		12132
7	Quanah	Tx. 171-43-29	12145
8	Martin-Tenmarq x Chiefkan	Tx. 160-42-333	12146
9	Martin-Tenmarq x Kharkof	Tx. 42-2142	12147
10	Cheyenne x Turkey	N.P. 40410	12142
11	Blue Jacket		12502
12	29-34-275 Doublecross	Tx. 172-43-205	12511
13	do.	Tx. 172-43-210	12504
14	do.	Tx. 172-44-104	12512
15	Mqo.-Oro x Pawnee	Ks. 45R2023	12505
16	Chiefkan x Oro-Tenmarq	H.C. 43-112	12133
17	do.	H.C. 46-41	12518
18	Mqo.-Oro x Oro-Tenmarq	Ks. 431420	12406
19	Comanche x Medit.-Hope	Tx. 157-44-112	12513
20	do.	Tx. 157-44-200	12514
21	Hard Federation Hybrid	Wd. 678 (43h1-399)	12515
22	Blackhull-Oro x Pawnee	Wd. 681 (43h1-400)	12516
23	Comanche x Blackhull-Hd.Federation	Wd. 723 (43h2-123)	12517
24	Nebr. 60 x Medit.-Hope	Nebr. 366-26	12500
25	Orienta	Danne hybrid C29-5-12	12522

The nine strains with C. I. numbers above 12505 were new in the test this year while the others were tested one or more years previously. Most strains are kept in this nursery at least two years, after which time they may be advanced to plot tests or discontinued depending on the promise they show. Kharkof, Blackhull, and Early Blackhull have been designated permanent checks but Pawnee and Comanche have been in for so many years that they too are so classified.

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No.	Variety or cross	State No.	C.I. No.
1	Kharkof		1442
2	Blackhull		6251
3	Early Blackhull		8855
4	Pawnee		11669
5	Comanche		11673
6	Triumph		12132
7	Quanah	Tx. 171-49-29	12145
8	Martin-Tenmarq x Chiefkan	Tx. 160-42-339	12146
9	Martin-Tenmarq x Kharkof	Tx. 42-2142	12147
10	Cheyenne x Turkey	M.T. 40-19	12142
11	Blue Jacket		12502
12	29-34-275 Doublecross	Tx. 172-43-205	12511
13	do.	Tx. 172-43-210	12504
14	do.	Tx. 172-44-104	12512
15	Mgo.-Oro x Pawnee	Ks. 45R2023	12505
16	Chiefkan x Oro-Tenmarq	M.C. 43-112	12133
17	do.	M.C. 46-41	12518
18	Mgo.-Oro x Oro-Tenmarq	Ks. 43H420	12406
19	Comanche x Medit.-Hope	Tx. 157-44-112	12513
20	do.	Tx. 157-44-200	12514
21	Hard Federation Hybrid	Wd. 678 (43H-39)	12515
22	Blackhull-Oro x Pawnee	Wd. 681 (43H-400)	12516
23	Comanche x Blackhull-Hd. Federation	Wd. 723 (43H-123)	12517
24	Nebr. 60 x Medit.-Hope	Nebr. 764-26	12500
25	Oriental	Canne hybrid 029-5-12	12522

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DATA OBTAINED

Table 13 is a presentation of average data by stations for several plant characteristics on strains grown as a uniform nursery at 14 stations in 1949. In addition, a two-year average yield and a four- or five-year average yield is shown for each strain if grown that long in the experiment. Finally, the total number of years grown and a relative yield in terms of the Kharkof check are shown if the strain has been grown two or more years. Seasonal conditions prevailing for the plot experiments discussed earlier in this report apply equally well to the nurseries discussed here and will not be repeated.

The uniform yield nursery was grown at two stations in Texas. In the Chillicothe test leaf rust infection was rather heavy except on the Fronteira derivatives (C. I. 12504, 12511, 12512) and Quanah. Several strains had moderate resistance but readings on Pawnee and Comanche and the older strains exceeded 65 percent. C. I. 12516 and Pawnee gave the highest yield in 1949, Pawnee has the best two- and five-year averages. At Bushland, Pawnee ranked fourth being exceeded by two Texas selections and one from Oklahoma. Leaf rust was prominent late in the season but was not closely correlated with yield. Best two- and three-year averages were made by C. I. 12146 and 12147. Pawnee has the best 11-year average.

Three nurseries were grown in Oklahoma. At Stillwater three new entries from Woodward yielded the most grain and were superior for test weight also. Triumph, C. I. 12147, and Blackhull have the best two-year records but Pawnee vies with Triumph for high five-year averages. Leaf rust was moderately heavy this year in the nursery with no strain showing less than 5 percent of infection. At Cherokee, Triumph and C. I. 12406 came off with the highest yields and, except for Blue Jacket, had the best test weights. They have the best two-year averages also. Three-year averages favor Triumph, C. I. 12133, Comanche, and Pawnee. The Woodward nursery was on fallow and gave excellent yields. Triumph and Pawnee were the high yielding named varieties but were exceeded by C. I. 12505 and C. I. 12517.

[redacted] OBTAINED

Table 13 is a presentation of average data by stations for several plant characteristics on strains grown as a uniform nursery at 14 stations in 1949. In addition, a two-year average yield and a four- or five-year average yield is shown for each strain if grown that long in the experiment. Finally, the total number of years grown and a relative yield in terms of the Kharkof check are shown if the strain has been grown two or more years. Seasonal conditions prevailing for the plot experiments discussed earlier in this report apply equally well to the nurseries discussed here and will not be repeated.

The uniform yield nursery was grown at two stations in Texas. In the Chillicothe test leaf rust infection was rather heavy except on the Wronteiny derivatives (C. I. 12504, 12511, 12512) and Guanah. Several strains had moderate resistance but readings on Pawnee and Comanche and the older strains exceeded 65 percent. C. I. 12516 and Pawnee gave the highest yield in 1949, Pawnee has the best two- and five-year averages. At Bushland, Pawnee ranked fourth being exceeded by two Texas selections and one from Oklahoma. Leaf rust was prominent late in the season but was not closely correlated with yield. Best two- and three-year averages were made by C. I. 12546 and 12547. Pawnee has the best 11-year average.

Three nurseries were grown in Oklahoma. At Stillwater three new entries from Woodward yielded the most grain and were superior for test weight also. Triumph, C. I. 12547, and Blackhull have the best two-year records but Pawnee vies with Triumph for high five-year averages. Leaf rust was moderately heavy this year in the nursery with no strain showing less than 5 percent of infection. At Cherokee, Triumph and C. I. 12406 came off with the highest yields and, except for Blue Jacket, had the best test weights. They have the best two-year averages also. Three-year averages favor Triumph, C. I. 12513, Comanche, and Pawnee. The Woodward nursery was on fallow and gave excellent yields. Triumph and Pawnee were the high yielding named varieties but were exceeded by C. I. 12505 and C. I. 12517.

It is of interest that two of the three highest yielding strains had the shortest straw among the 25 strains compared. Two-year averages favor C. I. 12505 and Triumph; five-year records show the merits of Triumph and Pawnee; and for the 15-year period Pawnee has a 26 per cent advantage over Kharkof.

In the two Kansas nurseries the lowest yielding strain at Manhattan outyielded by a five-bushel margin the highest yielding strain at Hays. This illustrates how different the condition may be between stations less than 200 miles apart in the same state. In the Manhattan test the wheat grew tall, rank, and lodged severely. Leaf rust, mildew, and loose smut were prominent diseases. Test weights were low except in the case of Blue Jacket. C. I. 12406, Blue Jacket and C. I. 12505 were the highest yielding entries. Best two-year averages appear for Blue Jacket, C. I. 12505, and C. I. 12133 while five-year averages favor Pawnee. The longer period averages show that Pawnee in 15 years has exceeded the Kharkof check by 36 percent and Comanche shows a 25 percent advantage in 13 years of testing. Leaf rust, aphids, mosaic, unseasonable rain, and associated factors affected the Hays wheat. C. I. 12500 significantly outyielded all other varieties, producing twice as much grain as nine of the entries. C. I. 12147 and C. I. 12133 have the best two-year averages and C. I. 12133 has the best five-year record. In 14 years Pawnee has surpassed Kharkof 27 percent and in 13 years Comanche shows a 20 percent advantage.

Three tests were in Colorado. At Akron both leaf and stem rust were present. Eight strains yielded over 25 bushels to the acre with C. I. 12146 and Early Blackhull the highest. Two-year averages favor C. I. 12505 and C. I. 12146, while five-year averages favor C. I. 12133 and Pawnee. The Blackhulls, Pawnee, and Comanche have the best long-time records. Yields and test weights at Fort Collins were high in spite of the lodging and rust. C. I. 12505, Triumph, and C. I. 12133 gave the most grain which was about double that of the lowest yielding entries. These same wheats have the best two-year averages, whereas C. I. 12133 stands alone as highly superior in the five-year averages. At Hesperus the wheat was irrigated two times thereby supplementing other conditions which favored high

ships of interest when two of the three highest yielding strains had the shortest straw among the 25 strains compared. Two-year averages favor C. I. 1259 and Triumph; five-year records show the merits of Triumph and Pawnee; and for the 15-year period Pawnee has a 2% per cent advantage over Hancock.

In the two seasons of greatest rust damage the lowest yielding strain at Manhattan outyielded by a five-bushel margin the highest yielding strain at Hays. Tall, stiff-strawed sorts may differ somewhat in the percentage by which they exceed lodged averages. Last year, Triumph and Pawnee were prominent diseased, lodged varieties. Test weights were low except in the case of Blue Jacket. C. I. 1259, Blue Jacket and C. I. 1259 were the highest yielding entries. Past two-year averages appear for Blue Jacket, C. I. 1259, and C. I. 1259 while five-year averages favor Pawnee. The long-period average also that Pawnee exceeded the Turkey check by 30 pounds and Dawsons Chaff by 2.5 bushels. Resistance in 47 years of testing, heavy rust, spring, mealy, unseasonable rain, and associated factors affected the Hay's record. C. I. 1259 significantly outyielded all other varieties, producing twice as much grain as straw of the entire. C. I. 1247 and C. I. 1259 have the best two-year averages and C. I. 1259 has the best five-year records. In the years Pawnee has surpassed Turkey 27 percent and in 38 years Dawsons Chaff 20 percent advantage.

Three tests were in Colorado. At Akron both leaf and stem rust were present. Tall straws yielded over 25 bushels to the acre with C. I. 1259 and Pawnee, Blackhull the highest. Two-year averages favor C. I. 1259 and C. I. 1259, while five-year averages favor C. I. 1259 and Pawnee. The Blackhulls, Pawnee, and Comanche have the best long-time records. Yields and test weights at Fort Collins were high in spite of the lodging and rust. C. I. 1259, Triumph, and C. I. 1259 gave the most grain which was about double that of the lowest yielding entries. Those same varieties have the best two-year averages, namely C. I. 1259, Pawnee alone as highly successful in the five-year averages. At Hearons the wheat was irrigated two times thereby supplementing other conditions which favored high

yields in a disease-free test. Seven strains surpassed the 80-bushel mark and all went 60 or better. All strains had test weights of 62 or 63 pounds. C. I. 12146 has a two-year average of 70.8 bushels to the acre; Quanah, 68.2; and C. I. 12505, 68.0 bushels. Comanche has the highest four-year average.

There was some winterkilling in the Ames, Iowa, test but this was largely overcome before harvest so that 12 strains yielded over 45 bushels to the acre and all entries went above 36 bushels. Triumph and C. I. 12147, rather different varieties, tied for first place with a yield of 51.3 bushels to the acre. In the four-year averages, Pawnee is first.

Three tests in Nebraska provided good information on several plant characteristics. At Lincoln all strains were tested in the cold chamber for hardiness. Field survivals also were taken and it is obvious that a fair correlation exists between the two sets of data. Chinch bugs in large numbers attacked the thin plots in the nursery. Following this, leaf rust became heavy on many strains which, coupled with other diseases and a wet, windy June, brought on extensive lodging. Soon after heading, C. I. 12500 became the most impressive entry in the test and remained so to the end of the season. As at Hays, C. I. 12500 significantly outyielded all other entries. It was second in test weight. It has the best two-year record and for the three years tested has exceeded the Kharkof check by 60 per cent. Pawnee has been tested 15 years and surpasses Kharkof by 36.5 percent. At North Platte the varieties lodged early and did not appear attractive. Exceptions to this were Pawnee, Blue Jacket, and C. I. 12505 which stood up rather well. Leaf rust was heavy on many entries but the readings are not closely related to rank in yield. C. I. 12517, C. I. 12515, C. I. 12514, C. I. 12500, and C. I. 12146 comprised the high yielding group for 1949 while the latter strain held the best two-year average. Pawnee in 11 and Comanche in 9 years have outyielded Kharkof 28 and 20 percent, respectively. High yields of good quality grain were made at Alliance. C. I. 12505, C. I. 12142, C. I. 12406, and

yields in a diseases-free test. Seven strains surpassed the 60-bushel mark and all went 30 or better. All showing had test weights of 62 or 63 pounds.

C. I. 12516 has a two-year average of 70.8 bushels to the acre, and C. I. 12538, 68.0 bushels. Comanche has the highest four-year average.

There was some winterkilling in the area, too, test dirt this year overdone before harvest so that 12 strains yielded over 65 bushels to the acre and all entries went above 30 bushels. Triumph and C. I. 12512, rather different varieties, tied for first place with a yield of 71.3 bushels to the acre. In the four-year average, they are listed.

Three tests in Kafirs provided good information on several plant characteristics. At Lincoln all strains were tested in the acid chamber for fertility survivals also were taken and it is obvious that a fair correlation exists between the two sets of tests. Quince Dale in large numbers attacked the thin glume in the variety. Following Dale's lead were Beaver on many strains which, combined with other diseases and a wet, wind June, brought on extensive lodging. Soon after heading C. I. 12500 became the most impressive entry in the test and remained so to the end of the season. As at Ames, C. I. 12500 significantly outyielded all other entries. It was second in test weight. It has the best two-year record and for the three years tested has exceeded the Hegari check by 20 per cent. Twelve kis been tested 15 years and surpassed Hegari by 30.5 percent. Not quite five varieties lodged early and did not appear attractive. Combinations this were Texas, Milo Dwarf, and C. I. 12503 which stood up rather well. Heat-resistant Hegari on many entries but the results are not closely related to rank in yield - C. I. 12515, C. I. 12516, C. I. 12500, and C. I. 12506 comprised the high yielding group for 1940 while this latter strain held the best two-year average. Entries in Ik and Comanche in 9 years have outyielded Hegari 88 and 80 percent, respectively. High yields of good quality grain were made at Hilfiker, C. I. 12500, C. I. 12515, C. I. 12502, and

C. I. 12517 yielded over 50 bushels to the acre. The highest yielding strain lodged least and was shortest. C. I. 12133 has the best five-year record. Of the five strains compared 11 or more years Kharkof exceeds all of them except Pawnee and in this case the margin is under 3 percent.

C. I. 12517 yielded over 50 bushels to the acre. The highest yielding strain lodged least and was shortest. C. I. 12193 has the best five-year record. Of the five strains compared 11 or more years Kharkof exceeds all of them except Pawnee and in this case the margin is under 3 percent.

Table 13 Yield and other data for varieties grown in the uniform yield nursery in cooperative experiments at 14 stations in the hard red winter wheat region in 1949, and yield summaries for various periods.

Chillicothe, Texas
(Four plots)

C. I. No.	Date headed	Leaf rust	Top Growth	Weight per bushel	Average acre yield			No. yrs. Grown	Percent of Kharkof	Rank
					1949	1948-49	1945-49			
		%	%	Lbs.	Bus.	Bus.	Bus.			
12516	5-6	15	110	61	35.4	—	—	1	—	—
11669	5-6	75	100	60	34.5	37.2	30.6	11	129.5	5
12500	5-6	45	100	62	33.9	32.1	—	3	138.8	1
12406	5-2	10	110	60	33.5	32.5	—	2	128.5	6
12511	5-4	2	120	62	33.3	—	—	1	—	—
12145	5-4	5	130	62	33.0	29.6	—	3	128.1	7
12515	5-4	15	110	59	32.5	—	—	1	—	—
12514	5-4	50	110	60	31.4	—	—	1	—	—
12517	5-6	15	110	60	31.2	—	—	1	—	—
12512	5-6	2	130	61	30.5	—	—	1	—	—
12505	5-6	10	110	60	30.3	31.7	—	2	125.3	9
12522	5-12	30	90	61	30.1	—	—	1	—	—
12147	5-6	75	100	55	29.9	29.5	—	3	119.8	10
12504	5-4	T	120	62	29.8	27.6	—	2	109.1	13
12502	5-6	65	120	62	29.4	25.6	—	2	101.2	14
12132	4-30	95	110	62	29.3	34.0	29.9	5	133.3	4
8856	5-2	75	100	63	29.0	30.5	27.8	11	119.5	11
12146	5-6	65	90	59	28.8	31.8	—	3	134.1	3
12513	5-4	20	120	59	28.6	—	—	1	—	—
12518	5-4	95	130	58	26.5	—	—	1	—	—
1442	5-12	75	110	57	25.2	25.3	22.4	11	100.0	15
12133	5-4	95	100	58	25.0	30.0	30.1	5	134.2	2
11673	5-6	65	100	57	24.0	27.2	27.6	11	127.8	8
12142	5-12	85	100	58	22.3	24.8	—	4	95.9	16
6251	5-6	75	110	58	19.8	25.1	23.1	11	110.9	12

Standard error of a difference = 2.19 bus.

Bushland, Texas
six plots

C.I. No.	Date headed	Plant height	Frost injury to leaf	Leaf rust 2/	Weight per bushel	Average acre yield			No. yrs. Grown	Percent of Kharkof	Rank
						1949	1948-49	1947-49			
	May	Ins.	March 1/	%							
12146	6	34	1	60	60.0	42.2	27.8	28.3	3	111.9	2
12147	10	34	1	80	59.0	41.7	27.4	28.0	3	111.0	4
12517	5	33	3	25	61.0	41.5	–	–	1	–	–
11669	7	31	1	75	60.0	39.8	26.3	26.4	11	117.5	1
11693	11	36	1	80	58.0	39.7	26.4	27.3	3	107.9	6
12511	5	34	1+	10	57.0	39.1	–	–	1	–	–
12522	10	40	1+	20	59.0	38.8	–	–	1	–	–
1442	14	40	1	80	57.0	38.4	24.7	25.3	11	100.0	8
12133	4	33	2	85	60.0	38.2	25.8	25.2	3	99.9	9
12505	4	29	2+	25	60.0	38.0	25.9	–	2	105.1	7
8856	4-29	39	1	75	59.0	37.9	24.4	22.6	11	98.6	11
12515	5	33	1	–	60.0	37.8	–	–	1	–	–
12516	6	35	1	25	60.0	37.5	–	–	1	–	–
12132	1	30	1	65	59.0	37.3	25.3	24.2	3	95.8	12
12502	10	39	1	80	61.0	36.8	24.6	–	2	99.6	10
6251	11	38	1	80	60.0	36.7	25.0	25.5	11	111.5	3
11673	6	35	1	65	58.0	36.2	24.3	24.8	11	109.0	5
12406	7	37	1+	20	58.0	36.0	23.2	–	2	93.9	13
12518	5	36	1+	80	59.0	35.7	–	–	1	–	–
12512	8	34	2	5	58.0	35.1	–	–	1	–	–
12514	7	34	1	–	59.0	35.1	–	–	1	–	–
12500	7	33	1+	70	58.0	34.5	21.7	22.9	3	90.5	14
12145	4	32	3	5	57.0	33.2	21.9	22.9	3	90.5	15
12513	7	32	1	–	57.0	32.5	–	–	1	–	–
12504	6	33	2	5	58.0	32.1	20.6	–	2	83.6	16

1/ Grades of injury: 1, little; 5, severe.
2/ From a later planting.
Standard error of a difference = 3.03 bus.

12
60

60

Stillwater, Oklahoma
(Four plots)

C. I. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
12517	5	10	33	14	60.8	32.0	-	-	1	-	-
12515	6	10	34	7	60.3	29.8	-	-	1	-	-
12516	7	10	34	19	60.0	29.5	-	-	1	-	-
12132	4-30	5	31	54	59.9	28.2	26.9	27.6	5	129.1	1
12500	5	10	31	36	58.5	27.7	26.0	-	3	107.3	8
12147	7	11	33	17	58.1	27.5	26.6	-	3	105.5	10
12518	5	10	33	60	59.3	27.3	-	-	1	-	-
11673	5	9	33	35	58.5	27.0	24.7	24.5	11	117.8	3
12146	5	10	33	39	58.6	26.9	27.2	-	3	108.8	6
12133	5	10	31	50	59.3	26.5	26.1	25.0	5	116.7	4
12502	7	11	37	31	62.2	26.4	25.6	-	2	101.4	13
12511	6	10	33	8	59.6	26.4	-	-	1	-	-
8856	1	5	36	40	60.3	25.9	24.9	26.3	16	109.9	5
12504	7	12	34	7	59.0	25.8	25.2	-	2	99.8	15
6251	7	11	34	50	60.0	25.3	26.6	24.0	16	108.2	7
12514	5	10	34	25	58.2	25.2	-	-	1	-	-
12406	6	10	33	14	59.3	25.0	24.7	-	2	97.8	16
11669	6	8	31	48	58.5	25.0	23.8	27.0	13	125.9	2
12145	7	12	31	11	58.6	24.9	24.9	-	3	103.6	11
12522	8	11	35	29	59.1	24.5	-	-	1	-	-
12505	7	11	31	20	59.0	24.5	25.8	-	2	102.2	12
1442	9	11	33	55	58.0	24.4	25.2	21.4	16	100.0	14
12512	7	12	33	5	59.4	23.8	-	-	1	-	-
12513	5	10	33	21	57.8	23.7	-	-	1	-	-
12142	8	11	32	51	57.3	21.8	23.7	-	4	106.8	9

Standard error of a difference = 1.7 bus.

Cherokee, Oklahoma
(Four plots)

C.I. No.	Plant height	Weight per bushel	Average acre yield			No. Yrs. Grown	Percent of Kharkof	Rank
			1949	1948-49	~~Bus.~~			
	Ins.	Lbs.	Bus.	Bus.				
12132	39	56.3	41.7	37.4		3	133.5	1
12406	45	56.7	38.4	36.2		2	133.4	2
12500	43	54.5	36.3	30.0		3	111.3	8
12517	44	51.0	36.2	–		1	–	–
12505	40	53.8	36.1	33.5		2	123.4	3
12511	45	53.3	35.6	–		1	–	–
11669	43	52.8	34.4	31.4		3	116.3	6
12133	42	52.1	33.8	31.7		3	120.7	4
11673	45	51.1	33.7	30.5		3	117.1	5
12522	50	51.3	32.6	–		1	–	–
12502	50	58.1	32.6	31.1		2	114.8	7
12518	43	52.0	32.5	–		1	–	–
12512	45	53.2	31.4	–		1	–	–
12145	43	53.3	30.8	28.7		3	110.5	9
12146	44	50.3	29.7	29.2		3	106.5	11
12147	45	47.4	29.0	29.5		3	110.1	10
12514	45	51.4	28.3	–		1	–	–
8856	44	52.0	27.6	29.3		3	104.1	12
12504	44	52.4	27.1	25.7		2	94.8	16
1442	46	49.5	26.9	27.1		3	100.0	14
12142	43	49.2	25.3	26.1		3	100.5	13
12515	44	49.1	23.2	–		1	–	–
12516	45	52.5	21.9	–		1	–	–
6251	46	49.8	20.1	26.1		3	98.6	15
12513	44	47.6	19.5	–		1	–	–

Standard error of a difference = 3.32 bus.

Woodward, Oklahoma
(Four plots)

C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
	May	June	Ins.	Lbs.	Bus.	Bus.	Bus.			
12505	5	11	38	60.0	50.7	41.8	–	2	120.8	3
12517	6	10	40	62.3	50.3	–	–	1	–	–
12132	3	6	38	61.4	49.3	41.3	35.0	5	124.2	2
11669	6	11	40	60.1	48.9	40.0	32.5	15	126.1	1
12147	8	12	41	59.8	47.8	39.1	–	3	118.3	5
12516	7	12	42	62.2	47.0	–	–	1	–	–
12146	6	11	41	59.8	45.7	39.3	–	3	117.1	6
12406	6	12	42	60.4	44.4	38.4	–	2	111.1	7
11673	6	11	43	60.4	44.2	37.3	31.2	13	118.3	4
12133	6	11	40	61.4	43.9	38.7	31.1	5	110.3	8
12515	6	11	42	61.8	43.6	–	–	1	–	–
8856	3	6	39	62.0	43.5	36.6	32.3	18	106.8	11
12511	7	12	43	59.9	43.1	–	–	1	–	–
12512	6	11	41	61.0	42.6	–	–	1	–	–
12500	5	11	39	60.4	42.0	35.0	–	3	103.9	13
12522	9	12	44	60.9	41.6	–	–	1	–	–
12142	9	13	42	59.5	39.6	34.1	–	4	107.3	10
12518	6	11	40	60.9	39.3	–	–	1	–	–
12504	7	12	44	60.5	38.9	33.5	–	2	97.0	16
6251	9	13	45	61.2	38.5	35.3	29.6	18	104.1	12
1442	10	13	42	59.4	38.5	34.6	28.2	18	100.0	14
12145	6	11	41	60.3	38.3	35.3	–	3	107.8	9
12514	7	12	42	60.2	37.6	–	–	1	–	–
12502	9	14	46	63.1	36.9	33.7	–	2	97.4	15
12513	6	11	41	59.3	36.5	–	–	1	–	–

Standard error of a difference = 2.56 bus.

Manhattan, Kansas
(four plots)

C.I. No.	Date headed	Plant height	Lodging	Leaf rust	Mildew 1/	Loose smut 2/	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
	May	Ins.	%	%			Lbs.	Bus.	Bus.	Bus.			
12406	22	42	28	11	4	1	57.0	38.3	46.9	-	2	117.7	6
12502	22	46	29	90	4	1	60.0	36.5	47.1	-	2	118.2	5
12505	21	42	37	8	4	1	56.3	35.3	47.1	-	2	118.3	4
11673	22	43	42	67	4	T	51.3	34.4	45.3	36.5	13	124.9	3
12133	20	42	25	77	4+	1	54.0	33.5	47.0	39.4	5	128.9	2
12517	21	42	72	22	4	0	53.8	33.3	-	-	1	-	-
11669	21	41	40	92	4	0	53.0	32.8	44.9	41.9	15	136.2	1
12522	24	43	Seg.	Seg.	4	0	56.2	32.6	-	-	1	-	-
6251	23	43	62	80	4	1	57.0	32.4	44.6	33.7	18	111.6	11
12500	20	41	72	70	4	1	56.0	31.9	43.1	-	3	116.3	8
12511	20	41	90	1	3	2	54.8	31.1	-	-	1	-	-
12518	21	44	25	67	4	2	53.0	29.1	-	-	1	-	-
12512	24	42	75	T	3	4	56.2	28.7	-	-	1	-	-
12504	23	41	87	T	3	4	56.5	28.0	37.4	-	2	93.8	16
12147	22	42	75	52	4	1	51.8	27.7	40.2	-	3	106.6	12
12132	14	41	87	95	4	0	54.5	27.6	40.4	35.8	5	116.9	7
12146	19	41	40	87	3	T	51.8	27.2	41.1	-	3	113.0	10
12516	22	42	77	25	4	0	49.5	26.9	-	-	1	-	-
12514	22	44	70	52	4	T	54.3	25.5	-	-	1	-	-
1442	25	42	85	100	4	1	54.0	25.1	39.8	30.6	18	100.0	14
12145	22	40	80	5	3	2	53.8	24.9	37.7	-	3	98.8	15
8856	15	42	97	100	4	0	53.7	22.6	40.8	33.3	18	115.6	9
12515	21	41	72	17	4	0	49.5	22.4	-	-	1	-	-
12142	24	42	60	100	4	0	50.5	20.1	39.0	-	4	103.4	13
12513	22	42	80	57	3	1	49.8	18.0	-	-	1	-	-

1/ 0, 1, 2 = resistant; 3, 4 = susceptible grades

2/ 1 = 1 or 2 infected plants per 8-foot row; 2 = 3 or 4 plants; 4 = 8 or more plants.

Standard error of a difference = 3.46 bus.

4YN

Hays, Kansas
Five plots

C.I. No.	Date headed	Date Ripe	Plant height	Leaf rust	Broken straw	weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. yrs. Grown	Percent of Kharkof	Rank
		June	Ins.	%	%	Lbs.	Bus.	Bus.	Bus.			
12500	5-31	27	33	40	5	55.0	13.1	19.8	-	3	101.1	10
12147	6-2	27	37	60	60	50.0	10.8	24.9	-	3	110.5	5
12406	6-2	27	36	50	5	52.5	10.2	23.2	-	2	101.3	9
12517	6-1	27	35	10	30	49.0	9.4	-	-	1	-	-
12522	6-3	27	37	10	5	52.0	9.3	-	-	1	-	-
11669	6-1	27	36	90	80	52.0	8.3	20.3	26.5	14	127.3	1
12516	6-2	27	36	20	40	47.0	8.3	-	-	1	-	-
12514	6-2	27	35	20	60	49.0	7.8	-	-	1	-	-
12512	6-6	28	38	5	0	50.0	7.6	-	-	1	-	-
12132	5-25	26	34	100	80	46.0	7.6	17.2	26.3	5	102.5	8
12511	6-6	29	37	10	0	48.0	7.5	-	-	1	-	-
12505	6-4	27	36	50	20	50.5	7.4	22.5	-	2	98.5	12
12502	6-3	27	41	90	5	55.0	7.2	22.2	-	2	96.9	13
12515	6-1	27	38	30	80	44.0	6.6	-	-	1	-	-
12133	5-31	27	36	100	50	49.0	6.6	24.4	30.8	5	119.8	3
12142	6-4	27	36	90	25	50.0	6.4	21.5	-	4	90.5	15
1442	6-5	28	36	100	10	49.5	6.4	22.9	25.7	17	100.0	11
11673	5-31	26	35	80	70	46.0	6.1	20.4	27.4	13	120.3	2
8856	5-28	26	38	100	90	47.0	5.1	18.3	27.1	17	111.2	4
6251	6-2	26	37	100	80	48.0	4.9	20.3	23.5	17	108.5	6
12513	6-3	27	35	30	70	48.0	4.3	-	-	1	-	-
12145	6-5	28	34	10	10	47.0	4.2	16.9	-	3	94.2	14
12518	6-2	26	36	100	50	46.5	4.1	-	-	1	-	-
12504	6-6	29	39	5	0	44.0	3.8	16.6	-	2	72.4	16
12146	5-30	27	37	100	80	50.5	9.3	22.2	-	3	103.7	7

Standard error of a difference = 1.4 bus.

Akron, Colorado
Five plots

C.I. No.	Date Headed	Date Ripe	Plant height	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. yrs. Grown	Percent of Kharkof	Rank
	June +31	July +30	Ins.	%	%	Lbs.	Bus.	Bus.	Bus.			
12146	4	16	36	40	5	54.0	27.6	34.7	-	3	103.9	7
8856	4	18	35	80	5	60.0	27.3	27.8	30.5	15	112.7	1
12516	6	19	37	5	5	57.5	26.7	—	—	1	—	—
12406	5	18	36	60	2	59.0	26.0	34.0	-	2	98.7	10
11669	5	18	36	80	5	56.0	26.0	31.7	31.5	13	111.2	2
12505	7	18	33	25	1	57.5	25.8	36.6	-	2	104.5	6
12517	4	16	35	5	20	57.0	25.6	—	—	1	—	—
12500	6	19	34	40	3	59.0	25.3	31.4	-	3	94.4	12
11673	7	19	36	90	10	57.0	24.6	30.6	30.6	12	107.0	4
12147	9	19	37	40	5	56.0	21.6	32.6	-	3	97.6	11
12514	7	19	36	25	T	59.0	21.4	—	-	1	—	—
12512 1/	11	19	33	2	0	59.0	21.1	—	-	1	—	—
12511	9	19	36	5	T	55.5	20.6	—	-	1	—	—
12132	5-31	16	32	90	3	57.0	20.6	27.0	30.6	5	100.2	8
12522	8	19	37	60	5	61.0	20.4	—	—	1	—	—
6251	7	19	37	80	3	61.0	20.0	32.7	29.7	15	108.0	3
1442	10	19	36	80	3	59.0	19.7	34.5	30.5	15	100.0	9
12518	5	18	35	60	1	58.0	18.7	—	—	1	—	—
12515	7	19	35	2	5	58.0	18.6	—	—	1	—	—
12513	7	18	38	40	T	59.0	18.4	—	—	1	—	—
12502	8	19	36	50	10	62.0	18.4	27.7	-	2	80.3	14
12142	10	19	34	80	4	58.0	18.2	31.3	-	4	94.2	13
12504	12	20	34	5	T	58.5	16.9	27.3	-	2	79.1	15
12133	8	18	34	60	5	61.0	16.7	28.4	31.9	5	104.5	5
12145	10	19	34	5	T	56.5	15.4	23.1	-	3	78.0	16

1/ Loose smut 1%.

Standard error of a difference = 3.29 bus.

Ft. Collins, Colorado
(Five plots)

C.I. No.	Date headed	Date Ripe 1/	Plant height	Lodging	Rust Leaf	Rust Stem	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
	June	July	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.			
12505	8		42	60	50	50	62.2	59.0	65.2	-	2	150.4	1
12132	2		40	60	90	10	61.9	58.5	60.4	46.6	5	108.9	9
12133 2/	6		42	20	100	50	62.0	54.7	64.3	51.9	5	121.4	3
11673	7		44	40	100	50	61.0	51.3	59.9	43.2	13	107.4	11
12518 2/	7		44	80	100	25	62.1	48.9	-	-	1	-	-
12502	6		48	20	75	50	63.5	48.4	50.4	-	2	116.3	7
12146	5		42	80	100	15	60.4	47.2	63.9	-	3	121.2	4
11669	7		44	10	90	35	62.0	46.7	51.5	42.5	15	107.1	12
12517	6		40	90	40	35	62.1	45.0	-	-	1	-	-
12522	10		43	100	60	35	61.4	44.1	-	-	1	-	-
12516	8		41	90	60	65	61.7	42.9	-	-	1	-	-
12406	7		42	80	70	5	61.6	42.4	50.9	-	2	117.4	5
12145	8		39	80	5	T	60.1	42.2	58.5	-	3	126.6	2
12500 2/	6		40	40	75	1	60.9	42.0	51.6	-	3	105.4	13
12512 2/	9		42	100	T	1	61.1	40.4	-	-	1	-	-
12515	7		42	90	10	25	61.0	40.1	-	-	1	-	-
6251	8		40	80	100	55	61.4	39.6	47.2	41.7	17	99.4	15
12514 2/	6		44	80	75	T	61.1	38.8	-	-	1	-	-
8856	2		41	60	100	10	62.0	38.6	48.6	37.9	17	95.4	16
12504	9		41	100	T	T	60.9	36.9	49.4	-	2	114.0	8
12147	9		42	80	100	50	60.5	34.8	47.7	-	3	108.4	10
12511	9		41	60	T	20	61.1	33.8	-	-	1	-	-
1442	11		42	70	100	50	57.8	31.7	43.4	42.8	17	100.0	14
12142	10		41	100	100	50	58.6	29.2	52.7	-	4	117.2	6
12513	7		40	100	80	3	60.6	26.0	-	-	1	-	-

Standard error of a difference = 5.32 bus.

1/ All ripe July 16.
3/ Trace of loose smut.

Hesperus, Colorado
(Five plots)
(Irrigated June 1 and July 2)

C.I. No.	Date Headed	Date Ripe	Plant height	Lodging	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1946-49	No. Yrs. Grown	Percent of Kharkof	Rank
	June	Aug.	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
12516	16	10	47	0	63	88.5	—	—	1	—	—
12145	20	11	44	8	62	84.1	68.2	—	3	127.2	4
12515	19	9	50	0	63	82.9	—	—	1	—	—
12406	20	6	44	0	62	82.0	66.5	—	2	135.2	2
12147	17	12	46	48	62	81.8	62.8	—	3	120.3	9
11669	18	9	44	0	62	81.7	66.4	57.9	11	112.9	11
11673	17	10	45	14	63	80.0	64.9	58.4	11	125.1	5
12146	18	11	44	0	63	79.9	70.8	—	3	124.0	6
12518	19	8	44	6	63	79.6	—	—	1	—	—
12504	20	8	50	0	62	77.7	65.8	—	2	133.6	3
12142	23	13	46	56	62	76.8	62.6	55.2	4	123.7	7
12517	17	8	44	0	63	76.3	—	—	1	—	—
12513	17	9	44	0	62	75.6	—	—	1	—	—
12522	23	12	46	0	62	75.6	—	—	1	—	—
12502	18	9	50	0	63	74.9	60.5	—	2	123.0	8
12512	24	9	46	0	62	74.8	—	—	1	—	—
12133	17	9	46	0	62	74.8	64.8	48.9	4	109.5	12
12505	23	10	42	0	62	74.3	68.0	—	2	138.2	1
12132	16	8	45	0	63	73.5	64.2	47.6	4	106.7	13
12511	23	10	45	40	62	70.7	—	—	1	—	—
6251	18	8	44	22	63	70.3	57.1	47.2	11	118.5	10
12514	18	10	47	0	62	69.8	—	—	1	—	—
8856	16	5	44	18	63	65.1	58.1	54.0	11	105.8	14
12500	19	9	44	0	62	64.1	54.9	—	3	96.4	16
1442	23	8	45	26	62	62.4	49.2	44.6	11	100.0	15

Standard error of a difference = 6.76 bus.

Ames, Iowa — Three Plots

C.I. No.	Spring survival	Date Headed	Date Ripe	Plant height	Lodging	Leaf rust		Smut	Weight per bushel	Average acre yield		No. Yrs. Grown	Percent of Kharkof	Rank
	%	May	June	Ins.	%	%	Type 1/	2/ No.	Lbs.	1949 Bus.	1945-49 Bus. 3/			
12132	99	21	26	39	4	60	4	0	61.1	51.3	37.8	4	112.4	4
12147	99	28	29	43	2	20	2	0	60.0	51.3	-	2	110.0	6
12502	99	27	29	45	0	40	2	6	62.9	49.7	-	1	-	-
12522	100	28	30	44	7	10	2	0	61.7	49.6	-	1	-	-
12515	85	27	28	42	5	15	2	0	61.4	49.4	-	1	-	-
12133	100	26	29	40	0	70	3	5	61.0	47.9	37.6	4	111.9	5
12517	90	26	29	40	0	10	2	0	61.9	47.4	-	1	-	-
12505	97	26	29	40	0	5	1	5	59.5	47.4	-	1	-	-
12146	96	27	29	41	9	35	2	0	60.6	47.2	-	2	114.1	3
11669	98	26	27	40	3	50	3	0	60.3	47.2	41.0	9	115.0	2
11673	99	27	28	41	2	35	2	2	59.3	45.3	34.2	9	96.3	12
8856	100	22	26	40	22	50	4	0	61.8	45.2	37.8	9	101.2	8
12500	97	27	28	40	2	20	2	1	61.6	44.6	-	2	103.9	7
6251	97	28	29	42	8	30	3	1	61.6	43.2	35.8	9	99.1	11
1442	99	31	30	41	3	35	2	0	59.3	41.7	33.6	9	100.0	9
12516	96	27	29	41	5	10	1	0	61.9	41.6	-	1	-	-
12514	89	27	28	43	4	10	2	0	59.9	41.3	-	1	-	-
12504	87	28	30	41	2	2	1	11	60.6	40.8	-	1	-	-
12142	100	28	29	39	2	45	2	0	60.1	40.5	-	3	119.8	1
12511	92	28	30	42	10	2	1	5	60.5	39.5	-	1	-	-
12518	99	27	29	39	0	50	3	11	60.7	39.3	-	1	-	-
12512	98	29	30	40	0	2	1	31	60.3	38.4	-	1	-	-
12145	90	27	30	41	7	5	1	3	60.3	38.2	-	2	99.7	10
12513	94	26	28	41	3	15	1	1	60.2	37.9	-	1	-	-
12406	94	27	30	39	0	15	1	7	60.6	36.1	-	1	-	-

1/ 1 = resistant type; 4 = highly susceptible type of reaction.
2/ Loose smut heads per row of 16 feet. 3/ No crop in 1948.

Standard error of a difference = 4.2 bus.

Lincoln, Nebraska
Five plots

C.I. No.		Spring Survival	Cold Chamber Surv. 1/	Date headed	Date Ripe	Plant height	Leaf rust	Lodging 4/	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. yrs. Grown	Percent of Kharkof	Rank
		%	% 3/	May	June	Ins.	%	%	Lbs	Bus.	Bus.	Bus.			
12500		99	49	23	27	43	30	25	59.5	38.4	46.2	-	3	160.5	1
12514	1/	95	19	25	27	44	5	70	56.0	25.1	-	-	1	-	-
12515		94	42	26	27	43	15	80	53.4	24.9	-	-	1	-	-
12132	2/	93	23	20	22	38	75	45	58.0	24.0	35.9	34.1	5	128.9	6
12522		96	30	28	30	47	15	50	57.2	24.0	-	-	1	-	-
12147		98	40	28	28	44	15	60	54.1	21.5	37.3	-	3	136.0	4
12502	2/	99	26	28	30	46	50	60	60.1	21.4	35.9	-	2	136.1	3
12406		90	52	27	7-1	41	3	15	56.2	20.1	34.9	-	2	132.4	5
11669		91	42	26	26	42	70	70	55.2	19.7	37.7	35.5	15	136.5	2
12142		98	43	28	27	44	70	20	51.0	18.5	37.0	-	4	125.4	8
8856	2/	83	21	24	27	42	60	70	57.4	17.9	33.8	33.2	18	126.1	7
11673	2/	92	36	26	27	44	70	70	50.4	17.8	34.2	33.6	13	115.0	13
12517		86	45	28	28	39	5	75	55.0	17.0	-	-	1	-	-
12516		82	24	28	30	42	10	70	53.7	16.8	-	-	1	-	-
12133		91	35	27	29	39	75	80	53.4	14.5	32.5	33.1	5	125.2	10
1442	2/	83	49	6-1	7-2	43	55	40	53.2	13.1	26.4	26.4	18	100.0	16
12146		89	41	28	30	39	60	55	53.7	12.5	33.5	-	3	125.3	9
6251	2/	89	39	30	29	46	55	90	54.0	11.8	26.3	27.4	18	111.1	14
12511		45	27	30	7-4	40	2	15	54.4	11.1	-	-	1	-	-
12513		58	27	29	7-1	41	5	70	52.3	9.7	-	-	1	-	-
12505		49	42	29	7-4	35	5	2	54.6	9.5	31.2	-	2	118.4	12
12518		82	42	29	29	40	75	65	51.0	9.5	-	-	1	-	-
12504	2/	43	25	6-3	7-5	40	2	0	54.0	8.3	28.2	-	2	106.8	15
12512		37	20	6-3	7-5	37	1	2	52.7	5.8	-	-	1	-	-
12145	2/	16	8	31	7-4	35	3	10	50.0	4.5	28.4	-	3	124.6	11

1/ Three replications. 2/ Four replications.
3/ Percentage transformed to degrees. S.E$_d$. 10°.
4/ Mostly broken straw.

Standard error of a difference = 3.1 bus.

North Platte, Nebraska

Three plots

C.I. No.	Date Headed	Date Ripe	Plant height	Lodging	Rust Leaf	Rust Stem 1/	weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. Yrs. Grown	Percent of Kharkof	Rank
	June 30	July 30	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.			
12517	7	12	39	85	60	T	57.4	39.5	–	–	1	–	–
12515	7	10	40	100	40	T	57.2	37.6	–	–	1	–	–
12514	9	11	40	75	30	0	58.1	37.4	–	–	1	–	–
12500	7	12	39	55	80	0	57.5	36.8	36.6	–	3	107.7	10
12146	8	12	39	60	60	0	56.2	35.3	39.1	–	3	121.1	4
11669	9	9	37	5	60	10	57.2	34.2	37.0	37.3	11	128.0	2
12406	7	13	39	15	T	T	58.9	33.8	37.1	–	2	132.8	1
12132	5-31	7	34	60	60	5	57.6	33.1	32.0	30.1	5	92.0	16
12516	8	11	39	95	30	T	58.5	32.9	–	–	1	–	–
12502	8	12	44	0	70	15	61.4	31.1	34.3	–	2	122.8	3
12513	9	8	41	95	60	0	55.1	28.6	–	–	1	–	–
11673	9	9	39	85	50	T	54.2	28.5	33.1	36.5	9	119.6	6
12133	7	12	37	40	80	0	56.7	27.1	32.3	38.1	5	116.4	8
12511	11	15	38	20	T	T	57.5	26.7	–	–	1	–	–
12518	7	11	39	35	80	T	56.5	26.1	–	–	1	–	–
12522	11	13	40	35	50	10	56.5	25.9	–	–	1	–	–
12147	11	10	39	70	50	T	54.5	25.8	34.9	–	3	116.7	7
12504	12	15	37	25	0	T	56.7	25.5	29.4	–	2	105.4	11
12505	8	14	34	5	10	10	57.0	25.2	33.7	–	2	120.6	5
12145	11	14	35	30	T	T	56.3	24.6	29.6	–	3	100.0	15
12512	12	15	36	25	T	T	56.0	23.6	–	–	1	–	–
1442	13	15	40	15	60	2	55.0	21.2	27.9	32.7	12	100.0	14
8856	7	8	39	95	80	T	56.0	21.0	29.5	31.3	12	103.9	12
6251	11	9	39	80	60	T	55.0	16.6	26.7	33.5	12	100.3	13
12142	11	12	38	50	70	25	52.0	15.9	25.7	–	4	116.3	9

Standard error of a difference = 3.99 bus.

Alliance, Nebraska
Three plots

C.I. No.	Date Headed	Date Ripe	Plant height	Lodging	Weight per bushel	Average acre yield 1949	Average acre yield 1948-49	Average acre yield 1945-49	No. yrs. Grown	Percent of Kharkof	Rank
	May	July	Ins.	%	Lbs.	Bus.	Bus.	Bus.			
12505	27	14	46	2	59.4	54.2	43.9	-	2	126.7	2
12142	30	14	50	35	59.3	52.3	47.8	-	4	119.3	3
12406	28	14	50	30	59.4	51.7	45.8	-	2	132.0	1
12517	27	14	49	55	60.9	50.3	-	-	1	-	-
12518	28	14	49	35	60.5	48.1	-	-	1	-	-
12515	27	14	49	90	60.1	46.6	-	-	1	-	-
8856	25	13	48	75	61.6	46.3	39.2	31.7	14	89.3	15
11669	28	13	47	50	59.8	45.9	42.4	32.7	11	102.7	6
12133	27	14	48	20	57.7	45.8	37.6	37.5	5	115.4	4
12145	29	14	47	40	59.2	45.7	41.9	-	3	86.3	16
12516	27	14	48	60	61.2	45.7	-	-	1	-	-
12132	26	13	47	80	61.0	44.2	44.9	31.3	5	96.4	13
12146	28	14	49	60	59.6	44.0	44.9	-	3	96.8	12
6251	29	14	50	85	61.3	43.8	38.4	32.1	14	95.3	14
11673	28	13	48	75	59.1	43.6	40.3	32.9	11	99.0	10
12512	30	14	49	55	59.1	43.3	-	-	1	-	-
12502	6-1	14	53	15	63.3	43.3	38.7	-	2	111.5	5
12511	30	14	49	75	59.4	41.6	-	-	1	-	-
12504	30	14	49	65	59.6	41.6	34.1	-	2	98.3	11
12522	31	14	53	35	58.8	39.7	-	-	1	-	-
12514	28	14	49	75	59.0	39.0	-	-	1	-	-
12147	30	14	51	80	57.0	38.7	41.0	-	3	102.1	7
1442	6-4	14	52	85	58.0	37.7	34.7	32.5	14	100.0	9
12500	27	14	48	25	60.5	37.2	37.2	-	3	100.1	8
12513	27	14	47	95	60.9	34.7	-	-	1	-	-

Standard error of a difference = 3.02 bus.

Begin New Page

STANDARD ERRORS

A summary of the number of replications, average yields, and standard errors for the uniform yield nursery is given in table 14. The procedure for calculating errors is the same as that described for the plot series.

(Table 14 follows)

STANDARD ERRORS

A summary of the number of replications, average yields, and standard errors for the uniform yield nursery is given in table 14. The procedure for calculating errors is the same as that described for the plot series.

(Table 14 follows)

Table 14. Number of plots, average yield, and standard errors for the uniform yield nursery at the various stations in 1949.

State and Station	No. of Plots	Av. yield all entries	Standard error of a			
			Single plot	Difference between means	Mean in	
					Bushels	Per cent
		Bus.	Bus.	Bus.		
Texas:						
Chillicothe	4	29.49	3.10	2.19	1.55	5.26
Bushland	6	37.26	5.25	3.03	2.14	5.74
Oklahoma:						
Stillwater	4	26.18	2.39	1.70	1.20	4.58
Cherokee	4	30.57	4.69	3.32	2.35	7.69
Woodward	4	42.89	3.62	2.56	1.81	4.22
Kansas:						
Manhattan	4	29.02	4.89	3.46	2.45	8.44
Hays	5	7.29	2.21	1.40	.99	13.58
Colorado:						
Akron	5	21.66	5.20	3.29	2.32	10.72
Ft. Collins	5	42.53	8.41	5.32	3.76	8.84
Hesperus	5	75.89	10.69	6.76	4.78	6.30
Iowa:						
Ames	3	44.08	5.14	4.20	2.97	6.73
Nebraska:						
Lincoln 1/	5	16.38	4.91	3.10	2.19	13.39
North Platte	3	28.56	4.89	3.99	2.82	9.88
Alliance	3	44.20	3.69	3.02	2.13	4.82

1/ Analysis based on 18 varieties.

SUMMARY OF NURSERY YIELDS

Yields by stations with state and regional averages are given for 1949 in table 15. The entries are listed in order of decliging average yield based on all 14 stations. Comanche x Blackhull-Hard Federation (C. I. 12517) heads the list with an average of 38.2 bushels to the acre which is 0.6 of a bushel ahead of Triumph and 0.7 of a bushel ahead of Pawnee, second and third place varieties, respectively. Marquillo-Oro x Pawnee (C. I. 12505) and Marquillo-Oro x Oro-Tenmarq (C. I. 12406) tied for fourth place with a yield of 37.0 bushels. The newcomer (C. I. 12517) was developed at Woodward; it has considerable bunt and leaf rust resistance but is susceptible to stem rust. In 1948, Martin-Tenmarq x Chiefkan (C. I. 12146) ranked first in the regional averages and ranked seventh in the current season. C. I. 12505 ranked third last year. C. I. 12406 was about mid-way down the list along with Pawnee in 1948, whereas C. I. 12500 which ranks sixth in 1949 was next to last in 1948. Of the strains having the most leaf rust resistance, the best ranking one was C. I. 12511 which occupied 17th place. Therefore in the region as a whole, tolerance and resistance to many hazards in addition to leaf rust along with inherent capacity to produce grain in this climate must be bred into our wheats to give them stability and wide adaptation.

The averages and ranks by states show how the strains behaved in small segments of the region. It is apparent that such groupings of stations gives a different rank of entries than the region as a whole. Correlation coefficients presented in table 18 show the fallacy of grouping stations by states; hence the state averages are not a practical basis for making recommendations to farmers in many cases.

Sixteen strains were grown in the uniform yield nursery in both of the years 1948 and 1949. Data on yield for the two-year period is shown by stations and states in table 16. The strains are listed in order of their average at the 13 stations. Marquillo-Oro x Pawnee (C. I. 12505) and Martin-Tenmarq x Chiefkan

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(C. I. 12146) were the highest in yield in the region as a whole followed by Marquillo-Oro x Oro-Tenmarq (C. I. 12406). Pawnee and Triumph ranked fourth and fifth. Kharkof was lowest in yield being seven bushels to the acre or 18 percent below C. I. 12505. The Blackhulls and C. I. 12504 also ranked toward the low end of the range. The state averages show the highest yields were made in Texas by Pawnee and C. I. 12146, in Oklahoma by Triumph and C. I. 12505, in Kansas by C. I. 12133 and C. I. 12406, in Colorado by C. I. 12146 and ~~C. I.~~ ~~12505 and~~ C. I. 12505, and in Nebraska by C. I. 12500 and C. I. 12406. Lowest state averages went to Kharkof in Colorado and Nebraska, while C. I. 12504 was lowest in Texas and Kansas, and C. I. 12142 was lowest in Oklahoma.

SUMMARY OF AGRONOMIC DATA

In table 17 are the 1949 agronomic data other than yield for the uniform yield nursery. The entries are arranged according to decreasing average test weight. Blue Jacket, ~~the Blackhulls, and C. I. 12517~~ led in test weight and surpassed some of the varieties by more than 5 pounds to the bushel.

Triumph and Early Blackhull were the earliest to head and ripen. In plant height C. I. 12505, Triumph, and Pawnee were shortest and gave a good yield in the region. Blue Jacket and Orienta were tallest. ~~Strength of straw readings~~ Data on lodging showed that Blue Jacket, Pawnee, and C. I. 12500 were ~~strongest~~ least subject to lodging.

Leaf rust readings indicated that the Fronteira double crosses (C. I. 12504, 12511, and 12512) were most resistant to this disease while the Marquillo hybrids Quanah and showed moderate resistance along with certain strains from Woodward. Several varieties formerly resistant appeared completely susceptible at many stations. Stem rust was too light for a critical evaluation of the varieties but those formerly demonstrated as being resistant continued to perform as before.

Table 15. Summary of the average yields in bushels per acre of the 25 varieties grown as a uniform nursery at 14 stations in the hard winter wheat region in 1949 with state averages.

Variety	C.I. No.	Texas				Oklahoma					Kansas			
		Chillicothe	Bushland	Av.	Rank	Stillwater	Cherokee	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank
Comanche X Blk.-Md.Fed.	12517	31.2	41.5	36.4	3	32.0	36.2	50.3	39.5	2	33.3	9.4	21.4	4
Triumph	12132	29.3	37.3	33.3	13	28.2	41.7	49.3	39.7	1	27.6	7.6	17.6	15
Pawnee	11669	34.5	39.8	37.2	1	25.0	34.4	48.9	36.1	4	32.8	8.3	20.6	7
MQ0.-Oro X Pawnee	12505	30.3	38.0	34.2	10	24.5	36.1	50.7	37.1	3	35.3	7.4	21.4	5
MQ0.-Oro X Oro-Ta.	12406	33.5	36.0	34.8	8	25.0	38.4	44.4	35.9	5	38.3	10.2	24.3	1
Nebr. 60 X Med.-Hope	12500	33.9	34.5	34.2	11	27.7	36.3	42.0	35.3	6	31.9	13.1	22.5	2
Mt.-Ta. X Chiefkan	12146	28.8	42.2	35.5	6	26.9	29.7	45.7	34.1	11	27.2	9.3	18.3	13
Blk.-Oro X Pawnee	12516	35.4	37.5	36.5	2	29.5	21.9	47.0	32.8	14	26.9	8.3	17.6	16
Comanche	11673	24.0	36.2	30.1	24	27.0	33.7	44.2	35.0	7	34.4	6.1	20.3	8
Md. Federation Hybrid	12515	32.5	37.8	35.2	7	29.8	23.2	43.6	32.2	17	22.4	6.6	14.5	22
Blue Jacket	12502	29.4	36.8	33.1	15	26.4	32.6	36.9	32.0	18	36.5	7.2	21.9	3
Mt.-Ta. X Kharkof	12147	29.9	41.7	35.8	5	27.5	29.0	47.8	34.8	9	27.7	10.8	19.3	10
Oriental	12522	30.1	38.8	34.5	9	24.5	32.6	41.6	32.9	13	32.6	9.3	21.0	6
Chiefk. X Oro-Ta.	12133	25.0	38.2	31.6	19	26.5	33.8	43.9	34.7	10	33.5	6.6	20.1	9
do	12518	26.5	35.7	31.1	20	27.3	32.5	39.3	33.0	12	29.1	4.1	16.6	18
Comanche X Med.-Hope	12514	31.4	35.1	33.3	14	25.2	28.3	37.6	30.4	21	25.5	7.8	16.7	17
29-34-275 D. Cr.	12511	33.3	39.1	36.2	4	26.4	35.6	43.1	35.0	8	31.1	7.5	19.3	11
Early Blackhull	8856	29.0	37.9	33.5	12	25.9	27.6	43.5	32.3	16	22.6	5.1	13.9	23
29-34-275 D.Cr.	12512	30.5	35.1	32.8	17	23.8	31.4	42.6	32.6	15	28.7	7.6	18.2	14
Quanah	12145	33.0	33.2	33.1	16	24.9	30.8	38.3	31.3	19	24.9	4.2	14.6	21
29-34-275 D.Cr.	12504	29.8	32.1	31.0	21	25.8	27.1	38.9	30.6	20	28.0	3.8	15.9	19
Cheyenne X Turkey	12142	22.3	39.7	31.0	22	21.8	25.3	39.6	28.9	23	20.1	6.4	13.3	24
Blackhull	6251	19.8	36.7	28.3	25	25.3	20.1	38.5	28.0	24	32.4	4.9	18.7	12
Kharkof	1442	25.2	38.4	31.8	18	24.4	26.9	38.5	29.9	22	25.1	6.4	15.8	20
Comanche X Med.-Hope	12513	28.6	32.5	30.6	23	23.7	19.5	36.5	26.6	25	18.0	4.3	11.2	25

Variety	C.I. No.	Colorado					Iowa		Nebraska					Average for 14 Stations
		Akron	Ft. Collins	Hesperus	Av.	Rank	Ames	Rank	Lincoln	North Platte	Alliance	Av.	Rank	
Comanche X Blk.-Hd. Fed.	12517	25.6	45.0	76.3	49.0	9	47.4	7	17.0	39.5	50.3	35.6	3	38.2
Triumph	12132	20.6	58.5	73.5	50.9	6	51.3	1	24.0	33.1	44.2	33.8	5	37.6
Pawnee	11669	26.0	46.7	81.7	51.5	5	47.2	10	19.7	34.2	45.9	33.3	7	37.5
Mdo.-Oro X Pawnee	12505	25.8	59.0	74.3	53.0	1	47.4	8	9.5	25.2	54.2	29.6	13	37.0
Mdo.-Oro X Oro-Tq.	12406	26.0	42.4	82.0	50.1	7	36.1	25	20.1	33.8	51.7	35.2	4	37.0
Nebr. 60 X Med.-Hope	12500	25.3	42.0	64.1	43.8	17	44.6	13	38.4	36.8	37.2	37.5	1	36.3
Mt.-Tq. X Chieftan	12146	27.6	47.2	79.9	51.6	4	47.2	9	12.5	35.3	44.0	30.6	10	36.0
Blk.-Oro X Pawnee	12516	26.7	42.9	88.5	52.7	2	41.6	16	16.8	32.9	45.7	31.8	9	35.8
Comanche	11673	24.6	51.3	80.0	52.0	3	45.3	11	17.8	28.5	43.6	30.0	11	35.5
Hd. Federation Hybrid	12515	18.6	40.1	82.9	47.2	11	49.4	5	24.9	37.6	46.6	36.4	2	35.4
Blue Jacket	12502	18.4	48.4	74.9	47.2	12	49.7	3	21.4	31.1	43.3	31.9	8	35.2
Mt.-Tq. X Kharkof	12147	21.6	34.8	81.8	46.1	15	51.3	2	27.5	25.8	38.7	28.7	16	35.0
Orienta	12522	20.4	44.1	75.6	46.7	14	49.6	4	24.0	25.9	39.7	29.9	12	34.9
Chiefk. X Oro-Tq.	12133	16.7	54.7	74.8	48.7	10	47.9	6	14.5	27.1	45.8	29.1	14	34.9
do	12518	18.7	48.9	79.6	49.1	8	39.3	21	9.5	26.1	48.1	27.9	18	33.2
Comanche X Med.-Hope	12514	21.4	38.8	69.8	43.3	20	41.3	17	25.1	37.4	39.0	33.8	6	33.1
29-34-275 D.Cr.	12511	20.6	33.8	70.7	41.7	22	39.5	20	11.1	26.7	41.6	26.5	19	32.9
Early Blackhull	8856	27.3	38.6	65.1	43.7	19	45.2	12	17.9	21.0	46.3	28.4	17	32.4
29-34-275 D.Cr.	12512	21.1	40.4	74.8	45.4	16	38.4	22	5.8	23.6	43.3	24.2	23	31.9
Quanah	12145	15.4	42.2	84.1	47.2	13	38.2	23	4.5	24.6	45.7	24.9	21	31.7
29-34-275 D.Cr.	12504	16.9	36.9	77.7	43.8	18	40.8	18	8.3	25.5	41.6	25.1	20	30.9
Cheyenne X Turkey	12142	18.2	29.2	76.8	41.4	23	40.5	19	18.5	15.9	52.3	28.9	15	30.5
Blackhull	6251	20.0	39.6	70.3	43.3	21	43.2	14	11.8	16.6	43.8	24.1	24	30.2
Kharkof	1442	19.7	31.7	62.4	37.9	25	41.7	15	13.1	21.2	37.7	24.0	25	29.5
Comanche X Med.-Hope	12513	18.4	26.0	75.6	40.0	24	37.9	24	9.7	28.6	34.7	24.3	22	28.1

Table 16. Summary of 2-year averages in bushels per acre for varieties grown in uniform yield nurseries at 13 stations in 1948 and 1949.

Variety	C.I. No.	Texas				Oklahoma					Kansas			
		Chillicothe	Bushland	Av.	Rank	Stillwater	Cherokee	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank
Mao.-Oro X Pawnee	12505	31.7	25.9	28.8	4	25.8	33.5	41.8	33.7	2	47.1	22.5	34.8	3
MT.-Tq. X Chiefkan	12146	31.8	27.8	29.8	2	27.2	29.2	39.3	31.9	5	41.1	22.2	31.7	9
Mao.-Oro X Oro-Tq.	12406	32.5	23.2	27.9	6	24.7	36.2	38.4	33.1	3	46.9	23.2	35.1	2
Pawnee	11669	37.2	26.3	31.8	1	23.8	31.4	40.0	31.7	6	44.9	20.3	32.6	6
Triumph	12132	34.0	25.3	29.7	3	26.9	37.4	41.3	35.2	1	40.4	17.2	28.8	14
Chiefkan X Oro-Tq.	12133	30.0	25.8	27.9	7	26.1	31.7	38.7	32.2	4	47.0	24.4	35.7	1
Comanche	11673	27.2	24.3	25.8	10	24.7	30.5	37.3	30.8	8	45.3	20.4	32.9	5
MT.-Tq. X Kharkof	12147	29.5	27.4	28.5	5	26.6	29.5	39.1	31.7	7	40.2	24.9	32.6	7
Nebr. 60 X Med.-Hope	12500	32.1	21.7	26.9	9	26.0	30.0	35.0	30.3	9	43.1	19.8	31.5	10
Blue Jacket	12502	25.6	24.6	25.1	13	25.6	31.1	33.7	30.1	11	47.1	22.2	34.7	4
Cheyenne X Turkey	12142	24.8	26.4	25.6	12	23.7	26.1	34.1	28.0	16	39.0	21.5	30.3	12
Quanah	12145	29.6	21.9	25.8	11	24.9	28.7	35.3	29.6	12	37.7	16.9	27.3	15
Early Blackhull	8856	30.5	24.4	27.5	8	24.9	29.3	36.6	30.3	10	40.8	18.3	29.6	13
Blackhull	6251	25.1	25.0	25.1	14	26.6	26.1	35.3	29.3	13	44.6	20.3	32.5	8
29-34-275 D. Cr.	12504	27.6	20.6	24.1	16	25.2	25.7	33.5	28.1	15	37.4	16.6	27.0	16
Kharkof	1442	25.3	24.7	25.0	15	25.2	27.1	34.6	29.0	14	39.8	22.9	31.4	11

Variety	C.I. No.	Colorado					Nebraska					2-year average for 13 Stations
		Akron	Ft. Collins	Hesperus	Av.	Rank	Lincoln	North Platte	Alliance	Av.	Rank	
Mao.-Oro X Pawnee	12505	36.0	65.2	68.0	56.4	2	31.2	33.7	43.9	36.3	8	39.0
Mt.-Tq. X Chiefkan	12146	34.7	63.9	70.8	56.5	1	33.5	39.1	44.9	39.2	3	38.9
Mao.-Oro X Oro-Tq.	12406	34.0	50.9	66.5	50.5	5	34.9	37.1	45.8	39.3	2	38.0
Pawnee	11669	31.7	51.5	66.4	49.9	7	37.7	37.0	42.4	39.0	4	37.7
Triumph	12132	27.0	60.4	64.2	50.5	6	35.9	32.0	44.9	37.6	6	37.5
Chiefkan X Oro-Tq.	12133	28.4	64.3	64.8	52.5	3	32.5	32.3	37.6	34.1	12	37.2
Comanche	11673	30.6	59.9	64.9	51.8	4	34.2	33.1	40.3	35.9	10	36.4
Mt.-Tq. X Kharkof	12147	32.6	47.7	62.8	47.7	10	37.3	34.9	41.0	37.7	5	36.4
Nebr. 60 X Med.-Hope	12500	31.4	51.6	54.9	46.0	13	46.2	36.6	37.2	40.0	1	35.8
Blue Jacket	12502	27.7	50.4	60.5	46.2	12	35.9	34.3	38.7	36.3	9	35.2
Cheyenne X Turkey	12142	31.3	52.7	62.6	48.9	9	37.0	25.7	47.8	36.8	7	34.8
Quanah	12145	23.1	58.5	68.2	49.9	8	28.4	29.6	41.9	33.3	13	34.2
Early Blackhull	8856	27.8	48.6	58.1	44.8	15	33.8	29.5	39.2	34.2	11	34.0
Blackhull	6251	32.7	47.2	57.1	45.7	14	26.3	26.7	38.4	30.5	15	33.2
29-34-27.5 D.Cr.	12504	27.3	49.4	65.8	47.5	11	28.2	29.4	34.1	30.6	14	32.4
Kharkof	1442	34.5	43.4	49.2	42.4	16	26.4	27.9	34.7	29.7	16	32.0

Table 17. Summary of agronomic data other than yield for the varieties grown in the uniform yield nursery in 1949.

Variety	C.I. No.	Spring survival	Date Headed	Date Ripe	Av. Height	Lodging	Rust Leaf	Rust Stem	Weight per bushel
		%	May	July	Ins.	%	%	%	Lbs.
Number of stations.....		2	13	9	13	8	10	3	14
Blue Jacket	12502	99	26	5	45	16	64	25	61.3
Nebr. 60 x Med.-Hope	12500	98	24	4	39	28	51	1	59.0
Mqo.-Oro x Oro-Tq.	12406	92	25	5	40	22	25	2	58.7
Early Blackhull	8856	92	21	2	41	66	76	5	58.5
Triumph	12132	96	19	1	38	52	78	6	58.5
Orienta	12522	98	28	5	43	41	31	17	58.4
Com. x Blk.-Nd. Fed.	12517	88	24	4	39	51	21	18	58.2
Mqo.-Oro x Pawnee	12505	73	25	5	38	16	22	20	58.0
Blackhull	6251	93	26	4	42	63	71	19	58.0
Blk.-Oro x Pawnee	12516	89	25	5	41	55	22	24	57.8
29-34-275 D. Cr.	12512	68	28	6	40	32	2	T	57.8
Pawnee	11669	95	25	3	39	32	73	17	57.8
Chiefk. x Oro-Tq.	12133	96	24	4	39	29	79	18	57.7
Com. x Med.-Hope	12514	92	25	4	41	54	28	T	57.7
29-34-275 D. Cr.	12511	69	26	6	40	39	4	7	57.5
do	12504	65	27	6	41	35	3	T	57.5
Chiefk. x Oro-Tq.	12518	90	25	4	40	37	82	9	57.2
Nd. Fed. Hybrid	12515	90	24	4	41	65	14	10	57.0
Mt.-Tq. x Chiefk.	12146	93	24	5	40	48	65	7	57.0
Quanah	12145	53	26	6	38	33	5	T	56.9
Kharkof	1442	91	30	6	41	43	64	18	56.3
Com. x Med.-Hope	12513	76	25	4	40	64	33	1	56.3
Comanche	11673	96	25	4	41	50	66	20	56.2
Mt.-Tq. x Kharkof	12147	99	26	5	41	59	51	18	56.1
Cheyenne x Turkey	12142	99	28	5	40	44	77	26	56.0

INTERSTATION CORRELATIONS

Yield data from the various stations have been correlated to show the degree of agreement in varietal performance at the different points. This was undertaken by the previous coordinator and has now been completed for the period 1932 to 1947. Average correlations are presented in table 18. Each r value represents the average relationship between the same varieties grown at both stations in the years involved. It will be noted that all of the values except six are positive. All values greater than .208 are highly significant and many smaller than this are significant. Hesperus and Ft. Collins show the poorest correlations with the other stations whereas Stillwater, Woodward, Manhattan, Hays, and Lincoln show fairly good correlations among themselves and the other stations. Denton correlates well with the eastern stations. Detailed presentation of this study is being prepared for publication.

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Table 18 Average correlation coefficients of grain produced by strains of winter wheat included in the uniform yield nursery as grown at 14 stations, 1932 & 1947.

Stations	Denton	Chillicothe	Bushland	Stillwater	Woodward	Manhattan	Hays	Akron	Ft. Collins	Hesperus	Ames	Lincoln	North Platte	Alliance
Denton		.437	.191	.464*	.185*	.395*	.455*	.269*	.009*	-.075	.041	.323*	.167	.033*
Chillicothe			.148	.252	.221	.367	.317	.073	-.032	-.042	.023	.195	-.010	.067
Bushland				.106	.256	.232	.391	.273	.148	.106	.107	.201	.379	.270
Stillwater					.411*	.411*	.413*	.271*	.019*	-.007	.355	.385*	.097	.162*
Woodward						.388*	.183*	.330*	.132*	-.013	.306	.241*	.245*	.320*
Manhattan							.354*	.259*	.038*	.112	.211	.386*	.163	.164*
Hays								.347*	.069*	.022	.104	.346*	.166	.096*
Akron									.206*	.074	.262	.246*	.335	.234*
Ft. Collins										.074	.186	.083*	.296*	.238*
Hesperus											.074	.099	.377	.132
Ames												.394	.277	.301
Lincoln													.270*	.188*
North Platte														.412
~~Alliance~~														

Note: Averages are for 5 ~~or more~~ to nine years, unless starred. Level of significance for a 5-year average at the 5% point is .159 and 1% point is .208

Starred averages are for 10 or more years. Level of significance for a 10-year average at the 5% point is .113 and 1% point is .148.

UNIFORM WINTERHARDINESS NURSERY

Two winterhardiness nurseries are grown in the region on a uniform basis so far as entries go. The one called the supplementary winterhardiness nursery contained 100 strains and varieties this year, submitted mostly by breeders in central and southern states for hardiness tests only. Duplicate rows of each entry were sown at Alliance, Colby, Akron, Brookings, St. Paul, and Moccasin. Usable data were obtained at the latter three stations, summaries were prepared and sent to breeders early enough in the season to be used when choosing strains for advancement. No details of this experiment are presented in this report.

The second nursery, called the uniform winterhardiness nursery, was composed of 30 strains of special interest to central and northern breeders. It was sown at Alliance, Laramie, St. Paul, Waseca, Brookings, Dickinson, Havre, and Lethbridge mostly in three replicated rod-row plots per station. The Havre test failed. Data from these plantings are reported in table 19. Six stations reported winterkilling. Wheats surviving best on the average were Yogo, Minter, C. I. 12506, Iohardi, C. I. 12704, C. I. 12519, C. I. 11726, and Minturki. Least hardy were N. 456446, and N. 456812. Three stations gave weight per bushel of grain harvested and it will be noted that only four entries averaged 60 pounds or heavier. The same three stations reported yields. N. 422123, C. I. 12142, Kharkof, Minturki, and C. I. 12506 came off with the highest 3-station average and C. I. 12500 the lowest. Other data appear in the table also.

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Table 19 Survivals and other data recorded on strains of wheat tested in the uniform winterhardiness nursery at 7 stations in the northern region (three replications at each station)

Variety	C.I. or Sel. No.	Spring Survival							Date headed	Plant height	Lodging	Leaf rust		Weight per bushel				Average acre		
		Laramie	St. Paul	Wasseca	Brookings	Dickinson	Lethbridge	Av.	Av.	Av.	Alliance	Laramie	Brookings	Alliance	Laramie	Brookings	Av.	Alliance	Laramie	Bro...
		%	%	%	%	%	%	%	1/	Ins. 1/	%		%	Lbs.	Lbs.	Lbs.	Lbs	Bus.	Bus.	Bus
Hope X Minturki 2	12506	89	67	42	97	11	85	65.2	15	41	10	1	70	59.7	61.6	55	58.8	40.6	49.1	33.
Nebred	10094	92	28	55	90	2	58	54.0	12	40	70	2	80	59.9	63.1	57	60.0	42.4	43.4	32.
Chiefkan X Cheyenne	N.422121	86	33	17	67	6	73	47.0	12	39	50	5	60	60.3	63.5	61	61.6	42.1	47.2	32.
do	N.422123	95	65	34	80	8	79	60.2	13	38	40	5	60	59.4	63.2	57	59.9	46.1	61.1	29.
Kharkof	1442	76	13	33	77	3	62	44.0	15	41	85	2	60	58.0	(62.1)	58	59.4	37.7	56.5	29
Minter	12138	72	82	67	87	18	84	68.3	16	41	30	1	50	59.6	61.0	56	58.9	37.9	56.4	28
Marmin X H44-Minh.	12508	90	62	43	95	11	81	63.7	16	41	35	3	70	59.9	62.5	54	58.8	38.9	51.3	27
do	12520	81	73	38	98	9	71	61.5	17	43	35	5	70	58.9	60.4	56	58.4	41.1	52.0	26
Iohardi	12510	76	78	67	85	18	63	64.5	13	43	20	1	80	61.5	61.0	57	60.5	46.5	38.6	27
Nebr. 60 X Med.-Hope	12500	87	27	38	50	3	61	44.3	11	36	25	4	50	60.5	61.1	58	59.9	37.2	31.8	23
Minturki	6155	85	67	49	93	6	78	63.0	16	42	50	3	80	57.9	61.8	54	57.9	38.1	59.5	23
Yogo	8033	92	73	67	95	18	84	71.5	16	43	60	1	50	58.0	62.4	54	58.1	32.9	59.4	23
Minhardi	5149	65	47	50	98	13	68	56.8	17	42	20	4	80	59.0	62.2	52	57.7	41.2	54.7	24
Hope X Cheyenne 2	N.451636	91	12	27	53	11	39	38.8	12	36	35	3	50	56.7	63.2	56	58.6	37.0	49.6	23
H44 X Minturki 2	12532	79	53	47	95	14	88	62.7	16	42	25	1	70	59.5	62.2	53	58.2	37.0	47.0	24
H44 X Minturki 3	12704	69	98	55	93	6	66	64.5	16	42	20	3	80	59.8	60.7	55	58.5	39.8	52.3	24
do	12519	70	88	49	90	15	71	63.6	16	39	25	5	80	58.4	61.5	53	57.6	41.8	51.6	21
do	M.2784	62	91	58	53	11	69	57.3	16	42	15	2	80	59.5	62.1	54	58.5	36.9	47.3	21
Turkey X Cheyenne	N.P.40672	64	42	60	47	16	75	50.7	12	37	30	5	80	59.7	60.9	56	58.9	50.0	39.0	24
Kanred X Minhardi	11726	77	85	47	92	12	74	64.5	16	41	10	3	80	59.2	63.1	56	59.4	42.0	44.6	22
Cheyenne X Turkey	12142	89	57	55	48	7	39	49.2	14	38	35	1	80	59.3	60.8	56	58.7	52.3	59.8	19
Martin X Tenmara 3	11824	81	23	0	33	3	63	33.8	13	39	60	5	50	57.3	62.0	53	57.4	39.9	52.7	19
Hope-Tk. X Cheyenne	N.P.44541	88	15	0	43	3	67	36.0	13	38	60	2	60	56.2	62.1	55	57.8	42.1	47.7	20
Hope-Tk. X Turkey	N.456446	67	5	0	10	6	34	20.3	11	36	35	2	50	61.9	63.0	59	61.3	50.7	46.8	18
Hope-Tk. X Cheyenne	N.P.44552	91	23	17	20	5	42	33.0	14	36	5	4	50	56.6	62.6	52	57.1	40.0	57.7	12
Nebred X Hope-Tk.	N.456812	91	20	0	9	6	31	26.0	10	34	35	2	80	59.4	63.1	51	57.8	52.1	51.5	10
Hope X Cheyenne 2	N.451558	89	17	24	23	12	50	35.8	14	38	10	4	50	58.9	62.4	54	58.4	42.3	49.5	14
do	N.45904	86	22	33	13	6	30	31.7	13	34	25	3	80	60.7	63.1	53	58.9	47.2	40.7	12
Turkey X Ora Mont. 208		85	30	48	42	2	58	44.2	15	38	95	5	80	56.0	62.1	51	56.4	28.1	57.0	16
do 12705		77	43	80	25	4	73	50.3	16	38	70	4	80	56.6	62.2	51	56.6	33.6	63.2	14

1/ Alliance, Laramie and Brookings.

2/ Standard error of a difference at Alliance 3.02 bus., Laramie 7.9 bus. and Brookings 2.85 bus.

DATA FROM THE DISEASE NURSERIES

~~There is attached to this report a summary~~ Summaries of the results obtained in the uniform bunt nursery which was sown at 8 stations ~~likewise~~ and the uniform rust nursery ~~was~~ grown at several locations in this region ~~and the results obtained are attached to this report.~~ will appear in separate reports.

DATA FROM THE QUALITY LABORATORY

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

DATA FROM THE DISEASE NURSERIES

There is attached to this report a summary of the results obtained in the uniform bunt nursery which was sown at 3 stations. Likewise, the uniform rust nursery was grown at several locations in this region and the results obtained are attached to this report.

DATA FROM THE QUALITY LABORATORY

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