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Bureau of Plant Industry,
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COMPARISON OF
WINTER WHEAT VARIETIES GROWN IN COOPERATIVE
PLOT AND NURSERY EXPERIMENTS IN THE
HARD RED WINTER WHEAT REGION
IN 1943

Lincoln, Nebraska
January 15, 1944

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By
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Division of Cereal Crops and Diseases

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^{1/} The writer wishes to express his appreciation to Dorothy M. Wilson and Mary M. Burbank, Agents, of Lincoln, Nebr., for their assistance in assembling the data, making the computations, and stencilling this summary.

EXPERIMENTS IN 1943

The 1943 crop was the thirteenth harvested since the cooperative winter wheat improvement program has been in operation. Plans have not been altered greatly since the beginning, but each year changes are made in the lists of varieties tested in both plot and nursery experiments. The cooperating stations have changed from time to time owing to reorganization of State and Federal work.

A change that has been made at a few stations is the substitution of rod-row plots for the larger plots for yield tests. At the stations where the change has been made, 3-row plots are used with the center row being cut for yield. The number of replications has been increased to seven or eight and randomized complete block designs used, since the number of varieties in these tests was relatively small. As yet there is no unanimous opinion, either for or against the idea, but in some cases it was the rod-row plot or nothing, due to shortage of help.

This report is a summary of the 1943 data from all cooperating stations as well as a summary of yield data for various periods ending in 1943. An attempt has been made to summarize the yields for the entire period during which the varieties have been grown, by expressing the average for each variety in terms of Kharkof check grown during the same years. The cooperating agencies, stations, and personnel concerned in these experiments are as follows:

COOPERATING AGENCIES, STATIONS, AND PERSONNEL

(The asterisk (*) indicates Government field stations)

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING:

Division of Cereal Crops and Diseases

Wheat Investigations
Hard Red Winter Wheat
Rust and Smut
Milling and Baking

M. A. McCall
S. C. Salmon
K. S. Quisenberry
C. O. Johnston
M. A. Barmore
K. F. Finney

TEXAS AGRICULTURAL EXPERIMENT STATION:

Agronomy (Corn and Small Grains)

College Station Agricultural Exp. Station
Denton Substation No. 6
Chillicothe Substation No. 12

Bushland Amarillo Experiment Station

C. H. McDowell
E. S. McFadden
I. M. Atkins
J. R. Quinby
I. M. Atkins
I. M. Atkins

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Field Crops and Soils

*Lawton U. S. Dry Land Field Station²/₁
Stillwater A. & M. College
*Woodward Southern Great Plains Field Sta.²/₁

Goodwell Panhandle Agr. Exp. Station

H. F. Murphy
W. M. Osborn
C. B. Cross
V. C. Hubbard
J. B. Sieglinger
O. Clay Terry

Marvin McKee

KANSAS AGRICULTURAL EXPERIMENT STATION:

Agronomy

Manhattan

Kansas State College

Hays

Ft. Hays Branch Exp. Station

Colby

Colby Branch Station

R. I. Throckmorton

H. H. Laude, L.P. Reitz,

E. G. Heyne

A. F. Swanson

E. H. Coles

COLORADO AGRICULTURAL EXPERIMENT STATION:

Agronomy

*Akron

U. S. Dry Land Field Station^{2/}

Fort Collins

State Agricultural College

Hesperus

Fort Lewis Substation

Alvin Kezer

D.W. Robertson, J.F.

Brandon, S.F. Callahan

D. W. Robertson

D. W. Koonce

IOWA AGRICULTURAL EXPERIMENT STATION:

Ames

Iowa State College

L.C. Burnett, H.C. Murphy

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Agronomy (Experimental)

Lincoln

Agricultural Experiment Station

North Platte

North Platte Substation

Alliance

Box Butte Experiment Farm

Valentine

Valentine Substation

T. A. Kiesselbach

K. S. Quisenberry

O. J. Webster, L.L. Zook

Robert Pahl

E. M. Brouse

WYOMING AGRICULTURAL EXPERIMENT STATION:

Agronomy

Laramie

Agricultural Experiment Station

*Sheridan

U. S. Dry Land Field Station^{2/}

A. F. Vass

Dayton Klingman

R. S. Towle

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy

Brookings

Agricultural Experiment Station

A. N. Hume

J. E. Grafius

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy and Plant Genetics

St. Paul

University Farm

Waseca

Southeast Experiment Station

Grand Rapids

H. K. Hayes

E. R. Ausemus

R. E. Hodgson

E. R. Ausemus

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy

Dickinson

Dickinson Substation

T. E. Stoa

R. W. Smith

MONTANA AGRICULTURAL EXPERIMENT STATION:

Agronomy

Bozeman

Montana Experiment Station

Moccasin

Judith Basin Branch Station

Havre

Northern Montana Branch Station

A. H. Post

R. H. Bamberg

R. H. Bamberg

J. J. Sturm

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

ACCESSION NUMBERS ASSIGNED

The following C. I.^{3/} numbers have been assigned to wheats of the Region during the past year.

<u>C. I. No.</u>	<u>Name</u>	<u>State No.</u>
12120	Blackhull x Hard Federation	Woodward No. 36h769-150
12121	Ceres-38h x Kawvale	Woodward No. 35h1151-19
12122	Cheyenne x Early Blackhull	Hays Cereal No. 40-95
12123	Cheyenne x Tenmarq	Kans. No. 2758
12124	Early Blackhull x Tenmarq	Kans. No. 2769
12125	Tenmarq selection	Kans. No. 2770
12126	Tenmarq x Blackhull	Hays Cereal No. 40-118

NEW VARIETIES

During the year Early Blackhull x Tenmarq (C. I. 11952) was named Wichita. This name was selected by a committee composed of workers from Texas, Oklahoma, Kansas, and Nebraska, with J. Roy Quinby as chairman. Some tables in this report were stencilled before the variety was named but the new name is used where possible.

Definite action has been taken by the various states as to where the new varieties, Comanche, Pawnee, and Wichita, will be recommended. These recommendations are as follows:

Comanche

Texas - The hard red winter wheat region of northwestern Texas, particularly the Rolling Plains Area.

Oklahoma - Entire hard red winter wheat area of the State.

Kansas - South-central, central, and southwestern parts of the State.

Pawnee

Oklahoma - Western part south to a line north of Beckham, Oklahoma, and Pottawatomie counties.

Kansas - Hard wheat portion of the eastern one-half of the State.

Nebraska - South of the Platte River and east of Highway U.S. 81.

Wichita - Being increased in Texas, Oklahoma, and Kansas and will be recommended as a replacement for Early Blackhull in the Chillicothe, Wichita Falls, Lawton area as soon as seed is available. Kansas has taken no final action on distribution.

The estimated seed stocks of Comanche, Pawnee, and Wichita in the fall of 1943 were as follows:

^{3/} C. I. refers to accession number of the Division of Cereal Crops and Diseases.

Comanche

*Austin
saw 900 - from Denton.*

Kansas:

Pure

Hays	24 acres	445 bushels
Meade	15 acres	20 bushels and 21 bushels semi-pure
Manhattan	1 acre	15 bushels

Impure: Possibly 40 to 60 acres grown but amount of seed not known.

Oklahoma:

Pure

On farms	69 acres	700 950 bushels.	} 800 acres
Lawton	1 acre	27 bushels.		15 "

Texas:

Pure

Chillicothe	10 acres	277 bushels	} 200 catipud
Denton	1 acre	20 bushels	
Denton (head rows)		1 bushel	

Impure

Panhandle area	2500 acres	50,000 bushels ^{1/}	→ 5000
Chillicothe area	250 acres	5,000 bushels	→ 3000, 4000 acres
Miscellaneous	500 acres	10,000 bushels ^{1/}	→ 8000 acres.

1/ Estimates.

Pawnee

Nebraska:

Lincoln	11 acres	432 bushels (Foundation)
Humboldt	4 1/2 acres	182 bushels (Foundation)
20 farms	40 acres	1200 bushels (Certified)

Kansas:

Manhattan	12 acres	205 bushels
Hutchinson	14 acres	440 bushels
Wichita	1 acre	20 bushels
Manhattan (head rows)		7 bushels

Possibly 75 acres of "bootleg" seed harvested.

Oklahoma:

Stillwater	3 acres	12 bushels.	- all planted. 25-30 acres.
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Wichita

Texas:

Chillicothe	1 acre	15 bushels	} 10 acres on station Denton 1 acre pure - rest mixed
Denton (head rows)		1 bushel	
Amarillo	1/2 acre	8 bushels	

Oklahoma:

Lawton	1/10 acre	2 1/4 bushels.
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Kansas:

Manhattan	1/2 acre	15 bushels (semi-pure)
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Possibly 30 acres of "bootleg" seed harvested.

*Westar
1 acre Denton
4 1/2 Amarillo*

UNIFORM VARIETIES IN PLOTS

Because of the wide variation in environment encountered in the region from Texas to Montana, it has not seemed advisable to seed the same varieties at all stations. The region has been divided into three districts, as shown by the map on the following page, and the varieties grown uniformly at the cooperating experiment stations are somewhat different in each of the three districts. The varieties grown uniformly in each district in 1943 were as follows:

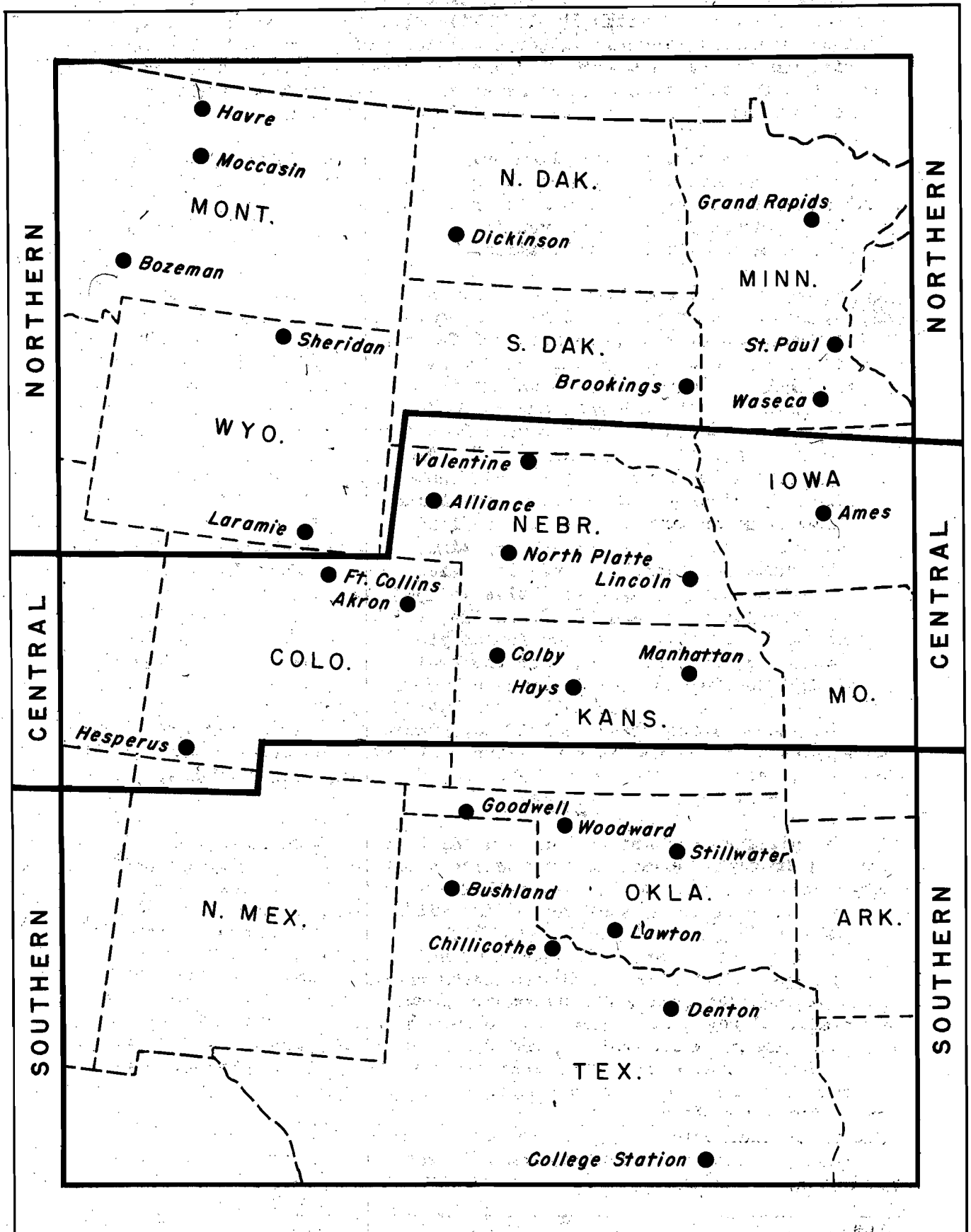
<u>Variety</u>	<u>C. I. No.</u>	<u>Southern</u>	<u>Central</u>	<u>Northern</u>
Kharkof	1442	X	X	X
Tenmarq	6936	X	X	
Blackhull	6251	X	X	
Chiefkan	11754	X	X	
Comanche	11673	X	X	
Pawnee	11669	X	X	
Wichita	11952	X	X	
Red Chief	12109	X	X	
Cheyenne x Tenmarq	11972	X	X	
Early Blackhull	8856	X		
Kawvale x Tenmarq	11956	X		
Nebred	10094			X
Cheyenne	8885		X	
Minturki	6155			X
Yogo	8033			X
Karmont	6700			X
Marmin	11502			X
Mont. 36-Beloglina x Kanred	12108			X

The lists include the most widely grown commercial varieties of the region (considering Kharkof as representing the Turkey type) and some of the more promising new varieties and strains.

At all of the experiment stations, varieties of local interest, in addition to those in the uniform list, were grown. The data for all varieties reported as grown in replicated plots at each station are included in this report.

PLOT DATA

In the fall of 1942 conditions for seeding winter wheat were rather favorable, and for the most part seeding was done at the usual time with acceptable stands being obtained. In the Central District fall growth was slow, especially where seeding was a few days late, due to a cool, dry fall. In the Southern District the winter weather was characterized by extreme fluctuations in temperature and lack of moisture until late April or early May. During May this district received rain in unprecedented amounts, causing considerable damage in the way of floods. In the Central District the spring was dry, but the moisture in May and June came in time to give a good crop. At stations in the Northern District the extremely low temperatures of winter and early spring caused severe winterkilling. Leaf rust was present at most of the southern stations but did not seem to do much damage. Stem rust was very light in the south, appeared late at the northern stations and caused little damage. Green bugs did considerable damage at Amarillo and Stillwater.



Plots were seeded at 22 stations in the fall of 1942. Hail completely wiped out the crop at North Platte, while at St. Paul, Grand Rapids, and Dickinson winterkilling was either complete or so severe that the remaining material was not worth saving.^{4/} Yield and other agronomic data for varieties grown at each of 17 stations are given in table 1. The generalized standard errors for most of the stations are given and are summarized in table 2.

To save space, data are given only for those characters that showed a contrasting reaction and that may have had an influence on yield. For each station the varieties are listed in order of yield for 1943, and, where possible, average yields are given for the period 1931-1943. For the most part the data need little explanation.

At Denton fall conditions were favorable and good growth was obtained. In January some extremely variable temperatures were encountered. On January 19 a temperature of 4° F. was recorded followed by 87°, 89°, and 84° F. on January 22, 23, and 24, and then on January 25 the temperature dropped to 16° F. which of course did some damage to tender varieties. Growth was well started again in late February and early March only to be checked by a reading of 5° F. on March 5, which caused more injury as shown by the data, with Kanred-Hard Federation x Tenmarq (C. I. 12105) and Marquillo x Oro (FN787-1) being hurt the worst. Other than this the season was rather favorable, with some Septoria present and possibly some damage caused by chinch bugs. Leaf rust infection was prevalent in the fall and again in the spring with resistant varieties being fairly clean each time. Test weights ranged from 56.0 to 60.0 pounds per bushel and yields varied from 31.9 to 18.6 bushels per acre. The highest yielding varieties in 1943 were Kawvale x Tenmarq (C. I. 11956), Cheyenne x Tenmarq (C. I. 11972), and Kanred-Hard Federation x Tenmarq (C. I. 12110), while the lowest yields were recorded for Denton, Fulcaster, and Mediterranean. For the twelve crops harvested during the period 1931 to 1943 inclusive, Tenmarq has had the highest average yield followed by Kanred and Blackhull. The 1941 and 1943 averages follow closely the 1943 yields since those in 1941 were very low. Of the varieties grown for 5 years or more, the ones with the highest yields as expressed in percentage of check (Kharkof) were Comanche, Chiefkan, Pawnee, Tenmarq, and Early Blackhull in the order named.

At Chillicothe there were no unusual weather conditions except for a period in March in which moisture became a little short, although no serious damage occurred. In May the rainfall was extremely heavy and this may have had some bad effects on the crop. Test weights ranged from 57 to 60 pounds per bushel. The highest yield, 34.6 bushels per acre, was produced by Kanred-Hard Federation x Tenmarq (C. I. 12105) and the lowest, 14.6 bushels per acre, by Chiefkan. Some of the higher yielding varieties were Kawvale x Tenmarq (C. I. 11956), Comanche, and Cheyenne x Tenmarq (C. I. 11972). For the period 1938-1943, Tenmarq has had the highest average yield, followed by Martin x Tenmarq (C. I. 11805), and Comanche. The average yields for the period 1942-43 follow rather closely the yields in 1943. For the 6-year period over which yields have been reported the highest average, as expressed

^{4/} No report was received from Stillwater at the time this summary was completed.

in percentage of Kharkof, is shown for Tenmarq followed by Martin x Tenmarq (C. I. 11805) and Comanche. Grown in plots for a 2-year period, Wichita has had a percentage of Kharkof of 128.1 compared to Early Blackhull for a 6-year period of 105.2.

The crop at Amarillo became well established in spite of the fact that seeding was somewhat delayed due to continued rains. Starting in January, abnormally dry weather prevailed throughout the remainder of the crop season and for this reason wheat made a very small growth with heights ranging from 17 to 21 inches. Some rather severe weather in January may have caused a little damage to wheat and again in March a reading of 4° F. caused some damage to the more tender strains. Green bugs were present and did damage in spots throughout the experimental area. Yields were fairly low, ranging from 8.6 to 17.5 bushels per acre. The highest yielding varieties were Cheyenne x Tenmarq (C. I. 11972), Blackhull, Chiefkan, Red Chief, and Kanred-Hard Federation x Tenmarq (C. I. 12110), while Comanche, Tenmarq, Pawnee, and Early Blackhull yielded less than the varieties listed. For the long-time average, Tenmarq has had the highest average yield being slightly superior to Blackhull, Kanred, and Kharkof. For the 1942-43 period Blackhull ranks first followed by Chiefkan, Comanche, and Kanred-Hard Federation x Tenmarq (C. I. 12110). Expressed in percentage of Kharkof, Comanche has had a slight advantage over Pawnee during a period of 6 years and by a similar comparison although over a shorter period Wichita has been superior in yield to Early Blackhull.

Good fall stands were obtained at Lawton and normal growth prevailed until the winter dormant stage was reached. January temperatures were variable ranging from 1° F. on the 18th to 83° on the 21st. Severe temperatures were experienced again in March and at this time there was some killing of leaves although the damage was not heavy. March was cold and fairly dry, while good spring growth was obtained during April although there was a shortage of moisture. Rainfall during May was extremely heavy, amounting to 14.2 inches, which caused considerable lodging and delayed harvest, but plant heights were about average. Lodging was particularly heavy in Early Blackhull and Wichita, while Kharkof and Cheyenne had the strongest straw. Leaf rust was quite heavy especially in the case of Cheyenne and Clarkan, while some of the newer hybrids such as Oro x Tenmarq (C. I. 11672), Kawvale x Tenmarq (C. I. 11956), and Cheyenne x Tenmarq (C. I. 11972) had almost no infection. Grain quality was unusually good with all but three of the varieties showing test weights of 60 pounds per bushel or better with the highest one being Red Chief with a weight of 63 pounds per bushel. Tenmarq ranked first for yield with an average of 34.6 bushels per acre. This variety was followed by Kawvale x Tenmarq (C. I. 11956), Cheyenne x Tenmarq (C. I. 11972), and Oro x Tenmarq (C. I. 11672), while some of the lower yielding varieties were Red Chief, Kawvale, and Kharkof. For a long-time period covering 10 crop years Tenmarq has the highest average yield, followed by Kawvale, Kanred, and Cheyenne. Grown for 3 years, Wichita has outyielded Early Blackhull by an average of 2.9 bushels per acre. Comanche during 4 years has exceeded Tenmarq by 0.8 bushel per acre. This would seem to indicate that in the vicinity of Lawton, Comanche is a slightly higher yielding variety than is Tenmarq and that Wichita should be a good substitute for Early Blackhull.

Ample moisture was available at Woodward but abundant fall growth was retarded by cool weather. The winter was dry and the drought continued until May when sufficient moisture was received. No extreme fluctuations in temperature were recorded. The crop was normal with the possible exception that straw was shorter than usual. Leaf rust infections were quite high for all

varieties except Tenmarq x Kawvale (C. I. 11956). Test weights per bushel were all above 60 pounds with Blackhull x Hard Federation sel. 31 (C. I. 12120) having a weight of 64 pounds per bushel. Cheyenne x Early Blackhull (C. I. 12000) had the highest average yield, 34.9 bushels per acre, followed by Comanche, Pawnee, and Cheyenne x Early Blackhull (C. I. 11999). Blackhull, Red Chief, Tenmarq, Cheyenne, and Chiefkan all yielded less than the leading varieties. For a 12-year period Tenmarq has had the highest average yield followed by Cheyenne and Blackhull. The 1942-43 average yields follow very closely those shown for 1943. Comanche and Pawnee have been grown at Woodward for 6 years and during this time Comanche has had a percentage of Kharkof of 131.3 and Pawnee 141.7. Although not grown over comparable periods, it appears that at this station Wichita has more yielding ability than Early Blackhull.

Fall conditions were very favorable for winter wheat at Manhattan and there was little or no injury during the winter. A drought extending from February 2 to the middle of May retarded vegetative growth but probably caused little if any reduction in yield. From the middle of May until harvest, rainfall was so high as to injure the wheat although this injury was not as heavy as might have been expected. Plant growth was fairly heavy with some varieties having heights of over 40 inches. Lodging was rather severe in such varieties as Early Blackhull, Turkey, and Wichita. Loose smut infections varied from zero in Pawnee to 8.3% for Marquillo x Tenmarq (C. I. 12113). There seems to be clear indication that the Marquillo hybrids were more susceptible to loose smut than other material in the test. Leaf rust was heavy, ranging from 88% on Nebred to 2% on Marquillo x Oro (C. I. 11979), with varieties performing in accordance with their known behavior. Culm counts indicated fairly normal tillering with a number of varieties such as Cheyenne, Pawnee, and several others having counts of over 2 million culms per acre. Bushel weights ranged from 57.5 to 62.7 pounds. Three Cheyenne x Tenmarq strains, namely, Kansas 2759, C. I. 11972, and C. I. 12123, had the highest average yields followed by Pawnee and Cheyenne. Some of the more commonly grown varieties ranked in the following order for yield: Tenmarq, Kawvale, Chiefkan, Comanche, Nebred, Blackhull, Early Blackhull, and Red Chief. For a 12-year period the highest average yield has been made by Kawvale, followed by Cheyenne and Tenmarq. Based on the 1942-43 average, Cheyenne x Tenmarq (Kans. No. 2759) ranks first, followed by Cheyenne x Tenmarq (C. I. 12123), Pawnee, and Early Blackhull x Tenmarq (Kans. No. 2757). Grown for a 6-year period, Pawnee has a percentage of Kharkof of 151.5, while Comanche for the same period has 135.5. Also grown for 6 years Chiefkan has exceeded the check by 24.7%, while Red Chief for 3 years has outyielded the check by only 8%.

At Hays, good fall stands were obtained but fall growth was slow and moisture was deficient throughout the winter and early spring. Drought was probably the most important factor influencing yields at this station. No winterkilling was recorded but some reduction in yield was probably caused by green bug infestation. Heading occurred from May 3 for Early Blackhull to May 21 for Oro, while ripening covered the period from June 19 to June 24. Straw was somewhat shorter than usual, ranging from 22 inches for Early Blackhull to 29 inches for Chiefkan. With two exceptions test weights were 60 pounds per bushel or better. Yields were unusually low with Chiefkan ranking first with a yield of 14.7 bushels per acre and Oro last with 5.0 bushels. Some of the higher yielding strains were Red Chief, Cheyenne x Tenmarq (C. I. 11972), Comanche, and Wichita. Based on a 12-year average Tenmarq ranks first, Early Blackhull second, Blackhull third, and Cheyenne fourth. For the last 3 years the highest average yields have been shown by Cheyenne x Tenmarq (C. I. 11972), Pawnee, Chiefkan, and Comanche. Expressing the average yields in percentage of Kharkof for varying periods of years some of the higher

yielding varieties rank as follows: Cheyenne x Tenmarq (C. I. 11972), 160.7; Pawnee, 157.4; Red Chief, 144.0; and Wichita, 141.1.

An unusually good crop was harvested at Colby. Straw growth was normal, and weights per bushel were very heavy with all varieties testing 60 pounds per bushel or better. Yields ranged from 51.7 to 43.3 bushels per acre. Varieties ranking at the top of the list were Cheyenne x Tenmarq (C. I. 11972), Comanche, Wichita, and Early Blackhull, all of which had yields above 50 bushels per acre. For longer periods of time Cheyenne, Tenmarq, and Blackhull have had the highest average yields. Based on yield expressed as a percentage of Kharkof, the following varieties ranked the highest: Cheyenne x Tenmarq (C. I. 11972), Pawnee, Cheyenne x Tenmarq (C. I. 12104), Wichita, and Red Chief.

Fall stands were good at Akron and there was heavy growth with little or no winterkilling, and a cool, wet May and early June resulted in extremely heavy straw growth. A hailstorm on May 28 and a light freeze on June 4 possibly damaged wheat to some extent and on July 8 a more severe hailstorm injured the crop as shown by the data. Test weights were all relatively low with no variety testing as much as 60 pounds per bushel. Yields ranged from 12.9 bushels for Alton to 24.3 bushels for Blackhull, while Nebred, Early Blackhull, Cheyenne x Tenmarq (C. I. 11972), Cheyenne, and Tenmarq all gave good yields. For the long-time average Early Blackhull ranks first, followed by Blackhull, Tenmarq, Cheyenne, and Kanred. Expressed in terms of Kharkof for a 3-year period in plots Wichita has a percentage of 141.1. Other varieties having good percentages of Kharkof are Kanred-Hard Federation x Minhardi (C. I. 11970), Early Blackhull, and Comanche.

At Lincoln seeding was done at the usual time and normal fall growth was obtained. Owing to lack of snow covering at the time of the coldest weather some winterkilling occurred, causing differential survival. The spring was cool and at times there was a threat of damage owing to drought but always moisture was received just in time to do the most good. Harvest was later than usual, being delayed by continued rains. Straw was quite tall, considerable leaf and stem rust developed on the varieties, and the stem rust may have had some influence on yield although it came in late. Stooling was quite heavy with Pawnee showing a culm count of 3,700,000 per acre, while all the other varieties except one had counts under 3,000,000. Test weights per bushel showed a range from 63.2 for Wichita to 56.2 for Nebr. 60. Pawnee had an average yield of 54.3 bushels per acre, followed by Wichita, Cheyenne x Tenmarq (C. I. 11972), and Minturki x Blackhull (C. I. 11817). At the bottom of the list and yielding less than 40 bushels per acre were the later wheats such as Turkey, Nebred, Kharkof, and Nebr. 60. Over a 13-year period Cheyenne ranks first for yield followed by Tenmarq, Nebred, and Kharkof. For the 1942-43 period, Pawnee ranks first, Wichita second, and Comanche third. Grown for an 8-year period Pawnee has had a percentage of Kharkof of 131.7. The nearest competitors are Minturki x Blackhull (C. I. 11817) with 125.3 and Tenmarq x Minturki (C. I. 11982) with 123.4, and these two strains have been grown for 1 year only.

The variety test at Alliance was grown in rod-row plots with 7 replications. Winterkilling was rather severe with tender varieties such as Comanche, Blackhull, and Wichita being heavily damaged. Nebred ranked first in yield, closely followed by Cheyenne. Other strains making good performance were Cheyenne x Tenmarq (C. I. 11972) and Pawnee. At the bottom of the list were Comanche, Wichita, and Chiefkan. Cheyenne has had the best average yield for the long-time period as well as for the period 1942-43. At this station the later, more hardy wheats tend to show up the best as would be expected.

Varieties were grown in single plots at Valentine. The crop appeared to be rather good, yields ranging from 29.3 bushels per acre for Cheyenne x Tenmarq (C. I. 11972) to 14.1 bushels for Blackhull. Some of the high yielding varieties were Cheyenne, Kharkof, and Tenmarq, while Pawnee, Red Chief, and Chiefkan yielded only slightly more than did Blackhull. For the 1942-43 average Kharkof ranks first followed by Cheyenne and Tenmarq. Based on a percentage of Kharkof for years grown, Cheyenne x Tenmarq (C. I. 11972) ranks first with 106.2, Kharkof second with 100.0, and Cheyenne third with 97.4. Red Chief has the poorest percentage with 65.6.

Winterkilling was extremely severe at Waseca with no variety showing a survival higher than 75%. Leaf rust and stem rust were present and the infections were quite heavy on susceptible varieties. Test weights generally were low with Karmont at 53.6 pounds per bushel. Yields ranged from 13.7 bushels down to 1.7 for Karmont. Marmin had the highest average yield followed by H44 x Minturki² (Minn. 2713) and Yogo. One other variety, namely, H44 x Minturki² (Minn. 2714), had a yield equal to the one for Minturki. Over a long period Yogo has outyielded Minturki by a small amount. For the last 2 years a number of strains have had average yields above Minturki. One of the interesting developments at this station is the production of rust-resistant winter wheats from winter x spring crosses and backcrosses that give yields equal to or better than Minturki. A number of single plots were also included at Waseca and all of these strains showed high rust resistance but only one, Hope x Minturki (Minn. 2724), outyielded Minturki.

Some winterkilling occurred at Sheridan, caused in part by light fall growth and by cold weather coming when the ground was bare and immediately following some much warmer weather. March was the coldest month ever recorded at the station. Nebred and Kharkof showed the lowest survivals, and Minturki and a new hybrid the highest. Test weights per bushel were good and yields ranged from 36.4 to 47.7 bushels per acre, with Minturki, Yogo and Nebred having the three highest yields. Over a 13-year period Kanred, Yogo, and Kharkof have had the highest average yields, although the differences are small. For the 1942-43 period Nebred, Mont. 36-Beloglina x Kanred (C. I. 12108), and Cheyenne have had the highest average yield. For the period grown (9 years) Cheyenne has the highest percentage of Kharkof of any variety in the test, while Marmin and Karmont have been the lowest.

Differential killing occurred in two of the three replications at Bozeman, but in the third there was none, which may explain why the correlation between survival and yield is not closer. Lodging was very heavy except for Tenmarq, Marmin, and Nebred. Nebred, Yogo, Marmin, and Minturki had average yields above 50 bushels per acre. The three low-bunt resistant varieties had the lowest yields, having been badly hurt by killing. Over an 11-year period Yogo has had the highest average yield, followed by Kharkof and Minturki. During the last 2 years Nebred, Mont. 36-Beloglina x Kanred (C. I. 12108), and Yogo have had the highest averages.

Winterkilling was very severe at Moccasin and as a result survival data only are reported. Yogo had the highest average survival, followed by Minturki x Beloglina-Buffum (C. I. 11661). Eight wheats had average survivals above that of Kharkof, and seven were below, with the low-bunt resistant varieties at the bottom of the list. No yields were obtained and the reader is referred to the 1942 report for a record of the past performance of these strains.

At Havre the crop went into the winter in only fair condition, and the season as a whole was favorable to the wheat until early in March, at which time thaws and warm weather caused renewal of growth. This was followed by severe sub-zero temperatures which caused heavy winterkilling of the tender varieties. Yogo with 62 percent and Minturki with 60 had the highest average survivals. Test weights were fairly good and yields followed very closely the survival percentages. Yogo, Mont. 36-Beloglina x Kanred (C. I. 12108), and Minturki had the highest average yields. For an 11-year period Yogo has had a slight yield advantage over other varieties grown during the same time. Three new varieties, resistant to low bunt, were included in the test in 1943 but they proved to be too tender for the conditions encountered.

STANDARD ERRORS

Standard errors have been calculated for yields where possible. The accuracy of these errors may be open to question since the plots were not randomized at all of the stations. Random arrangements were used at some stations. Statisticians do not agree as to whether or not a generalized error obtained from non-randomized plots is of any use. From the agronomic standpoint it is felt that the statistic is of use, although it is realized that the value may not be entirely correct. Just how far wrong it may be is not known, as it may be either too large or too small.

The analysis of variance was used for the 1943 yield data at each station. To obtain the standard error of the mean, the square root of the mean square due to error, or the standard deviation, was divided by the square root of the number of replications for each variety. The standard error of a difference was obtained by multiplying the standard error of a mean by $\sqrt{2}$.

The standard error in bushels may be expressed in percent by dividing the standard error by the mean yield and multiplying by 100. The summary of these standard errors is shown in table 2, together with the number of plots and average yields at each station.

Table 1.--Agronomic and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 17 experiment stations in the hard red winter wheat area in 1943, and average yields from 1931-43.

Denton, Texas
(Rod-row plots, 8 replications)

Variety	C. I. No.	Winter:	Date		Leaf rust:	Wt.	Av.	Yield	No. of:	Percent			
		surv.	Head- ed	Ripe	Fe.	Fall	Sp.	per acre	Av. 1931-43	Av. 1941-43	years: of		
		Mar. 16:						bu.	yield: 1941, 43	and 1943	grown: Kharkof		
		P. ct.			In.	Pct.	Pct.	Lbs.	Bu.	Bu.	Bu.		
Kawvale x Tenmarq	11956	100	5/1	6/1	30	T	13	58.0	31.9	....	20.3	3	160.4
Cheyenne x Tenmarq	11972	100	5/2	6/3	29	50	58	58.0	30.6	....	....	1	132.5
Kan.-Hd. Fed. x Tenmarq	12110	100	4/28	6/1	32	T	20	59.5	30.2	....	....	1	130.7
Tenmarq x Oro	12111	100	5/1	6/2	30	30	55	58.5	28.4	....	....	1	122.9
Chiefkan	11754	97	5/1	6/3	31	40	45	59.5	26.9	....	16.1	5	146.8
Comanche	11673	100	4/27	6/1	31	20	29	58.0	26.6	....	18.8	5	158.2
Red Chief	12109	100	4/29	6/3	31	40	64	60.0	26.6	....	....	1	115.2
Early Blackhull	8856	91	4/19	5/26	32	40	65	60.0	26.5	....	16.6	10	123.0
Early Blackhull x Tenmarq	11952	98	4/21	5/26	33	30	65	60.0	26.3	....	....	1	113.9
Kanred-Hd. Fed. x Tenmarq	12115	96	4/26	6/1	31	5	36	59.5	25.7	....	....	1	111.3
Kanred	5146	100	5/4	6/7	30	60	54	57.0	24.9	25.7	14.9	12	117.9
Clarkan	8858	98	5/1	6/2	32	50	64	60.0	24.8	....	13.8	9	118.1
Pawnee	11669	100	4/28	6/1	28	10	29	57.0	24.7	....	15.8	5	145.6
Ten. x P-1066-Prelude 29-34-59	.....	81	4/18	5/22	29	60	48	58.0	23.7	....	....	1	102.6
Tenmarq	6936	100	5/1	6/5	31	30	59	58.0	23.7	27.9	15.6	12	128.0
Kanred-Hd. Fed. x Tenmarq	12105	62	4/26	6/1	30	5	16	59.5	23.6	....	15.8	2	121.5
Campbell Medit. T.S. 23250	.....	98	4/29	6/3	31	40	24	56.0	23.2	....	13.9	6	123.1
Blackhull	6251	98	5/3	6/7	30	50	65	59.0	23.2	24.8	14.3	12	113.8
Kharkof	1442	100	5/5	6/7	30	60	68	56.0	23.1	21.8	13.0	12	100.0
Marquillo x Oro F.N. 787-1	.....	66	5/3	6/7	28	15	6	58.0	22.5	....	....	1	97.4
Red May sel. T.S. 7250-1	.....	85	4/26	5/28	28	30	40	58.0	21.4	....	12.4	3	100.0
Denton	8265	89	5/4	6/7	32	30	26	57.0	20.0	23.8	11.7	12	109.2
Fulcaster	6471	97	5/1	6/3	30	50	64	57.0	19.7	22.3	11.5	12	102.3
Mediterranean	10086	87	5/1	6/2	28	20	18	57.0	18.6	22.5	11.3	12	103.2

Standard error of a difference between the mean yields of any two varieties = 1.42 bushels.

Table 1.--(Continued)

Chillicothe, Texas
(Four plots)

Variety	C. I. No.	Date headed	Weight per bushel	Average acre yield	Yield				No. years grown	Percent of Kharkof	Rank
					Average 1938-43	Rank	Average 1942-43	Rank			
			Lbs.	Bu.	Bu.		Bu.				
Kan.-H. Fed. x Tenmarq	12105	4/30	59	34.6	....	..	21.0	2	3	153.7	1
Kawvale x Tenmarq	11956	5/5	58	33.1	....	..	18.7	3	3	148.0	2
Comanche	11673	4/30	57	31.6	18.2	3	19.7	2	6	118.2	7
Cheyenne x Tenmarq	11972	5/5	58	31.3	....	..	....	..	1	116.8	10
Tenmarq	6936	5/3	58	29.2	19.1	1	16.8	7	6	124.0	4
Martin x Tenmarq	11805	5/5	57	29.1	18.8	2	17.2	6	6	122.1	5
Mediterranean	11587	5/3	59	28.8	18.1	4	15.8	10	6	117.5	9
Kanred	5146	5/3	57	28.6	16.2	9	15.6	11	6	105.2	15
Kanred-H. Fed. x Tenmarq	12106	4/27	58	28.6	....	..	16.6	9	3	117.9	8
Cheyenne	8885	5/6	57	27.5	16.4	7	15.4	13	6	106.5	13
Kharkof	1442	5/6	58	26.8	15.4	13	14.6	17	6	100.0	19
Pawnee	11669	5/3	58	26.8	17.8	5	14.9	15	6	115.6	11
Certified Turkey	1558	5/6	58	26.4	16.3	8	15.0	14	6	105.8	14
E. Blackhull x Tenmarq	11952	4/23	59	24.4	....	..	18.7	3	2	128.1	3
Early Blackhull	8856	4/22	58	24.2	16.2	9	16.8	7	6	105.2	15
Blackhull	6251	5/3	59	24.0	17.6	6	15.6	11	6	114.3	12
Red Chief	12109	5/3	60	23.5	....	..	17.3	5	2	118.5	6
Denton	8265	5/3	57	21.7	16.2	9	14.8	16	6	105.2	15
Chiefkan	11754	5/3	58	14.6	15.9	12	10.8	18	6	103.2	18

Standard error of a difference between the mean yields of any two varieties = 1.17 bushels.

Table 1.--(Continued)

Amarillo, Texas
(Rod-row plots, 8 replications)

Variety	C. I. No.	Date		Ht.	Kernel: plump- ness	Wt. per bu.	Av. acre yield:	Yield				No. of years grown	Percent of Kharkof	Rank
		Head- ed	Ripe					Av. 1931 34,37-43	Av. 1942 Rank	Rank				
May	June	In.	Pct.	Lbs.	Bu.	Bu.	Bu.	Bu.						
Cheyenne x Tenmarq	11972	11	25	19	88	59.5	17.5	....	..	....	..	1	148.3	1
Blackhull	6251	8	23	20	82	58.5	16.9	16.1	2	17.9	1	9	104.5	12
Chiefran	11754	11	23	21	82	59.0	15.8	....	..	17.1	2	7	118.9	5
Red Chief	12109	11	23	20	82	59.5	15.8	....	..	14.3	9	2	117.2	8
Kan.-Hd. Fed. x Tenmarq	12110	7	23	20	86	58.5	15.8	....	..	16.3	4	2	133.6	2
Turkey	1558	12	25	21	82	58.0	15.3	....	..	13.6	12	8	96.2	19
Comanche	11673	9	23	18	82	58.0	14.9	....	..	17.1	2	6	124.7	4
Tenmarq	6936	10	24	21	80	57.5	14.7	16.3	1	15.4	6	9	105.8	11
Cheyenne	8885	12	25	18	80	57.0	14.7	....	..	14.1	11	8	100.0	16
Kan.-Hd. Fed. x Tenmarq	12106	6	24	17	90	59.5	14.7	....	..	16.0	5	3	117.8	6
Pawnee	11669	7	23	17	78	57.0	13.4	....	..	15.1	7	6	117.5	7
Kanred	5146	12	25	20	78	57.5	13.0	15.6	3	13.6	12	9	101.3	15
Tenmarq x Oro	12111	10	25	18	84	57.5	12.2	....	..	....	..	1	103.4	13
Kan.-Hd. Fed. x Tenmarq	12115	5	23	18	90	59.5	12.1	....	..	....	..	1	102.5	14
Kharkof	1442	11	25	20	78	57.0	11.8	15.4	4	12.2	16	9	100.0	16
Kan.-Hd. Fed. x Tenmarq (Amarillo 33-38-20)	.....	5	23	19	88	59.0	11.4	....	..	....	..	1	96.6	18
Kan.-Hd. Fed. x Tenmarq	12105	9	23	18	88	59.5	11.3	....	..	13.1	14	2	107.4	10
E. Blackhull x Tenmarq	11952	4	15	17	88	59.5	11.1	....	..	14.3	9	2	117.2	8
Kawvale x Tenmarq	11956	7	23	17	78	57.5	9.6	....	..	12.3	15	3	131.3	3
Early Blackhull	8856	1	15	17	82	58.0	8.6	....	..	14.4	8	8	95.5	20

Standard error of a difference between the mean yields of any two varieties = 1.22 bushels.

Table 1.--(Continued)

Lawton, Oklahoma
(Three .013-acre plots; seeded September 5; emerged September 12, 1942)

Variety	C. I. No.	Date		Ht.	Lodg- ing	Leaf: rust	Sep- toria	Wt. per bu.	Av. acre yield	Yield				No. years grown	Percent of Kharkof	Rank
		Head- ed	Ripe							Av. 1931-:		Average:				
										34, 36-	Rank:	1942-	Rank:			
										37, 40-43:	1943					
				In.	Pct.	Pct.		Lbs.	Bu.	Bu.		Bu.				
Tenmarq	6936	4/27	6/6	33	5	10	0	60	34.6	25.7	1	25.8	5	10	112.2	7
Kawvale x Tenmarq	11956	4/28	6/3	31	2	T	heavy	61	33.8	....	..	29.3	3	3	149.0	2
Cheyenne x Tenmarq	11972	4/28	6/6	32	2	T	light	61	33.7	....	..	....	..	1	132.7	4
Oro x Tenmarq	11672	4/24	6/3	36	13	0	0	60	33.2	....	..	30.8	1	4	149.5	1
E. Blkhl x Tenmarq	11952	4/19	6/2	34	50	2	0	62	32.1	....	..	29.8	2	3	145.4	3
Cheyenne	8885	5/1	6/8	30	1	90	heavy	60	32.1	24.5	4	23.5	9	10	107.0	10
Kanred	5146	4/29	6/6	31	10	5	heavy	59	31.1	24.9	3	25.3	6	10	108.7	9
Pawnee	11669	4/26	6/3	30	2	25	light	60	29.5	....	..	22.5	11	4	119.4	6
Comanche	11673	4/25	6/3	37	13	2	light	60	29.3	....	..	25.1	7	4	132.1	5
Blackhull	6251	4/28	6/6	33	10	25	heavy	61	28.1	23.4	6	23.1	10	10	102.2	14
Chiefkan	11754	4/28	6/7	34	5	10	heavy	62	27.7	....	..	19.7	14	5	105.4	11
Early Blackhull	8856	4/17	6/2	34	50	1	0	62	27.6	23.5	5	25.9	4	10	102.6	13
Clarkan	8858	5/1	6/8	34	5	90	med.	62	27.4	....	..	21.3	12	6	101.4	15
Red Chief	12109	4/28	6/7	34	5	10	heavy	63	26.7	....	..	20.1	13	2	104.7	12
Kawvale	8180	4/28	6/6	34	5	20	light	59	26.6	25.6	2	23.6	8	10	111.8	8
Kharkof	1442	5/1	6/8	30	1	90	heavy	58	25.4	22.9	7	19.2	15	10	100.0	16

Standard error of a difference between the mean yields of any two varieties = 1.67 bushels.

Table 1.---(Continued)

Woodward, Oklahoma
(Four 1/51-acre plots; seeded September 28; emerged October 2, 1942)

Variety	C. I. No.	Date		Ht.	Leaf rust	Wt. per bu.	Av. acre yield	Yield				No. years grown	Percent of Kharkof	Rank
		Head ed	Ripe					Av. 1931- 34, 36-43	Rank	Average 1942-43	Rank			
June	In.	Pct.	Lbs.	Bu.	Bu.	Bu.	Bu.							
Cheyenne x E. Blackhull	12000	4/28	11	28	83	62	34.9	....	..	38.9	1	3	148.2	4
Comanche	11673	5/2	13	27	55	62	33.5	....	..	38.6	2	6	131.3	7
Pawnee	11669	5/2	12	28	48	62	33.3	....	..	36.0	5	6	141.7	6
Cheyenne x E. Blackhull	11999	5/3	15	27	83	62	32.9	....	..	35.0	6	3	145.7	5
Tenmarq x Kawvale	11956	5/3	13	27	T	62	32.4	....	..	37.0	4	3	158.8	1
Cheyenne x Tenmarq	11972	5/4	15	27	63	63	32.3	....	..	....	..	1	149.5	3
E. Blackhull x Tenmarq	11952	4/25	10	30	70	63	31.7	....	..	37.5	3	2	151.8	2
Blackhull	6251	5/3	17	29	65	62	31.5	26.7	3	30.1	11	12	101.5	14
Red Chief	12109	5/4	17	28	60	63	31.5	....	..	30.9	10	2	125.1	8
Tenmarq	6936	5/4	16	29	60	62	31.2	29.2	1	33.9	7	12	111.0	12
Early Blackhull	8856	4/24	9	29	64	62	29.1	26.0	6	32.2	8	12	98.9	17
Cheyenne	8885	5/5	17	27	80	62	28.1	28.0	2	31.5	9	12	106.5	13
Chiefkan	11754	5/5	19	29	64	62	26.8	....	..	27.0	12	7	118.0	11
Ceres-38h x Kawvale	12121	4/24	8	27	75	61	26.5 1/2	....	..	....	..	1	122.7	9
Blkhl x Hd. Fed. Sel. 31	12120	4/29	12	25	30	64	26.1 1/2	....	..	....	..	1	120.8	10
Turkey	1558	5/7	21	29	60	61	25.5	26.2	5	25.4	13	12	99.6	16
Kharkof	1442	5/7	21	27	49	60	21.6	26.3	4	24.7	14	12	100.0	15

Standard error of a difference between the mean yields of any two varieties = 4.02 bushels.

^{1/} Average of two replications.

Table 1.—(Continued)

Manhattan, Kansas														
(Three 1/45-acre plots; seeded Oct. 2 and 7; emerged Oct. 9 and 14)														
Variety	: C.I. or : : selection: No.	: Date : : Head: ed	: : : Ripe:	: Ht. : : In.	: Lodg- : : ing	: Loose : : smut	: Leaf : : rust	: No. : : 1/culms:	: Wt. : : per A.	: Av. : : bu.	: Yield : : yield:	: No. : : 38; 40-43:	: Percent : : 1942-43:	: of : : grown: Kharkof
	: May	: June	: In.	: Pct.	: Pct.	: Pct.	: (1000)	: Lbs.	: Bu.	: Bu.	: Bu.	: Bu.	: Bu.	: Bu.
Cheyenne x Tenmarq	Kans. 2759	21	25	37	3	3.5	28	1960	60.8	34.9	....	34.2	2	141.3
Cheyenne x Tenmarq	11972	21	25	38	10	2.5	28	1920	60.4	34.0	....	32.7	4	140.2
Cheyenne x Tenmarq	12123	17	24	37	20	0.2	33	2070	61.0	33.4	....	33.8	2	139.7
Pawnee	11669	15	22	35	30	0.0	28	2130	60.8	32.6	....	33.5	6	151.5
Cheyenne	8885	22	26	36	0	0.2	82	2230	59.1	32.5	33.9	29.4	12	114.5
E. Blackhull x Tenmarq	Kans. 2757	10	21	35	35	0.8	77	2050	60.1	32.4	....	33.0	2	136.4
Harvest Queen x Kawvale	Kans. 2767	20	25	40	0	0.1	23	2200	59.2	31.6	....	....	1	114.1
Cheyenne x Tenmarq	12103	20	25	38	13	2.8	28	1910	60.7	31.2	....	31.8	4	134.9
Quivira x Tenmarq	Kans. 2762	17	23	36	23	0.8	28	1790	61.0	31.0	....	....	1	111.9
Cheyenne x Tenmarq	12104	16	24	37	30	0.7	27	2010	60.5	29.8	....	31.8	4	133.6
Tenmarq	6936	20	25	38	15	1.3	42	1840	60.0	29.8	33.3	28.7	12	112.5
Kawvale	8180	19	24	38	10	0.0	23	1830	58.4	29.6	35.2	31.2	12	118.9
Fulcaster	6471	21	26	42	13	0.1	82	1880	58.9	29.5	31.8	29.1	12	107.4
Clarkan	8858	22	26	42	5	1.1	77	1630	62.7	28.7	33.1	29.9	12	111.8
Chiefkan	11754	19	24	41	15	0.7	53	1910	61.2	28.4	....	25.9	6	124.7
Comanche	11673	17	24	37	23	0.9	27	1740	59.0	28.2	....	29.6	6	135.5
Nebred	10094	21	25	37	15	0.1	88	2130	59.3	28.1	....	24.1	8	112.6
Kharkof	1442	24	27	40	8	0.2	77	2190	58.9	27.7	29.6	24.2	12	100.0
Kanred x Quivira	Kans. 2763	19	25	38	35	0.9	40	2010	60.2	27.7	....	....	1	96.8
Iobred selection	11997	21	27	41	8	2.7	57	1700	60.1	27.3	....	29.3	2	121.1
E. Blackhull x Tenmarq	11952	13	22	36	38	0.7	77	1700	59.4	26.3	....	31.3	4	132.8
Marquillo x Tenmarq	12113	17	24	35	5	8.3	12	2090	57.5	26.2	....	28.6	2	118.2
Marquillo x Tenmarq	Kans. 2765	18	24	35	13	6.1	10	1890	58.0	25.9	....	....	1	93.5
Oro	8220	23	27	38	5	0.1	63	1980	59.7	25.1	30.4	23.5	12	102.7
Marquillo x Oro	11979	22	27	35	3	6.7	2	1880	58.1	24.4	....	25.8	2	106.6
Blackhull	6251	22	27	41	18	2.1	70	1770	59.4	24.0	31.7	21.7	12	107.1
Early Blackhull	8856	10	21	36	40	0.3	77	1830	60.3	22.8	31.1	22.4	12	105.1
Turkey	1558	23	26	39	40	0.9	78	1870	59.2	22.4	30.1	20.6	12	101.7
Red Chief	12109	18	24	38	5	2.0	70	1810	61.7	21.7	....	23.7	3	108.0
Harvest Queen	6199	23	27	43	15	0.3	83	1670	59.8	21.5	26.6	22.1	12	89.9
Kanred-Hd. Fed. x Tenmarq	12105	20	24	36	18	1.7	5	1490	60.8	21.5	....	....	1	77.6
Kanred (Manhattan)	5146	22	26	38	15	0.9	63	1880	58.6	20.9	30.0	21.0	12	101.4

Standard error of a difference between the mean yields of any two varieties = 1.75 bushels.

1/ Notes on disease reaction obtained in cooperation with members of the Department of Plant Pathology.

Table 1.--(Continued)

Hays, Kansas

(Four 1/50-acre plots; 2 on fallow, 2 on cropped land;
seeded September 28; emerged October 5, 1942)

Variety	C. I. No.	Date		Ht.	Wt. per bu.	Av. per acre yield	Yield		No. years grown	Percent of Kharkof	Rank		
		Head- ed	Ripe				Av. 1931- 43	Average: Rank: 1941-43					
		May	June	In.	Lbs.	Bu.	Bu.						
Chiefkan	11754	11	21	29	61.5	14.7	.....	..	25.8	3	8	137.5	5
Red Chief	12109	14	21	28	62.0	13.3	.....	..	24.2	5	3	144.0	4
Cheyenne x Tenmarq	11972	14	21	25	61.0	13.2	.....	..	27.0	1	3	160.7	1
Comanche	11573	10	21	25	61.0	12.2	.....	..	25.2	4	7	133.5	6
E. Blackhull x Tenmarq	11952	5	19	23	61.0	11.9	.....	..	23.7	7	3	141.1	3
Tenmarq	6936	14	21	27	60.5	11.9	23.4	1	23.5	8	12	125.1	8
Pawnee	11669	10	20	24	60.0	11.8	.....	..	26.5	2	6	157.4	2
E. Blackhull Hybrid	11846	10	21	26	59.5	11.5	.....	..	23.1	9	5	130.7	7
Early Blackhull	8856	3	19	22	59.0	10.6	23.2	2	23.9	6	12	124.1	9
Nebred	10094	20	21	24	60.0	10.4	.....	..	20.2	10	8	111.4	12
Blackhull	6251	15	23	24	62.0	9.6	21.5	3	19.0	11	12	115.0	10
Cheyenne	8885	20	24	25	62.0	8.6	21.1	4	18.9	12	12	112.8	11
Turkey	1558	20	24	24	60.0	7.1	19.2	7	16.9	14	12	102.7	15
Kanred	5146	20	24	23	60.5	7.0	19.4 ^{1/2}	6	17.1	13	11	107.8	13
Kharkof	1442	20	24	24	61.0	6.1	18.7	8	16.8	16	12	100.0	16
Oro	8220	21	24	23	61.0	5.0	19.6	5	16.9	14	12	104.8	14

Standard error of a difference between the mean yields of any two varieties = 1.09 bushels.

^{1/} No yield in 1937.

Table 1.--(Continued)

Colby, Kansas
(Three 1/50-acre plots)

Variety	C. I. No.	Date headed	Height In.	Weight per bushel lbs.	Average acre yield Bu.	Yield				No. of years grown	Percent of Kharkof	Rank
						Av. 1931- 32, 34, 38; 1941-43	Rank	Average 1942-43	Rank			
						Bu.		Bu.				
		May										
Cheyenne x Tenmarq	11972	27	34	61	51.7	....	..	56.6	1	2	138.7	1
Comanche	11673	20	35	61	51.4	....	..	50.4	5	4	118.7	8
E. Blackhull x Tenmarq	11952	11	34	63	51.4	....	..	51.7	3	3	122.5	4
Early Blackhull	8856	10	34	62	50.3	30.6	5	45.3	11	7	101.0	14
Pawnee	11669	20	32	60	49.1	....	..	53.7	2	3	129.6	2
Cheyenne	8885	27	32	61	48.9	32.9	1	44.9	12	7	108.6	10
Tenmarq	6936	22	35	61	47.8	32.9 ^{1/}	1	47.5	9	6	113.1	9
Chiefkan	11754	22	39	62	47.8	....	..	50.3	6	4	121.0	6
Cheyenne x Tenmarq	12104	20	33	62	47.6	....	..	51.3	4	2	125.7	3
Nebred	10094	27	30	61	47.2	....	..	46.0	10	4	108.1	12
Kanred	5146	27	33	60	45.6	31.0	4	42.8	14	7	102.3	13
Turkey	1558	27	32	60	45.1	30.6	5	42.2	15	7	101.0	14
Blackhull	6251	22	34	61	45.0	32.9	1	44.7	13	7	108.6	10
Red Chief	12109	22	38	63	44.7	....	..	50.0	7	2	122.5	4
Cheyenne x Tenmarq	12103	22	34	62	43.3	....	..	48.6	8	2	119.1	7

Standard error of a difference between the mean yields of any two varieties = 1.91 bushels.

^{1/} No data for 1932.

Table 1.—(Continued)

Akron, Colorado

(Four 1/41-acre plots; 2 on fallow and 2 on corn land;
seeded September 23; emerged October 1, 1942)

Variety	C. I. No.	Date		Ht.	Hail July 8	Weight: per bushel	Average: acre yield	Yield				No. : years : grown	Percent : of Kharkof	Rank
		Head- ed	Ripe					Av. 1931- 39; 41-43	Average: Rank	1942-43 Rank				
		July	In.	Pct.	Lbs.	Bu.	Bu.		Bu.					
Blackhull	6251	5/28	7	43.0	20	57.0	24.3	16.6	2	27.4	4	12	124.8	5
Nebred	10094	6/1	7	38.8	20	58.5	24.3	....	..	26.2	7	7	121.5	10
Early Blackhull	8856	5/22	4	40.5	15	58.0	23.7	17.0	1	29.7	1	12	127.8	3
Cheyenne x Tenmarq	11972	5/22	8	40.5	20	58.3	22.7	....	..	....	..	1	114.6	11
Cheyenne	8885	6/1	8	39.8	20	57.5	22.4	14.7	4	21.4	13	12	110.5	12
Tenmarq	6936	5/29	8	42.8	20	57.5	21.4	16.2	3	26.5	6	12	121.8	9
Kan-Hd. Fed x Minh-Mint	11370	5/26	7	45.8	20	57.0	20.6	....	..	28.5	2	7	133.1	2
Chiefkan	11754	5/27	7	44.8	20	58.3	20.2	....	..	27.0	5	7	123.8	7
Kharkof	1583	6/1	8	40.5	20	57.0	20.2	14.1	6	22.5	11	12	106.0	14
E. Blackhull x Tenmarq	11952	5/24	5	41.3	30	58.0	20.2	....	..	28.4	3	3	141.1	1
Kharkof	1442	6/1	8	39.5	20	57.5	19.8	13.3	7	20.3	15	12	100.0	15
Kanred	5146	6/1	8	39.5	20	57.0	19.6	14.7	4	21.7	12	12	110.5	12
Comanche	11673	5/27	6	42.3	20	58.3	19.1	....	..	25.1	8	7	126.9	4
Red Chief	12109	5/27	7	45.0	20	59.5	17.5	....	..	25.0	9	2	123.2	8
Minturki	6155	6/1	9	43.5	20	56.0	15.8	12.4	8	20.5	14	12	93.2	16
Pawnee	11669	5/27	6	40.5	30	57.5	14.7	....	..	23.6	10	7	124.4	6
Alton	1438	6/3	9	41.8	20	58.0	12.9	10.9	9	15.8	16	12	82.0	17

Standard error of a difference between the mean yields of any two varieties = 1.67 bushels.

Table 1.--(Continued)

Lincoln, Nebraska

(Five 1/40-acre plots; seeded September 24; emerged October 4, 1942)

Variety	C. I. No.	Winter: sur- vival	Date Head- ed	Ripe	Ht.	Rust Stem	No. Leaf	Wt. culms: per A.	Av. per bu.	Yield Average: 1931-43	No. Average: 1942-43	Percent years: grown	Percent of Kharkof	
		Pct.			In.	Pct.	Pct.	(1000)	Lbs.	Bu.	Bu.	Bu.		
Pawnee	11669	90	5/26	6/29	38	5	48	3,752	62.1	54.3	....	55.1	8	131.7
E. Blackhull x Tenmarq	11952	80	5/24	6/29	41	5	66	2,240	63.2	47.7	....	47.0	2	112.7
Cheyenne x Tenmarq	11972	75	5/30	7/5	38	35	64	2,420	59.8	46.7	....	45.0	3	113.6
Minturki x Blackhull	11817	87	5/30	7/6	38	15	68	2,761	60.9	45.0	....	....	1	125.3
Tenmarq x Minturki	11982	80	5/30	7/4	40	40	71	2,467	59.1	44.3	....	....	1	123.4
Chiefkan	11754	85	5/29	7/5	41	20	60	2,589	61.0	43.7	....	42.1	6	113.2
Red Chief	12109	81	5/28	7/5	42	50	62	2,197	61.2	42.2	....	43.5	2	104.3
Comanche	11673	71	5/27	7/2	39	25	59	2,457	60.2	41.7	....	45.3	6	113.2
Blackhull	6251	80	5/30	7/5	39	10	72	2,775	62.1	39.7	26.9	33.9	13	98.9
Tenmarq	6936	75	5/30	7/4	40	40	79	2,339	58.6	39.6	28.5	42.2	13	104.8
Cheyenne x Blackhull	12112	75	5/30	7/5	39	60	79	2,415	60.0	39.5	....	42.8	2	102.6
Hope x Turkey	11964	83	5/28	7/2	35	0	54	3,012	59.6	38.9	....	42.8	3	110.4
Clarkan	8858	86	5/31	7/6	44	60	66	2,003	59.8	38.7	....	42.6	9	108.9
Cheyenne	8885	84	6/1	7/5	39	65	77	2,894	57.5	38.3	29.7	42.1	13	109.2
Turkey(Nebr. No. 1)	.....	87	6/1	7/6	39	45	79	2,787	59.6	37.5	26.8	39.2	13	98.5
Nebred	10094	80	5/31	7/6	36	25	77	2,975	60.1	37.3	28.2	39.3	13	103.7
Kharkof	1442	88	6/2	7/6	41	35	82	2,584	56.5	35.9	27.2	41.7	13	100.0
Nebr. No. 60	6250	84	6/3	7/7	41	55	82	2,620	56.2	32.2	26.0	37.6	13	95.6

Standard error of a difference between the mean yields of any two varieties = 1.47 bushels.

Table 1.--(Continued)

Alliance, Nebraska

(Rod-row plots, 7 replications, seeded September 11, 1942)

Variety	C. I. No.	: Winter: sur- vival	Date ¹ / Headed:	Ht.	Weight: per bushel	Average: acre yield	Yield			: No. years: grown	: Percent: of Kharkof:	: Rank	
							Av. 1931- 33-38-39; 42-43	Rank	Av. 1942- 1943				Rank
		: Pct.	: June	: In.	: Lbs.	: Bu.	: Bu.	: Bu.	: Bu.	:	:	:	
Nebred	10094	82	15	39	59.0	29.1	...	..	36.4	2	5	107.8	3
Cheyenne	8885	77	16	40	58.2	28.9	21.7	1	38.6	1	7	114.8	1
Cheyenne x Tenmarq	11972	59	13	38	57.9	27.6	...	..	....	..	1	113.6	2
Pawnee	11669	72	12	37	56.2	25.8	...	..	35.1	3	4	106.8	4
Cheyenne x Blackhull	12112	66	15	39	59.4	25.6	...	..	....	..	1	105.3	5
Kharkof	1442	79	18	41	58.4	24.3	18.9	3	34.0	4	7	100.0	8
Tenmarq	6936	67	14	41	57.8	24.3	18.7	4	31.2	7	7	98.9	9
Nebraska No. 60	6250	74	18	41	59.1	24.2	19.9	2	33.0	6	7	105.3	5
Red Chief	12109	74	13	42	61.5	23.7	...	..	28.9	10	2	85.0	12
Blackhull	6251	56	14	42	59.0	19.9	18.2	5	30.4	8	7	96.3	10
Comanche	11673	44	13	37	57.9	19.2	....	..	33.9	5	4	104.7	7
E. Blackhull x Tenmarq	11952	55	13	37	59.1	18.0	...	..	30.1	9	2	88.5	11
Chiefkan	11754	67	14	40	59.1	17.8	...	..	24.0	11	4	83.3	13

Standard error of a difference between the mean yields of any two varieties = 2.28 bushels.

¹/ All ripe on July 23.

Table 1.--(Continued)

Valentine, Nebraska

(Single Plots)

Variety	C. I. No.	Weight:	Average:	Yield	No.	Percent:	Rank
		per	acre	Average:		of	
		bushel:	yield	1942-43:		grown:	
		Lbs.	Bu.	Bu.			
Cheyenne x Tenmarq	11972	59.5	29.3	....	1	106.2	1
Cheyenne	8885	58.5	28.1	18.0	2	97.4	3
Kharkof	1442	58.0	27.6	18.6	1	100.0	2
Tenmarq	6936	58.0	25.7	17.5	3	90.5	5
Nebraska No. 60	6250	59.0	25.6	....	2	92.5	4
Early Blackhull x Tenmarq	11952	60.5	25.0	16.6	4	89.2	6
Comanche	11673	57.5	21.3	14.3	5	79.4	7
Pawnee	11669	58.0	16.7	12.6	6	66.9	9
Red Chief	12109	57.5	16.3	12.2	7	65.6	11
Chiefkan	11754	58.5	15.3	12.0	8	69.1	8
Blackhull	6251	58.5	14.1	11.1	9	66.7	10

Table 1.—(Continued)

Waseca, Minnesota
(Three 1/40-acre plots)

Variety	Number		Winter	Leaf	Stem	Weight	Av.	Yield			No.	Percent	Rank	
	C. I.	Selection	sur-	rust	rust	per	acre	Av. 1931-	Average	of	of			
			vival			bushel	yield	33; 35; 1937-43	Rank	1942-43; Rank	years	Kharkof		
			Pct.	Pct.	Pct.	Lbs.	Bu.	Bu.	Bu.					
Marmin	11502	.....	73	50	10	56.7	13.7	.....	25.6	4	9	109.6	6	
H-44 x Minturki ²	.....	Minn. 2713	72	T	T	56.5	13.4	.....	27.2	1	2	117.2	3	
Yogo	8033		72	50	35	56.3	12.8	32.6	1	26.2	2	11	109.4	7
H-44 x Minturki ²	.....	Minn. 2714	60	T	T	54.1	9.9	.....	26.1	3	2	112.5	4	
Minturki	6155		57	60	40	55.4	9.9	31.0	2	23.3	8	11	104.0	9
Hope x Minturki ²	.....	Minn. 2719	57	T	T	56.5	8.6	.....	.....	..	1	126.5	1	
Minhardi x Marquis	.....	Minn. 2699	52	30	10	54.9	7.7	.....	23.6	7	3	117.6	2	
Kharkof	1442		42	70	40	56.1	6.8	29.8	3	23.2	9	11	100.0	11
H-44 x Minturki ²	.....	Minn. 2711	62	T	T	55.3	6.7	.....	23.9	6	2	103.0	10	
H-44 x Minturki ²	.....	Minn. 2710	58	10	T	55.5	6.6	.....	25.1	5	2	108.2	8	
Mont. 36- Bel. x Kanred	12108	.....	47	50	50	54.6	4.5	.....	21.1	11	2	90.9	12	
Nebred	10094	.....	30	15	20	55.5	3.9	.....	22.8	10	7	112.5	4	
Karmont	6700	.....	28	70	40	53.6	1.7	.....	19.4	12	7	86.5	13	
Single Plots														
Hope x Minturki	.....	Minn. 2724	75	T	T	57.7	14.0							
Minturki	6155	.....	75	40	40	56.4	12.8							
Minturki selection	.....	Minn. 2722	60	T	T	56.4	8.9							
Fultz x Minturki	.....	Minn. 2725	33	T	15	55.8	8.3							
H-44 x Minturki ²	.....	Minn. 2720	60	T	T	55.1	7.0							
H-44 x Minturki ²	.....	Minn. 2723	60	5	T	54.5	7.0							
Minturki selection	.....	Minn. 2721	60	T	T	55.7	6.5							

Standard error of a difference between the mean yields of any two varieties = 1.06 bushels.

Table 1.--(Continued)

Sheridan, Wyoming

(Three 1/55 acre plots; seeded September 29; emerged October 15, 1942)

Variety	C. I. No.	Winter: sur- vival	Date Head- ed	Ripe	Ht. In.	Weight: per bushel	Average: acre yield	Average: 1931-43	Rank	Yield Average: 1942-43	Rank	No. years: grown	Percent: of Kharkof	Rank
		Pct.	June			Lbs.	Bu.	Bu.		Bu.				
Minturki	6155	93	26	7/31	45	59	47.7	27.8	5	41.8	4	13	93.9	9
Yogo	8033	92	29	7/31	40	59	45.5	30.1	2	40.5	6	13	101.7	5
Nebred	10094	73	23	8/1	39	60	44.0	....	..	42.8	1	7	103.0	4
Mont. 36-Belog. x Kanred	12108	93	28	7/31	39	60	43.1	....	..	42.2	2	2	106.0	2
Marmin	11502	90	19	7/31	40	59	41.9	....	..	39.3	8	8	95.1	8
Cheyenne	8885	82	24	8/4	39	59	39.4	....	..	42.1	3	9	109.0	1
Kanred	5146	87	24	8/1	40	59	37.9	30.9	1	40.8	5	13	104.4	3
Kharkof	1442	75	26	8/2	42	60	37.3	29.6	3	39.8	7	13	100.0	6
Karmont	6700	83	27	8/4	38	59	36.4	29.0	4	39.0	9	13	98.0	7

Standard error of a difference between the mean yields of any two varieties = 4.84 bushels.

Table 1.—(Continued)

Bozeman, Montana

(Three 1/56-acre plots; seeded Sept. 27, 1942)

Variety	C. I. No.	Winter:	Date		Lodg- ing	Average:		Yield			No. years grown	Percent:		Rank
		sur- vival	Head- ed	Ripe		acre	Av. 1931,	Av. 1931,	Average:	Rank		of	Rank	
		Pct.	Aug.	Pct.		Bu.	Bu.	Bu.	Bu.	Bu.		Kharkof:		
Nebred	10094	63	6/30	8	30	54.4	....	..	69.9	1	6	107.7		1
Yogo	8033	83	7/5	20	100	54.4	65.3	1	65.3	3	11	102.5		3
Marmin	11502	90	6/30	11	20	54.1	....	..	60.8	9	7	89.8		11
Minturki	6155	70	7/5	22	100	51.8	61.1	3	62.2	6	11	95.9		6
Mont. 36-Balog x Kanred	12108	60	7/3	16	100	47.6	....	..	67.4	2	2	104.5		2
Kharkof	1442	55	7/2	21	100	44.8	63.7	2	64.5	4	11	100.0		4
Newturk	6935	55	7/1	13	70	44.8	59.2	5	62.2	6	11	92.9		10
Montana 36	5549	53	7/3	22	100	44.3	61.0	4	63.4	5	11	95.8		7
Yogo x Oro Sel. 5	.....	93	7/2	15	100	44.3	....	..	....	..	1	93.1		9
Compound Hybrid B.H. 32-33	.....	83	7/1	16	80	42.7	....	..	....	..	1	89.7		12
Tenmarq	6936	40	6/28	8	5	39.2	....	..	60.9	8	2	94.4		8
Karmon	6700	45	7/3	22	100	37.1	....	..	60.7	10	9	97.0		5
Ridit x Utah Kanred	11599	30	7/2	23	100	37.0	....	..	53.1	11	3	85.1		14
Ridit x Relief	11925	38	7/1	23	100	35.9	....	..	....	..	1	75.4		15
Relief	10082	20	7/2	23	100	28.7	....	..	52.8	12	3	85.4		13

Standard error of a difference between the mean yields of any two varieties = 6.97 bushels.

Table 1.—(Continued)

Moccasin, Montana
(Four, 1/50-acre plots)

Variety	C. I. No.	Average winter survival Pct.
Yogo	8033	62.5
Minturki x Beloglina-Buffum	11661	42.5
Yogo x Oro Selection 5	.....	38.8
Kanred-Beloglina-Buffum x Karmont B.M. 54-66	.....	37.5
Marmin	11502	33.8
Mont. 36-Beloglina x Kanred	12108	26.3
Kanred x Minhardi N.W. 133	11726	25.0
Minturki	6155	22.5
Kharkof	1442	12.5
Newturk	6935	12.5
Bulk Hybrid selection	11744	12.5
Karmont	6700	10.0
Nebred	10094	8.8
Ridit x Relief	11925	8.8
Relief	10082	8.8
Ridit x Utah Kanred	11599	5.0

Table 1.--(Concluded)

Havre, Montana

(Three 1/50-acre plots; seeded October 14; emerged November 2, 1942)

Variety	C. I. No.	Winter:	Date		Weight:	Average:		Yield		No.	Percent:			
		sur-	Head-	Ripe	Ht.	per	acre	Av. 1931-	Rank	Average:	Rank	years:	of	Rank
		vival	ed			bushel:	yield	35-38-43:		1942-43:		grown:	Kharkof:	
		Pct.	June:	In.	Lbs.	Bu.	Bu.		Bu.					
Yogo	8033	62	26	7/31	47	56.2	27.5	17.8	1	35.9	1	11	113.4	1
Mont. 36-Belog. x Kanred	12108	56	20	8/1	43	60.4	26.7	....	..	34.6	2	2	109.5	2
Minturki	6155	60	25	8/1	46	56.4	23.9	16.3	2	32.4	3	11	103.8	3
Montana No. 36	5549	50	24	7/31	42	58.2	21.7	15.9	4	29.8	5	11	101.3	5
Kharkof	1042	43	22	8/1	44	58.3	21.7	15.7	6	31.6	4	11	100.0	7
Newturk	6935	48	20	8/1	43	57.9	19.5	15.9	4	29.9	5	11	101.3	5
Karmont	6700	43	26	8/1	43	58.0	18.3	16.1	3	28.8	7	11	102.5	4
Marmin	11502	42	23	8/1	43	58.9	17.2	....	..	27.0	9	6	81.4	9
Nebred	10094	35	20	8/1	39	59.7	13.3	....	..	27.1	8	6	84.4	8
Relief	10082	23	21	8/1	43	58.0	10.3	....	..	....	..	1	47.5	10
Ridit x Utah Kanred	11549	21	27	8/2	44	58.6	9.5	....	..	....	..	1	43.8	11
Ridit x Relief	11925	9	26	8/3	45	59.1	3.9	....	..	....	..	1	18.0	12

Standard error of a difference between the mean yields of any two varieties = 3.13 bushels.

Table 2.--Number of plots, average yield, and standard errors for the plot test at each cooperating station, 1943.

Station	No. of plots	Average yield of varieties	Standard error of a			
			Single plot	Difference between means	Mean in	
					Bushels	Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton ^{1/}	8	24.85	2.84	1.42	1.00	4.02
Chillicothe	4	27.58	1.66	1.17	0.83	3.01
Amarillo (Dry) ^{1/}	8	13.52	2.43	1.22	0.86	6.36
Oklahoma:						
Lawton	3	29.89	2.04	1.67	1.18	3.95
Woodward	4	30.44	5.67	4.02	2.84	9.33
Kansas:						
Manhattan	3	27.79	2.14	1.75	1.24	4.46
Hays	4	10.27	1.53	1.09	0.77	7.50
Colby	3	47.78	2.33	1.91	1.35	2.83
Colorado:						
Akron	4	19.97	2.36	1.67	1.18	5.91
Nebraska:						
Lincoln	5	41.30	2.33	1.47	1.04	2.52
Alliance ^{1/}	7	23.73	4.28	2.28	1.62	6.83
Valentine	1	22.27	....	....	....	....
Minnesota:						
Waseca	3	8.17	1.29	1.06	0.75	9.18
Wyoming:						
Sheridan	3	41.46	5.91	4.84	3.42	8.25
Montana:						
Bozeman	3	44.54	9.85	6.97	4.93	11.06
Havre	3	17.77	3.82	3.13	2.21	12.44

^{1/} Nursery plots.

SUMMARY OF YIELDS

The yields of the uniform as well as other varieties grown in cooperative experiments have been summarized for the different districts and States. Where possible, the average yields for the last 2 years (1942-43) are also given.

Districts

Summaries of the yield data for the uniform varieties grown in 1943 and the 1942-43 averages where available are presented in tables 3 to 8.

In the southern district in 1943 yields were reported from 5 stations, with 11 varieties being grown uniformly (table 3). The highest yielding variety was Cheyenne x Tenmarq (C. I. 11972), while Kawvale x Tenmarq (C. I. 11956) ranked second and Comanche third. Comanche yielded slightly higher and Pawnee less than Tenmarq. Wichita had an average nearly 2 bushels per acre above that of Early Blackhull. Red Chief, Blackhull, and Chiefkan ranked in the order named, and Kharkof was last.

The average yields of the varieties grown for the period 1942-43 are shown in table 4. A total of 9 station years' results are summarized. Comanche ranked first, followed by Wichita and Kawvale x Tenmarq (C. I. 11956). Pawnee

was below Tenmarq but above Blackhull, Red Chief, and Chiefkan. Kawvale x Tenmarq (C. I. 11956) is a selection apparently well adapted to the southern stations, is resistant to leaf rust, has a good capacity for yield but is lacking in milling and baking characteristics and is being discarded.

Table 3.--Summary of average yields of the uniform winter wheat varieties grown in plot tests at 5 stations in the southern district, 1943.

Variety or cross	C. I. No.	Average yield in bushels per acre					
		Denton	Chillli- cothe	Ama- rillo	Lawton	Wood- ward	Average
Cheyenne x Tenmarq	11972	30.6	31.3	17.5	33.7	32.3	29.1
Kawvale x Tenmarq	11956	31.9	33.1	9.6	33.8	32.4	28.2
Comanche	11673	26.6	31.6	14.9	29.3	33.5	27.2
Tenmarq	6936	23.7	29.2	14.7	34.6	31.2	26.7
Pawnee	11669	24.7	26.8	13.4	29.5	33.3	25.5
Wichita	11952	26.3	24.4	11.1	32.1	31.7	25.1
Red Chief	12109	26.6	23.5	15.8	26.7	31.5	24.8
Blackhull	6251	23.2	24.0	16.9	28.1	31.5	24.7
Early Blackhull	8856	26.5	24.2	8.6	27.6	29.1	23.2
Chiefkan	11754	26.9	14.6	15.8	27.7	26.8	22.4
Kharkof	1442	23.1	26.8	11.8	25.4	21.6	21.7

Table 4.--Summary of average yields of winter wheat varieties grown in plot tests at 5 stations in the southern district for all or part of the period 1942-43.

Variety or cross	C. I. No.	Average yield in bushels per acre					Weighted average
		Denton	Chillli- cothe	Ama- rillo	Lawton	Wood- ward	Bu.
No. of yrs. grown		1	2	2	2	2	
Comanche	11673	26.6	19.7	17.1	25.1	38.6	25.3
Wichita	11952	26.3	18.7	14.3	29.8	37.5	25.2
Kawvale x Tenmarq	11956	31.9	18.7	12.3	29.3	37.0	25.2
Tenmarq	6936	23.7	16.8	15.4	25.8	33.9	23.1
Early Blackhull	8856	26.5	16.8	14.4	25.9	32.2	22.8
Pawnee	11669	24.7	14.9	15.1	22.5	36.0	22.4
Blackhull	6251	23.2	15.6	17.9	23.1	30.1	21.8
Red Chief	12109	26.6	17.3	14.3	20.1	30.9	21.3
Chieftan	11754	26.9	10.8	17.1	19.7	27.0	19.6
Kharkof	1442	23.1	14.6	12.2	19.2	24.7	18.3

In the central district yields were reported from 7 stations and these are shown in table 5. Cheyenne x Tenmarq (C. I. 11972) ranked first for yield as it did in the southern district. Cheyenne averaged 2.5 bushels less than the leading variety, while Pawnee ranked third. Tenmarq and Wichita had identical average yields which were one bushel above Comanche. Chiefkan was only slightly higher than Kharkof, while Red Chief and Blackhull were the lowest.

The 1942-43 average yields for 8 varieties grown uniformly in the central district are shown in table 6. Pawnee ranked first with an average 2.1 bushels per acre above Wichita. Comanche ranked third, followed by Cheyenne, Red Chief, and Tenmarq, while Chiefkan and Blackhull had the lowest averages.

Table 5.--Summary of average yields of the uniform winter wheat varieties grown in plot tests at 7 stations in the central district, 1943.

Variety or cross	C. I. No.	Average yield in bushels per acre at:							Average Bu.
		Man- hattan	Hays	Colby	Akron	Lincoln	Alli- ance	Valen- time	
Chey. x Tenmarq	11972	34.0	13.2	51.7	22.7	46.7	27.6	29.3	32.2
Cheyenne	8885	32.5	8.6	48.9	22.4	38.3	28.9	28.1	29.7
Pawnee	11669	32.6	11.8	49.1	14.7	54.3	25.8	16.7	29.3
Tenmarq	6936	29.8	11.9	47.8	21.4	39.6	24.3	25.7	28.6
Wichita	11952	26.3	11.9	51.4	20.2	47.7	18.0	25.0	28.6
Comanche	11673	28.2	12.2	51.4	19.1	41.7	19.2	21.3	27.6
Chiefkan	11754	28.4	14.7	47.8	20.2	43.7	17.8	15.3	26.8
Kharkof	1442	27.7	6.1	45.1	19.8	35.9	24.3	27.6	26.6
Red Chief	12109	21.7	13.3	44.7	17.5	42.2	23.7	16.3	25.6
Blackhull	6251	24.0	9.6	45.0	24.3	39.7	19.9	14.1	25.2

1/ Yield of Turkey used.

Table 6.--Summary of average yields of winter wheat varieties grown in plot tests at 8 stations in the central district for all or part of the period 1942-43.

Variety or cross	C. I. No.	Average yield in bushels per acre at:							Weighted average Bu.
		Man- hattan	Hays	Colby	Akron	Lincoln	Alli- ance	Valen- time	
Number of years grown		2	2	2	2	2	2	2	1
Pawnee	11669	33.5	18.5	53.7	23.6	55.1	35.1	12.6	50.8
Wichita	11952	31.3	17.3	51.7	28.4	47.0	30.1	16.6	36.8
Comanche	11673	29.6	17.5	50.4	25.1	45.3	33.9	14.3	43.8
Cheyenne	8885	29.4	15.7	44.9	21.4	42.1	38.6	18.0	35.5
Red Chief	12109	23.7	19.8	50.0	25.0	43.5	28.9	12.2	49.0
Tenmarq	6936	28.7	17.8	47.5	26.5	42.2	31.2	17.5	30.7
Chiefkan	11754	25.9	21.2	50.3	27.0	42.1	24.0	12.0	45.1
Blackhull	6251	21.7	16.8	44.7	27.4	33.9	30.4	11.1	30.8

Yields of the varieties grown in the northern district in 1943 are shown in table 7. At the four stations from which yields were reported Yogo had the highest average, with Minturki ranking second and Marmin third. Kharkof and Karmont had the lowest averages, due in part to the very poor yields at Waseca.

Table 7.--Summary of average yields of varieties of winter wheat grown in plot tests at 4 stations in the northern district in 1943.

Variety or cross	C. I. No.	Average yield in bushels per acre at:				Average Bu.
		Waseca	Sheridan	Bozeman	Havre	
Yogo	8033	12.8	45.5	54.4	27.5	35.1
Minturki	6155	9.9	47.7	51.8	23.9	33.3
Marmin	11502	13.7	41.9	54.1	17.2	31.7
Mont. 36-Bel. x Kanred	12108	4.5	43.1	51.3	26.7	31.4
Nebred	10094	3.9	44.0	54.4	13.3	28.9
Kharkof	1442	6.8	37.3	47.6	21.7	28.4
Karmont	6700	1.7	36.4	37.1	18.3	23.4

For the two-year period (1942-43) it is necessary to show two averages (table 8) because all varieties were not included at Grand Rapids and St. Paul. The average yields for 6 stations and for 8 stations agree in that Yogo and Mont. 36-Beloglina x Kanred (C. I. 12108) have had the highest averages. Minturki averaged slightly less than Nebred, and Marmin and Karmont had yields below Kharkof, when the six-station average is considered.

Table 8.--Summary of average yields of winter wheat varieties grown in plot tests at 8 stations in the northern district for all or part of the period 1942-43.

Variety or cross	C. I. No.	Average yield in bushels per acre at:								Weighted av.	
		Waseca	St. Paul	Grand Rapids	Dickinson	Sheridan	Bozeman	Mohr	Havre	8 sta- tions	6 sta- tions ^{1/}
										Bu.	Bu.
Number of years grown		2	1	1	1	2	2	1	2		
Yogo	8033	26.2	47.9	37.4	31.8	40.5	65.3	39.9	35.9	41.1	40.8
Mont. 36-Bel x Kan	12108	21.1	53.9	36.2	30.9	42.2	67.4	40.1	34.6	41.0	40.2
Nebred	10094	22.8	....	....	28.6	42.8	69.9	36.8	27.1	....	39.1
Minturki	6155	23.3	45.4	31.9	29.3	41.8	62.2	37.4	32.4	38.6	38.6
Kharkof	1442	23.2	....	....	19.9	39.8	64.5	38.3	31.6	....	37.6
Marmin	11502	25.6	48.1	30.9	25.9	39.3	60.8	34.6	27.0	37.1	36.6
Karmont	6700	19.4	....	....	23.0	39.0	60.7	38.6	28.8	....	35.7

^{1/} Excluding Grand Rapids and St. Paul.

States

In several of the States there were two or more cooperating stations from which data were received in 1943. At some of these stations only the uniform varieties were grown, while at others additional ones were included. It has been the practice to summarize the data by States by averaging yields from all stations within a State. In 1943, data were reported from more than one station in Texas, Oklahoma, Kansas, Nebraska, and Montana, and summaries have been made up for these.

In Texas, 13 varieties were grown at the three stations and the average yields are shown in table 9. Cheyenne x Tenmarq (C. I. 11972), Kawvale x Tenmarq (C. I. 11956), and Comanche had the highest average yields for 1943, and Wichita had a slight advantage over Early Blackhull. For the 1942-43 average, Comanche ranked first, Kawvale x Tenmarq (C. I. 11956) second, and Wichita third. Kanred-Hard Federation x Tenmarq (C. I. 12105) ranked fourth for both averages and seems to have promise. Pawnee does not have a good record in Texas, and Chiefkan is unusually low in yield.

Twelve varieties were grown uniformly at two stations in Oklahoma and these yields are averaged in table 10. For 1943 Kawvale x Tenmarq (C. I. 11956), Cheyenne x Tenmarq (C. I. 11972), and Tenmarq had the highest average yields. Pawnee and Comanche had identical averages and Wichita was considerably better than Early Blackhull. For the 2-year average Wichita ranked first, Kawvale x Tenmarq (C. I. 11956) second, and Comanche third. Red Chief, Chiefkan, and Kharkof had the lowest averages.

At three Kansas stations, 13 varieties were grown uniformly (table 11). Cheyenne x Tenmarq (C. I. 11972), Pawnee, and Comanche had the highest average yields for 1943. Wichita averaged 2 bushels above Early Blackhull and all varieties listed exceeded Turkey and Kanred in yield. The 1942-43 averages

follow the same general order as the 1943 yields except that Wichita, which ranked sixth in 1943, ranked third for the 1942-43 average.

Table 9.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Texas in 1943, and weighted average for 1942-43.

Variety or cross	C. I. No.	Average yield in bushels		Rank
		1943 (3 stations)	1942-43 (5 station yrs.)	
Cheyenne x Tenmarq	11972	26.5	...	..
Kawvale x Tenmarq	11956	24.9	18.8	2
Comanche	11673	24.4	20.0	1
Kan-H. Fed x Tenmarq	12105	23.2	18.4	4
Tenmarq	6936	22.5	17.6	8
Kanred	5146	22.2	16.7	10
Red Chief	12109	22.0	18.0	5
Pawnee	11669	21.6	17.0	9
Blackhull	6251	21.4	18.0	5
Kharkof	1442	20.6	15.3	12
Wichita	11952	20.6	18.5	3
Early Blackhull	8856	19.8	17.8	7
Chiefkan	11754	19.1	16.5	11

Table 10.--Average yields in bushels per acre of winter wheat varieties grown in plot tests in Oklahoma in 1943, and weighted averages for 1942-43.

Variety or cross	C. I. No.	Average yield in bushels		Rank
		1943 (2 stations)	1942-43 (4 station yrs.)	
Kawvale x Tenmarq	11956	33.1	33.2	2
Cheyenne x Tenmarq	11972	33.0	...	..
Tenmarq	6936	32.9	29.9	4
Wichita	11952	31.9	33.7	1
Pawnee	11669	31.4	29.3	5
Comanche	11673	31.4	31.9	3
Cheyenne	8885	30.3	27.5	7
Blackhull	6251	29.8	26.6	8
Red Chief	12109	29.1	25.5	9
Early Blackhull	8856	28.4	29.1	6
Chiefkan	11754	27.3	23.4	10
Kharkof	1442	23.5	22.0	11

Table 11.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Kansas in 1943, and weighted average for 1942-43.

Variety or cross	C. I. No.	Average yield in bushels		Rank
		1943 (3 stations)	1942-43 (6 station yrs.)	
Cheyenne x Tenmarq	11972	33.0	36.6	1
Pawnee	11669	31.2	35.2	2
Comanche	11673	30.6	32.5	4
Chiefkan	11754	30.3	32.5	4
Cheyenne	8885	30.0	30.0	8
Wichita	11952	29.9	33.4	3
Tenmarq	6936	29.8	31.3	6
Nebred	10094	28.6	29.1	9
Early Blackhull	8856	27.9	28.9	10
Red Chief	12109	26.6	31.2	6
Blackhull	6251	26.2	27.7	11
Turkey	1558	24.9	25.8	12
Kanred	5146	24.5	25.7	13

Three Nebraska stations reported yields and at these 11 varieties were grown uniformly (table 12). Cheyenne x Tenmarq (C. I. 11972), Pawnee, Cheyenne, and Wichita had the highest averages in 1943. For the 1942-43 average Pawnee, Cheyenne, and Comanche were the three highest yielding varieties and Blackhull the lowest.

Table 12.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Nebraska in 1943, and weighted averages for 1942-43.

Variety or cross	C. I. No.	Average yield in bushels :		Rank
		1943 (3 stations)	1942-43 (7 station yrs.)	
Cheyenne x Tenmarq	11972	34.5	33.3	1
Pawnee	11669	32.3	36.6	1
Cheyenne	8885	31.8	33.3	2
Wichita	11952	30.2	32.0	4
Tenmarq	6936	29.9	30.4	7
Kharkof	1442	29.3	31.3	5
Red Chief	12109	27.4	31.2	6
Comanche	11673	27.4	33.0	3
Nebraska No. 60	6250	27.3	...	...
Chiefkan	11754	25.6	28.8	8
Blackhull	6251	24.6	26.0	9

In Montana two stations reported yields and at these Yogo had the highest average in 1943 (table 13). Minturki, Mont. 36-Beloglina x Kanred (C. I. 12108), and Marmin had good averages while Redit x Relief (C. I. 11925) and Relief had the lowest average yields. For the two-year period, including five station-years, Mont. 36-Beloglina x Kanred (C. I. 12108), Yogo, and Nebred had the highest averages, and Marmin the lowest.

Table 13.--Average yield in bushels per acre of winter wheat varieties grown in plots in Montana in 1943, and weighted averages for 1942-43.

Variety or cross	C. I. No.	Average yield in bushels :		Rank
		1943 (2 stations)	1942-43 (5 station yrs.)	
Yogo	8033	41.0	48.5	2
Minturki	6155	37.9	45.3	5
Mont. 36-Bel. x Kanred	12108	37.2	48.8	1
Marmin	11502	35.7	42.0	8
Nebred	10094	33.9	46.2	3
Kharkof	1442	33.3	46.1	4
Montana No. 36	5549	33.0	...	...
Newturk	6935	32.2	44.9	6
Karmont	6700	27.7	43.5	7
Redit x Utah Kanred	11599	23.3	....	...
Redit x Relief	11925	19.9	....	...
Relief	10082	19.5	....	...

SUMMARY OF AGRONOMIC DATA

The agronomic (other than yield) and disease data have been summarized for each district for 1943 in tables 14 to 16. In each case the data are averaged for as many varieties and as many stations as possible. The number of stations entering the averages is shown at the top of each column.

Eleven varieties were grown uniformly at the southern stations and the data are averaged in table 14. For date of heading Early Blackhull was the earliest followed closely by Wichita, and several days later by Pawnee and Comanche. Ripening dates show the same differences only the spread was not so great. Average heights differ by very little, with only three inches spread between the shortest and tallest variety. For leaf rust reaction Kawvale x Tenmarq (C. I. 11956) had the lowest average infection, while Comanche and Pawnee were intermediate and Kharkof had the highest average infection. Red Chief had the highest average test weight per bushel. Wichita, Chiefkan, and Early Blackhull also had high averages, while Kharkof was the lowest for weight per bushel.

Table 14.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the southern district, 1943.

Variety or cross	C. I. No.	Date		Average		
		Head- ed	Ripe : June	Height : In.	Leaf : rust : Pct.	Wt. per bushel : Lbs.
Number of stations		5	4	4	3	5
Kharkof	1442	5/6	15	27	69	57.8
Blackhull	6251	5/3	13	28	52	59.9
Tenmarq	6936	5/3	13	29	43	59.1
Early Blackhull	8856	4/23	5	28	43	60.0
Pawnee	11669	5/1	10	26	34	58.8
Comanche	11673	5/1	10	28	29	59.0
Chiefkan	11754	5/4	13	29	40	60.1
Wichita	11952	4/24	6	29	46	60.7
Kawvale x Tenmarq	11956	5/3	10	26	4	59.3
Cheyenne x Tenmarq	11972	5/4	12	27	40	59.9
Red Chief	12109	5/3	13	28	45	61.1

In the central district winter survivals were reported from two stations (table 15), and the averages showed Cheyenne and Pawnee to be the most hardy and Comanche the most tender. The high average of Pawnee is somewhat out of line with previous tests with this variety. Wichita averaged first for date of heading but ripened at the same date as did Pawnee. Tenmarq had an average heading date one day earlier than either Pawnee or Comanche. Average heights showed Cheyenne and Pawnee to be the shortest and Chiefkan and Red Chief the tallest. All varieties developed considerable leaf rust but Pawnee, Comanche, and Cheyenne x Tenmarq (C. I. 11972) showed the most resistance, and Cheyenne the least. Culm counts from two stations indicated that Pawnee and Cheyenne tillered the most and Wichita the least, while Comanche and Red Chief also were low. Test weights per bushel varied from 59.1 pounds on the average to 60.9. Red Chief had the highest average, followed by Wichita and Chiefkan, while Tenmarq and Cheyenne had the lowest averages.

Table 15.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the central district, 1943.

Variety or cross	C. I. No.	Winter:	Date		Height In.	Leaf:	No. culms per A.	Weight per bushel
		sur-	Head-	Ripe		rust		
		vival	ed					
		Pct.	May	July		Pct.	(1000)	Lbs.
Number of stations		2	6	5	6	2	2	7
Blackhull	6251	68	27	5	37	71	2273	59.9
Tenmarq	6936	71	23	4	37	61	2090	59.1
Cheyenne	8885	81	30	5	35	80	2562	59.1
Pawnee	11669	81	24	2	35	38	2941	59.2
Comanche	11673	58	24	3	36	43	2099	59.3
Chiefkan	11754	76	26	4	39	57	2250	60.2
Wichita	11952	68	20	2	35	72	1970	60.6
Cheyenne x Tenmarq	11972	67	28	4	36	46	2170	59.7
Red Chief	12109	78	26	4	39	66	2004	60.9

The data for the northern district are summarized in table 16. Winter-killing was reported from five stations and at these Yogo and Marmin had the highest average survival while Karmont and Nebred were the lowest. For date of heading Nebred was the earliest and Yogo the latest, based on an average of three stations. As usual, Minturki had the tallest straw and Nebred the shortest. Test weights were reported from three stations and when these data were averaged the differences proved to be small. All averages were well under 60 pounds per bushel with four varieties averaging approximately 58 pounds per bushel, and the rest approximately 57 pounds per bushel.

Table 16.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the northern district in 1943.

Variety or cross	C. I. No.	Winter:	Date		Height In.	Weight per bushel
		sur-	Head-	Ripe		
		vival	ed			
		Pct.	June	Aug.		Lbs.
Number of stations		5	3	3	2	3
Minturki	6155	60.5	29	8	46	56.9
Yogo	8033	74.3	30	7	44	57.2
Nebred	10094	42.0	24	3	39	58.4
Mont. 36-Beloglinax Kanred	12108	56.5	27	6	41	58.3
Marmin	11502	65.8	24	4	42	58.2
Kharkof	1442	45.5	27	8	43	58.1
Karmont	6700	41.8	29	9	42	56.9

SUMMARY OF PLOT DATA

The winter wheat crop in the southern district was influenced by extreme temperature fluctuations which caused some winterkilling. The spring, until early May, was dry followed by extremely heavy rains before and during harvest.

In the central district some winterkilling occurred but the crop was good except at one or two stations.

Winterkilling was very severe at most stations in the northern district.

No serious disease or insect damage occurred in 1943.

In the southern district Cheyenne x Tenmarq (C. I. 11972) gave the highest average yield, with Kawvale x Tenmarq (C. I. 11956) ranking second.

Comanche, Wichita, and Kawvale x Tenmarq (C. I. 11956) have had the highest two-year average yields in the southern district.

Cheyenne x Tenmarq (C. I. 11972) had the highest average yield in the central district in 1943. Cheyenne and Pawnee were also high in yield.

Pawnee and Wichita have the highest average yields for the 1942-43 period in the central district. The ranking of Wichita is surprising in view of its lack of winterhardiness.

In the northern district Yogo and Mont. 36-Beloglina x Kanred (C. I. 12108) had the highest average yields.

Comanche is being distributed in Texas, Oklahoma, and Kansas, and the acreage is increasing rapidly.

Pawnee is being distributed by Kansas and Nebraska, and to a limited extent by Oklahoma.

Wichita will be increased in Texas, Oklahoma, and Kansas. Texas and Oklahoma will distribute it as soon as sufficient seed is available.

UNIFORM YIELD NURSERY

In the fall of 1942 the uniform yield nursery was seeded at the same 14 stations in the central and southern districts as in 1941. The nursery consisted of 30 varieties and strains, each seeded in three row-plots with three to five replications. In table 17 the varieties making up the 1943 nursery, together with State and C. I. numbers, are shown.

A comparison of the 1943 list with that of 1942 will show a number of changes in the nursery. Six strains which seemed to be lacking in agronomic value and which were not needed for ecological studies were replaced by newer selections. As soon as a strain is shown to be lacking in some important character, it is omitted from the nursery, although it may be continued at individual stations. The strains having the best performance in the nursery are tested in plot trials. An attempt is made to avoid too many duplications between the plot and nursery tests.

Table 17.--Varieties of winter wheat grown in the uniform yield nursery, 1943.

Variety	C. I. No.	State or hybrid No.
Kharkof	1442	
Blackhull	6251	
Early Blackhull	8856	
Comanche	11673	Kans. No. 2729
Pawnee	11669	Nebr. No. 1086
Kawvale x Tenmarq	11950	Kans. No. 2726
Kawvale x Tenmarq	11956	Denton No. 35-34-117
Wichita	11952	Kans. No. 2739
Cheyenne x Tenmarq	11972	Kans. No. 2748
Cheyenne x Tenmarq	12103	Kans. No. 2749
Cheyenne x Tenmarq	12104	Kans. No. 2750
Kanred-Hard Federation x Tenmarq	11974	Denton No. 37-34-54
Cheyenne x Early Blackhull	11999	Woodward No. 1126
Cheyenne x Early Blackhull	12000	Woodward No. 1127
Blackhull x Cheyenne	12101	H. C. No. 40-102
Blackhull x Tenmarq	12102	H. C. No. 40-115
Hope x Turkey	11964	Nebr. sel. No. 363404
Kanred-Hard Federation x Tenmarq	12106	Denton sel. No. 25-34-44
Kanred-Hard Federation x Tenmarq	12105	Denton sel. No. 33-34-303
Cheyenne x Early Blackhull	12114	H. C. No. 40-91
Tenmarq x Oro	12111	Denton sel. No. 70-38-44
Marquillo x Tenmarq	12113	Kans. No. 2755
Marquillo x Oro	11979	Kans. sel. No. 383483
Cheyenne x Blackhull	12112	Nebr. sel. 3120A-1-7
Kanred-Hard Federation x Tenmarq	12110	Amarillo sel. No. 25-34-116
Kanred-Hard Federation x Tenmarq	12115	Amarillo sel. No. 33-37-90
Quivira x Tenmarq	12116	Kansas No. 2762
Kanred-Hd. Fed. x Minhardi-Mint.	12117	Akron No. 186
Kanred-Hd. Fed. x Minhardi-Mint.	12118	Akron No. 192
Kanred-Webster x (Kanred x Hard Federation-Marquis) x Marquis	12119	Akron No. 864

DATA OBTAINED

In table 18 are presented the data from 13 nurseries, since the one seeded at North Platte was ruined by hail. For each station the varieties are listed in order of 1943 yields, and only C. I. numbers are given for identification. Average yields and ranks for the 2-year period, 1942-43, are shown where possible, and the average yield for the variety for the period grown is expressed as a percentage of Kharkof check for the same period. Data other than yield are included when the characters concerned seemed to be related to yield or when the data showed differences believed to be of interest.

At Denton, the variable temperatures mentioned earlier caused some killing of the more tender varieties such as C. I. numbers 12105, 12119, and 8856 (Early Blackhull). Leaf rust notes were taken in both the fall and spring and showed good differentiation for reaction with C. I. 11979 having the lowest spring reading. Test weights ranged from 54.0 to 60.0 pounds per bushel and yields from 18.5 to 33.8 bushels per acre. Three strains, C. I. numbers 11972, 12103, and 12110, had average yields above 30 bushels per

acre, and 12 strains outyielded C. I. 11669 (Pawnee) and C. I. 11673 (Comanche). Grown for 4 years C. I. 11952 (Wichita) has averaged 29.0 bushels per acre compared to 26.1 bushels for C. I. 8856 (Early Blackhull).

In a few varieties lodging was rather heavy at Chillicothe, as for example C. I. numbers 12106, 12117, and 12105. Leaf rust was fairly severe and may have had some influence on yield, although the relationship is not clear cut. C. I. numbers 11956, 12110, and 11979 had readings of only 2 percent. Test weights per bushel were good with a number of varieties weighing 62 and 63 pounds per bushel. The highest yielding strains were C. I. numbers 12105, 11956, 12111, 11974, and 11972, all of which averaged more than 30 bushels per acre. Nine strains had yields above Comanche (C. I. 11673), and all but three strains outyielded Early Blackhull. In general, the averages for 1942-43 are in line with the 1943 yields except that C. I. 11972, which ranked fifth for 1943, ranks first for the 2-year period. The varieties grown for 5 years rank in the following order for yield: Comanche (C. I. 11673), Pawnee (C. I. 11669), Early Blackhull (C. I. 8856), Blackhull (C. I. 6251), and Kharkof (C. I. 1442).

The nursery at Amarillo (Bushland) was grown on dryland and was injured by green bugs, thus straw was short, test weights rather low, and the yields ranged from slightly less than 20 to about 8 bushels per acre. The highest yielding varieties were C. I. numbers 12114, 12110, 12101, and 11999. The average yields for the period 1942-43 follow in general the same ranking as do those for 1943. Grown for 3 years, Kanred-Hard Federation x Tenmarq (C. I. 12105) has made a very good record for yield as expressed in percentage of Kharkof. Wichita (C. I. 11952) has made a much better showing at this station than has Early Blackhull (C. I. 8856), and Pawnee (C. I. 11669) has a higher percentage of Kharkof than does Comanche (C. I. 11673).

At Stillwater drought and green bugs caused considerable damage and as a result the crop was very light. The yields reported from this station ranged from 17.7 to 4.0 bushels per acre. Wichita (C. I. 11952) had the highest yield in 1943 and the highest average for 1942-43. Other strains having good records in 1943 were C. I. numbers 12112, 11956, 12000, and 12104. The agreement between the 1943 and the 1942-43 average yields is not especially close. For example, C. I. 12112 ranked second in 1943, but twelfth for the 1942-43 average, while Pawnee (C. I. 11669) was near the bottom in 1943, but ranked eleventh for the 1942-43 average. When the average yields are expressed as percentages of Kharkof all exceed 100 percent, with the highest strains being C. I. numbers 12116, 12117, 12115, and 12118.

The crop at Woodward was rather good and some interesting comparisons may be made. Leaf rust was present with such varieties as C. I. numbers 11956, 12110, 11950, 11964, and 11979 showing considerable resistance and C. I. 11999 being very susceptible. The rust did not seem to have had any great influence on yield. Some shattering occurred especially in C. I. 11956. Test weights were all between 60 and 63 pounds per bushel. The following strains had the highest average yields; C. I. numbers 12114, 11673 (Comanche), 11999, and 12101. All but two of the strains in the nursery had average yields above C. I. 1442 (Kharkof). Varieties tested for five or more years and having good yield records are Comanche (C. I. 11673), Pawnee (C. I. 11669), C. I. 11950, Wichita (C. I. 11952), and C. I. 11974. Wichita has a much better yield record at Woodward than has Early Blackhull, and in the nursery Pawnee has had an advantage over Comanche.

At Manhattan, there was a wide spread in dates of heading between early and late strains, straw was fairly well, and lodging was rather severe in most of the varieties. Leaf rust readings were reported as were loose smut counts, one strain, C. I. 11979, having 37% of loose smut, and several others were above 10%. Yields ranged from 37.9 to 16.7 bushels per acre with the highest yields reported for C. I. numbers 11956, 12115, 11952 (Wichita), and C. I. 12110. Five strains outyielded Pawnee (C. I. 11669) and 13 strains were above Comanche (C. I. 11673). The 1942-43 average yields follow very closely those for 1943 except that C. I. 11952 (Wichita) ranks first for the 2-year average. For the entire period grown all but two strains have exceeded Kharkof check by a rather wide margin, in fact two strains have percentages slightly above 180, and this for a 3-year period.

Dry weather at Hays cut the yields at this station considerably below the usual figure, and test weights per bushel also were low. The highest yielding strains were C. I. numbers 12114, 11999, 12101, and 12000, with all but one strain ranking above Kharkof (C. I. 11442). The 2-year averages agree rather well with the 1943 yields, except that C. I. 11669 (Pawnee) had a poor yield in 1943 and this pulled down the average. Over the period of years grown all strains have outyielded Kharkof as shown by the percentage of Kharkof figure. In this nursery C. I. 11669 (Pawnee) has had a better yield record than C. I. 11673 (Comanche), and C. I. 11952 (Wichita) has outyielded C. I. 8856 (Early Blackhull).

The Akron crop was characterized by having a very heavy straw growth with very poor grain quality and low yields. The available moisture was exhausted before the crop matured, and then a hailstorm damaged the wheat a few days before it ripened. The highest yielding strains were C. I. numbers 12000, 8856 (Early Blackhull), 12101, and 12102. It should be noted that Early Blackhull (C. I. 8856) has been grown for 9 years and has a percentage of Kharkof of 123.6, and that for a 4-year period Wichita (C. I. 11952) has a percentage of 127.8. Both of these are tender varieties.

Growth was not as heavy as usual at Fort Collins and as a result the crop stood up rather well. Some leaf rust developed but it was not a heavy epidemic. Test weights per bushel were heavy as usual and the yields ranged from 53.6 to 36.2 bushels per acre. Among the higher yielding strains were C. I. numbers 12114, 11673 (Comanche), 11950, and 12103. Eight strains outyielded Kharkof (C. I. 11442) and Blackhull (C. I. 6251). At this station Pawnee (C. I. 11669), Comanche (C. I. 11673), and Wichita (C. I. 11952) have exceeded the check by a rather small margin. C. I. 12114 grown for 2 years and C. I. 11974 grown for 4 years have the best yield records when expressed in terms of percentage of Kharkof.

At Hesperus (Ft. Lewis) yields were variable and in light of the standard error there may be no significant differences. No disease notes were reported, test weights were uniformly high, but the average yields were about half as large as they were last year. Of the varieties grown for 4 or more years the best records have been made by the following: C. I. numbers 11972, 11673 (Comanche), 6251 (Blackhull), and 11974, while C. I. 8856 (Early Blackhull) and C. I. 11952 (Wichita) have yielded less than Kharkof.

Winterkilling occurred at Ames as shown by the stand at harvest, and, while the data show some unexplained variations, must have had considerable influence on yield. Grain was extremely light in test weight and yields ranged from 23.5 to 1.3 bushels per acre. The highest yielding strains were C. I. numbers 11956, 12000, 12114, and 12102. In general, the 1943 data agree with the 2-year averages, although C. I. 11669 (Pawnee) had a rather low yield compared to 1942. Grown for 4 or more years the following strains have exceeded Kharkof in yield: C. I. numbers 11956, 11950, 11669 (Pawnee), and 11952 (Wichita). It should be pointed out that all of these strains except Wichita are Kawvale x Tenmarq selections.

Winterkilling was an important factor in the nursery at Lincoln, although as stated earlier no killing occurred in the plots. As at Ames, the three Kawvale x Tenmarq strains, C. I. numbers 11956, 11669 (Pawnee), and 11950, showed the highest survival. Winter survival undoubtedly had a great influence on yield, and in addition some strains may have been hurt by leaf rust which was fairly heavy. No strain had a test weight of 60 pounds per bushel, the range being from 51.0 to 59.9. The highest yielding strains were C. I. numbers 11956, 11669 (Pawnee), 11950, and 12000. The first three strains have the best long-time record at Lincoln, Pawnee (C. I. 11669) being slightly the better having outyielded Kharkof by 34.9 percent over a 9-year period.

At Alliance winterkilling was also a factor, and the yields are closely associated with survival. Straw was rather tall and test weights ranged from 57.0 to 61.5 pounds per bushel. Strains yielding the highest were C. I. numbers 11972, 12112, 12114, 1442 (Kharkof), and 11669 (Pawnee). Only six strains have outyielded Kharkof, namely, C. I. numbers 11972, 12112, 12114, 11669 (Pawnee), 12110, and 12000. At this station the need is for fairly early wheats with considerable winterhardiness.

Table 18.--Agronomic and other data for the uniform winter wheat varieties grown in replicated nursery plots in cooperative experiments at 13 stations in the hard red winter wheat area in 1943, and average yields for 1942-43.

Denton, Texas
(Four plots)

C. I. No.	: Winter: Date		: Leaf rust Wt. Av. : Yield		: No. : Percent:								
	: sur	: Head	: Ht.	: per	: acre	: Average:	: years: of	: Rank					
	: vival	: ed	: Ripe	: Fall	: Spring	: bu.	: yield: 1942-43:	: Rank	: grown: Kharkof:				
	: Pct.	:	: In.	: Pct.	: Pct.	: lbs.	: Bu.	: Bu.	:	:	:	:	
11972	100	5/1	6/3	31	30	50	58.0	33.8	24.6	1	3	169.6	4
12103	100	5/1	6/2	27	40	49	58.0	31.6	24.0	2	2	164.4	5
12110	97	4/29	6/1	34	T	15	58.0	30.9	....	..	1	137.3	12
11956	100	5/2	6/2	32	T	16	58.0	29.6	23.3	5	3	176.4	2
12111	100	5/1	6/3	32	30	29	58.0	29.2	....	..	1	129.8	16
12104	99	4/28	6/3	27	40	46	60.0	29.0	23.5	4	2	161.0	6
12115	98	4/26	6/1	30	5	36	60.0	28.1	....	..	1	124.9	17
11952	98	4/21	5/25	31	30	50	60.0	27.8	23.7	3	4	171.6	3
12106	99	4/27	6/2	32	35	45	57.5	27.7	21.6	7	2	147.9	10
12114	100	4/29	6/3	31	30	70	59.0	27.3	....	..	1	121.3	20
11950	100	4/29	6/2	33	T	15	56.0	26.5	20.5	9	4	149.1	9
12101	100	5/3	6/5	27	30	56	59.0	25.6	19.0	12	2	130.1	14
11669	100	4/29	6/2	29	10	33	58.0	25.5	21.1	8	7	159.6	7
11673	99	4/27	6/2	29	20	19	57.0	25.4	21.8	6	6	179.1	1
12113	95	5/1	6/4	31	25	35	57.0	24.8	....	..	1	110.2	22
11979	98	5/1	6/5	28	10	5	57.0	24.0	....	..	1	106.7	23
8856	90	4/19	5/25	31	35	53	60.0	23.7	19.1	10	10	153.0	8
12116	94	4/29	6/1	31	Seg.	35	60.0	23.5	....	..	1	104.4	25
11964	96	4/30	6/2	28	10	29	59.0	23.1	19.1	10	2	130.8	13
1442	100	5/4	6/7	30	40	50	57.0	22.5	14.6	19	10	100.0	26
12118	98	4/26	5/30	34	40	65	57.0	22.5	....	..	1	100.0	26
12112	100	5/3	6/4	30	30	60	59.0	22.2	....	..	1	98.7	28
11999	98	5/1	6/1	29	35	60	60.0	22.0	17.8	16	2	121.9	19
12000	100	4/22	5/27	31	30	45	58.0	21.5	19.0	12	2	130.1	14
6251	99	5/4	6/5	30	40	59	60.0	21.2	16.4	17	10	119.4	21
11974	98	4/26	6/1	31	25	26	54.0	19.9	18.0	14	3	142.2	11
12119	80	4/29	6/3	31	30	41	56.0	19.7	....	..	1	87.6	29
12105	65	4/28	6/3	29	5	8	57.0	19.4	18.0	14	2	123.3	18
12102	98	5/2	6/4	28	40	54	59.0	18.9	15.4	18	2	105.5	24
12117	100	4/30	6/2	31	30	66	57.0	18.5	....	..	1	82.2	30

Standard error of a difference between the mean yields of any two varieties = 4.00 bushels.

Table 18.--(Continued)

Chillicothe, Texas

(Four plots)

C. I. No.	Date	Lodg- ing	Leaf: rust	Weight: per bushel	Average: yield 1942-43	Yield	No. Rank	Percent: of years: grown: Kharkof:	Rank
:	ed :	:	:	Lbs. :	Bu. :	Bu. :	:	:	:
12105	4/27	20	10	60	34.5	24.5	5	2	97.2
11956	5/3	0	2	61	32.9	26.1	2	3	150.0
12111	5/3	0	15	62	32.4	....	..	1	137.9
11974	5/3	0	20	58	31.8	22.9	8	3	140.8
11972	5/3	0	40	61	31.4	26.3	1	3	158.6
11950	5/3	0	10	60	30.0	22.6	9	4	116.9
12115	5/3	10	25	60	29.9	....	..	1	127.2
12110	5/3	0	2	62	29.9	....	..	1	127.2
12103	5/3	0	30	61	29.4	25.0	4	2	99.2
11673	5/3	0	20	59	28.7	25.2	3	5	140.0
12116	5/3	0	25	62	28.6	....	..	1	121.7
12106	4/27	50	25	59	28.5	21.6	10	2	85.7
12119	5/3	0	25	60	26.8	....	..	1	114.0
12114	5/3	0	70	63	26.7	....	..	1	113.6
12102	5/3	0	60	62	26.1	19.5	14	2	77.4
11999	5/3	0	70	63	25.9	20.3	12	2	80.6
11979	5/3	0	2	59	25.8	....	..	1	109.8
12118	5/5	10	40	59	25.0	....	..	1	106.4
12102	5/3	0	60	63	24.4	20.9	11	2	82.9
12104	5/3	0	35	60	24.4	23.3	7	2	92.5
11669	5/3	0	20	61	24.3	24.2	6	5	134.1
12113	4/29	10	25	59	24.3	....	..	1	103.4
12000	4/28	0	55	60	24.1	18.9	16	2	75.0
6251	5/3	0	50	63	24.0	16.4	18	5	120.0
1442	5/6	0	50	61	23.5	16.3	19	5	100.0
11964	5/3	0	10	59	23.3	20.2	13	2	80.2
8856	4/24	0	45	61	22.7	19.0	15	5	124.1
12117	5/5	20	40	59	22.0	....	..	1	93.6
11952	4/25	0	45	61	21.4	18.5	17	4	112.8
12112	5/3	0	60	62	20.4	....	..	1	86.8

Standard error of a difference between the mean yields of any two varieties = 2.84 bushels,

Table 18.--(Continued)

Amarillo, Texas

Dryland
(Four plots)

C. I.	Date			Kernel	Weight	Average	Yield		No.	Percent	
No.	Head	Height	plump	per	acre	Average	Rank	years	of	Rank	
	ed	Ripe	ness	bushel	yield	1942-43		grown	Kharkof		
	June	In.	Pct.	Lbs.	Bu.	Bu.					
12114	5/7	19	16	86	60.0	18.9	19.8	3	2	143.5	2
12110	5/7	19	19	88	59.5	17.7	19.3	5	2	139.9	3
12101	5/9	21	17	82	60.0	17.7	20.8	1	3	132.3	7
11999	5/3	15	17	82	59.5	16.5	20.4	2	3	128.7	13
11952	5/3	15	16	90	60.0	16.3	18.1	10	5	129.9	10
12000	5/1	16	17	84	59.0	16.2	19.7	4	3	125.0	17
12111	5/9	19	17	80	58.0	16.2	18.0	11	2	130.4	8
12106	5/5	17	19	88	59.0	16.1	18.6	7	3	129.3	12
12103	5/11	23	18	86	58.5	15.8	18.2	9	3	134.1	5
12104	5/8	22	17	88	59.5	15.6	17.3	14	3	129.9	10
11972	5/9	20	18	78	59.0	15.4	17.3	14	4	130.1	9
12115	5/1	13	18	88	59.0	15.3	....	..	1	127.5	15
11956	5/8	20	18	78	58.0	15.0	18.4	8	4	136.0	4
11673	5/10	20	18	86	58.0	14.9	16.4	17	7	119.6	19
11974	5/4	15	17	86	59.0	14.7	17.4	13	4	123.5	18
6251	5/7	22	18	82	59.0	14.5	16.9	16	7	115.9	21
12116	5/7	18	18	82	58.5	14.3	....	..	1	119.2	20
12113	5/7	17	18	82	59.0	13.8	15.5	20	2	112.3	22
11979	5/7	20	19	73	57.0	13.5	14.7	23	2	106.5	24
11669	5/10	21	17	78	58.0	13.1	15.4	21	7	127.5	15
8856	4/30	16	16	82	59.0	12.9	16.0	19	7	103.6	25
12102	5/9	20	16	82	58.5	12.6	18.7	6	3	128.7	13
12112	5/9	16	16	78	59.0	12.5	15.0	22	2	108.7	23
12105	5/10	24	16	90	59.0	12.0	18.0	11	3	144.5	1
1442	5/13	24	18	82	57.0	12.0	13.8	24	7	100.0	26
12118	5/7	20	17	82	57.0	11.8	....	..	1	98.3	28
12117	5/7	18	18	75	57.0	11.6	....	..	1	96.7	29
11950	5/10	20	18	68	57.0	10.8	16.4	17	5	133.6	6
11964	5/7	16	14	73	57.0	8.4	10.6	25	3	100.0	26
12119	5/10	21	16	78	57.0	7.9	....	..	1	65.8	30

Standard error of a difference between the mean yields of any two varieties
= 2.22 bushels.

Table 18.--(Continued)

Stillwater, Oklahoma

(Four plots)

C. I.	Average:	Yield	No.	Percent:	
No.	: acre	: Average	: Rank	: years:	: Rank
	: yield	: 1942-1943:	: grown:	: Kharkof:	
	: Bu.	: Bu.			
11952	17.7	20.7	1	4	158.2 12
12112	13.7	14.9	12	2	171.3 10
11956	13.6	17.7	2	3	157.4 13
12000	13.2	16.4	5	2	188.5 6
12104	12.3	15.5	7	2	178.2 8
12116	11.8	....	..	1	295.0 1
11972	11.2	15.2	8	3	149.7 15
11950	11.1	16.8	4	4	153.3 14
11999	10.9	12.6	17	2	144.8 17
12111	10.8	16.9	3	2	194.3 5
12102	10.2	12.8	16	2	147.1 16
12113	10.0	12.6	17	2	144.8 17
12117	10.0	....	..	1	250.0 2
12103	9.8	14.5	13	2	166.7 11
6251	9.6	12.2	21	11	106.4 28
12115	9.4	....	..	1	235.0 3
11673	9.3	13.8	14	6	120.4 26
12110	9.2	15.8	6	2	181.6 7
12118	9.1	....	..	1	227.5 4
11979	8.9	12.2	21	2	140.2 21
12114	8.3	12.4	20	2	142.5 20
12101	8.2	11.5	23	2	132.2 23
8856	7.7	15.1	10	11	104.4 29
11974	7.6	13.5	15	3	137.4 22
12106	7.4	15.2	8	2	174.7 9
11669	6.7	15.0	11	8	125.8 24
12105	4.7	12.5	19	2	143.7 19
12119	4.7	....	..	1	117.5 27
11964	4.5	10.8	24	2	124.1 25
1442	4.0	8.7	25	11	100.0 30

Standard error of a difference between the mean yields of any two varieties = 1.87 bushels.

Table 18.--(Continued)

Woodward, Oklahoma

(Four plots; seeded September 29; emerged October 6, 1942)

C. I. No.	Date Head ed	Ripe	Ht. In.	Leaf rust	Shat- tering	Weight per bushel	Average acre yield	Yield Average Rank	No. years grown	Percent of Kharkof	Rank
				Pct.	Pct.	Lbs.	Bu.	Bu.			
12114	5/2	11	24	70	Tr	63	33.4	24.6	6	2	150.9
11673	5/1	12	25	25	0	62	30.0	26.7	1	7	128.5
11999	5/1	12	25	85	3	63	28.5	25.3	4	3	135.9
12101	4/30	12	24	25	0	62	28.4	24.3	7	3	140.1
11956	5/1	12	24	Tr	19	62	28.3	25.6	3	4	142.9
12110	5/1	12	25	Tr	Tr	62	27.9	22.7	12	2	139.3
12103	5/3	12	24	33	3	62	27.4	19.8	19	3	136.4
12116	4/28	11	27	13	Tr	63	27.2	...	1	1	143.9
11669	4/30	10	24	18	Tr	62	26.9	23.0	11	9	137.4
12104	4/29	12	25	30	Tr	62	26.9	21.4	14	3	139.2
12000	4/26	10	26	63	0	62	26.6	25.8	2	3	119.4
11950	4/29	11	25	Tr	0	62	26.5	25.2	5	5	128.5
12106	4/27	11	26	18	0	62	25.9	24.0	8	3	142.4
12113	5/1	12	23	18	0	62	25.7	18.3	23	2	112.3
12102	5/1	12	25	75	Tr	63	25.6	20.6	16	3	131.8
11972	5/4	12	22	25	0	62	25.3	20.0	18	4	139.6
12111	5/1	12	23	25	Tr	63	25.3	19.8	19	2	121.5
12118	4/29	12	26	53	0	62	25.2	...	1	1	133.3
12115	4/27	10	25	5	0	63	25.0	...	1	1	132.3
11952	4/26	10	27	50	2	63	24.8	23.4	10	5	134.7
12117	5/1	12	25	55	2	62	24.7	...	1	1	130.7
11974	4/29	11	23	20	Tr	61	24.2	23.5	9	4	141.5
11964	4/29	11	24	Tr	0	61	23.6	20.4	17	3	120.3
12112	5/3	13	22	63	0	63	23.3	19.6	21	2	120.2
6251	5/4	14	25	55	Tr	62	22.9	21.3	15	12	104.5
8856	4/24	8	27	75	0	62	22.8	22.7	12	12	105.5
11379	5/4	13	23	Tr	0	62	22.8	17.3	24	2	106.1
1442	5/7	17	25	50	Tr	60	18.9	16.3	25	12	100.0
12119	5/1	16	24	5	Tr	62	17.6	...	1	1	93.1
12105	4/29	12	23	5	Tr	63	16.3	18.7	22	3	133.2

Standard error of a difference between the mean yields of any two varieties = 2.53 bushels.

Table 18.---(Continued)

Manhattan, Kansas

(Three plots)

C. I. No.	Date		Ht.	Lodg- ing	Leaf- rust	Loose smut	Wt.: per: bu.	Av. : acre: yield:	Yield		No.	Percent: of Kharkof:	Rank
	Head- ed	Ripe							Average:	Rank:			
	May	June	In.	Pct.	Pct.	Pct.	Lbs.	Bu.	Bu.				
11956	24	27	39	38	18	0	59.6	37.9	31.3	2	4	154.5	10
12115	16	24	36	7	25	0	61.0	36.8	....	..	1	145.5	12
11952	16	22	36	53	65	T	60.6	36.5	35.6	1	4	166.7	6
12110	21	27	40	15	8	2	59.6	33.9	31.0	3	2	179.2	3
11950	20	25	38	27	20	3	58.6	33.8	28.3	9	4	158.1	8
11669	21	25	36	17	25	0	59.6	33.0	29.6	5	8	144.7	14
12102	22	28	40	25	60	8	60.5	32.7	29.4	6	3	170.1	4
12116	20	27	39	28	45	3	60.1	32.6	....	..	1	128.9	23
12103	22	28	39	18	50	5	60.2	32.5	29.8	4	3	181.0	1
12104	19	26	37	20	45	4	60.1	31.3	28.9	7	3	180.5	2
12114	23	28	38	62	60	T	58.5	30.7	23.0	20	2	132.9	22
12101	24	28	39	43	70	0	58.4	30.5	25.7	15	3	145.4	13
11972	24	28	37	23	45	2	59.7	30.1	27.3	12	4	144.6	15
11673	19	25	37	20	30	3	58.5	30.0	28.0	10	6	141.3	17
12000	17	24	36	63	65	T	59.8	30.0	26.4	13	3	161.5	7
12118	21	26	41	45	50	0	57.6	29.4	....	..	1	116.2	25
8856	13	23	37	65	65	0	59.2	29.3	26.4	13	11	121.9	24
11979	23	29	37	14	10	37	57.0	28.8	23.5	18	2	135.8	20
11974	19	24	36	3	30	14	57.3	28.8	27.8	11	4	137.4	19
12111	22	28	40	23	45	T	59.6	28.4	24.6	16	2	142.2	16
12113	21	27	28	33	15	18	57.3	28.3	24.1	17	2	139.3	18
12117	23	26	40	30	55	0	58.0	27.6	....	..	1	109.1	27
11999	21	25	38	37	65	0	59.0	27.2	20.4	23	3	133.9	21
1442	26	28	38	28	60	T	58.0	25.3	17.3	24	11	100.0	28
6251	23	28	40	78	60	5	59.3	25.2	21.4	21	11	114.5	26
12106	17	24	36	20	45	13	57.0	24.6	23.4	19	3	149.4	11
11964	21	24	36	30	28	4	59.0	24.4	28.6	8	3	169.0	5
12105	22	26	38	23	18	5	59.0	24.1	20.8	22	3	157.5	9
12112	24	28	39	22	75	0	58.0	21.8	15.9	25	2	91.9	29
12119	23	28	37	20	30	0	57.0	16.7	....	..	1	66.0	30

Standard error of a difference between the mean yields of any two varieties
= 2.87 bushels.

Table 18.--(Continued)

Hays, Kansas
(Three plots)

C. I. No.	Date		Height: In.	Weight: per bushel: Lbs.	Average: acre yield: Bu.	Yield: Average: Rank	No.	Percent: years: grown	Rank
	Head- ed	Ripe							
	May	June							
12114	13	22	31	57	23.8	25.0	2	2	196.9
11999	14	20	31	57	21.3	23.8	4	3	174.4
12101	12	21	30	57	20.9	19.9	16	3	153.6
12000	8	20	29	56	19.9	23.4	6	3	167.9
12110	11	21	33	57	19.2	22.6	9	2	178.0
12115	6	19	31	57	18.6	....	..	1	224.1
11974	11	20	30	55	18.2	23.3	7	4	184.4
12102	12	21	31	57	17.8	23.1	8	3	163.1
11950	10	19	32	53	17.7	24.0	3	5	195.0
12103	15	22	30	57	17.5	21.3	13	3	170.8
12116	9	20	32	57	16.9	....	..	1	203.6
11972	18	22	30	57	16.4	22.0	12	4	176.6
11669	11	19	29	55	16.4	25.8	1	8	147.4
11673	11	19	34	56	16.3	22.4	10	7	132.8
12106	9	19	29	56	16.1	19.9	16	3	165.5
12104	11	21	30	58	15.9	22.4	10	3	178.6
12113	10	19	30	54	15.8	20.1	14	2	158.3
11952	7	18	30	58	15.4	23.8	4	5	180.9
12117	15	22	34	56	14.1	....	..	1	169.9
11979	16	22	27	55	12.8	16.8	21	2	132.3
12112	17	22	30	58	12.1	17.7	20	2	139.4
12105	10	22	29	57	11.8	20.1	14	3	141.1
12119	15	22	31	57	11.8	....	..	1	142.2
12111	16	21	30	56	11.7	18.3	19	2	144.1
8856	3	17	28	55	11.1	19.0	18	11	112.3
12113	13	21	33	56	11.1	....	..	1	133.7
6251	16	22	30	56	10.7	15.1	23	11	116.4
11956	18	21	32	56	10.3	15.9	22	4	150.6
1442	19	22	30	..	8.3	12.7	25	11	100.0
11964	12	19	27	..	6.6	14.1	24	3	138.7

Standard error of a difference between the mean yields of any two varieties = 2.06 bushels.

Table 18.--(Continued)

Akron, Colorado

(Five plots; seeded September 30; emerged October 7, 1942)

C. I. No.	Date:	Lodge- ing	Hail damage: 1/ May : : 26 :	Wt. : : per : : bu. :	Av. : : acre : : yield:	Yield Average: 1942-43:	No. : : Rank :	Percent: : years : : grown:	Percent: : of : : Kharkof:	Rank		
	head- ed :	Ht. : : ing :	Pct. :	Pct. :	Lbs. : : Bu. :	Bu. : : Bu. :	: : :	: : :	: : :	: : :		
	: : :	: : :	: : :	: : :	: : :	: : :	: : :	: : :	: : :	: : :		
12000	5/27	44	1	2	15	56.0	26.1	39.2	2	3	124.3	2
8856	5/25	46	2	T	15	57.0	25.5	39.8	1	9	123.6	3
12101	6/2	45	..	4	15	57.0	23.0	36.3	7	3	114.8	8
12102	5/31	46	1	7	15	55.0	21.5	36.7	6	3	112.8	12
12114	6/3	46	2	3	15	54.0	21.4	35.6	8	2	111.3	15
6251	6/2	48	..	7	15	56.0	21.2	34.9	9	9	116.9	7
11999	6/2	46	..	7	15	55.0	20.8	34.4	11	3	112.8	12
11952	5/28	44	2	2	20	56.0	20.6	36.9	5	4	127.8	1
11972	6/3	44	1	3	15	55.0	19.9	37.6	3	3	123.0	4
12112	6/2	44	T	4	13	56.0	19.9	33.5	13	2	104.7	19
12113	5/30	45	1	3	12	50.5	18.1	33.2	15	2	103.8	20
12103	6/2	45	T	4	15	54.0	18.0	33.7	12	3	110.3	16
12116	5/30	45	T	5	13	55.0	17.4	....	..	1	103.0	21
11974	5/31	45	5	7	15	53.0	17.3	37.1	4	3	120.2	5
1442	6/5	46	2	3	13	55.0	16.9	32.0	21	9	100.0	22
11673	6/1	44	1	3	8	56.0	16.7	34.8	10	6	114.1	9
11669	5/30	44	..	5	15	54.0	16.2	33.2	15	7	119.8	6
12119	6/2	46	1	3	15	55.0	16.0	....	..	1	94.7	26
11979	6/3	42	..	2	10	50.0	15.8	30.6	25	2	95.6	25
11974	6/1	44	1	6	15	53.0	15.6	37.1	4	3	120.2	5
12106	5/28	46	4	5	15	54.5	15.2	33.0	18	3	114.0	10
12104	5/31	47	2	2	15	55.5	15.2	32.1	20	3	105.3	18
12118	6/3	48	9	3	15	54.0	14.5	....	..	1	85.8	28
11956	6/2	46	..	5	15	52.0	14.2	31.4	24	3	94.2	27
12105	5/30	45	4	6	15	54.5	13.8	32.3	19	3	113.6	11
12115	5/28	47	1	1	15	55.0	13.7	....	..	1	81.1	29
11950	6/1	45	1	4	15	53.0	13.6	33.5	13	4	112.6	14
12110	6/2	44	2	5	15	54.0	13.3	31.7	23	2	99.1	24
12117	6/3	47	..	4	15	54.0	12.3	....	..	1	72.8	30
12111	6/3	46	2	3	12	55.0	12.0	31.9	22	2	99.7	23

Standard error of a difference between the mean yields of any two varieties = 1.66 bushels.

Most varieties were just turning when hailed on July 8, and all ripened July 11 and 12.

1/ T and 1 = light, 9 = heavy.

Table 18.---(Continued)

Fort Collins, Colorado

(Five plots)

C. I.	Date:	Lodg-	Leaf	Weight	Average	Yield	No.	Percent:			
No.	:head-:Ht.	:ing	:rust	:per	:acre	:Average	:Rank	:years:	:of	:Rank	
	:cc:			:bushel:	:yield	:1942-43:		:grown:	:Kharkof:		
	:June	:In.	:Pct.	:Pct.	:Lbs.	: Bu.	: Bu.	:	:	:	
12114	14	43	2	4	64.5	53.6	51.0	4	2	129.4	1
11673	9	43	5	1	62.5	52.3	53.0	2	7	107.7	13
11950	11	44	8	2	63.0	50.0	52.6	3	5	119.8	4
12103	13	43	0	4	63.3	49.9	45.5	10	3	107.8	12
12112	13	42	0	0	64.0	49.6	46.8	9	2	118.8	6
12116	13	42	6	0	63.8	48.9	....	..	1	101.9	20
11974	11	42	3	3	63.0	48.8	54.2	1	4	127.9	2
12106	8	45	1	4	63.5	48.1	46.9	8	3	118.9	5
1442	16	46	8	3	63.0	48.0	39.4	22	11	100.0	22
6251	12	46	8	2	63.0	47.7	38.9	23	11	97.0	25
11669	11	40	2	2	63.3	47.6	48.0	6	9	108.3	11
12000	6	42	15	5	64.0	47.4	48.6	5	3	120.6	3
11972	16	40	2	1	63.5	47.3	41.2	16	4	106.0	16
11999	13	42	1	5	62.5	47.1	44.0	13	3	109.2	10
12119	11	45	0	0	64.0	46.8	....	..	1	97.5	24
11956	13	45	7	0	63.0	46.5	41.1	17	4	103.9	18
11979	12	41	0	1	63.0	46.4	43.6	14	2	110.7	8
12118	11	46	4	2	62.3	46.3	....	..	1	96.5	27
11952	5	42	4	3	64.0	46.2	47.3	7	5	107.5	14
12105	10	42	5	2	63.8	45.8	44.9	11	3	114.9	7
12104	9	43	5	5	64.0	45.4	44.4	12	3	105.2	17
12117	15	45	2	2	63.0	44.5	....	..	1	92.7	29
12113	9	44	0	4	62.5	43.4	43.1	15	2	109.4	9
12102	11	44	7	3	63.5	41.1	40.7	18	3	107.3	15
12110	13	43	1	0	63.5	40.3	38.1	25	2	96.7	26
12111	13	44	5	1	63.0	40.3	39.6	21	2	100.5	21
12115	9	41	1	0	62.8	39.9	....	..	1	83.1	30
8856	5	43	14	3	63.5	39.5	38.8	24	11	94.7	28
11964	11	40	0	1	63.0	39.1	39.9	20	3	98.8	23
12101	14	40	0	4	64.0	36.2	40.2	19	3	102.6	19

Standard error of a difference between the mean yields of any ten varieties
= 4.62 bushels.

Table 18.--(Continued)

Hesperus, Colorado

(Three plots; seeded September 18; emerged October 20;
irrigated June 9 and July 6)

C. I. No.	Date: ripe:	Height: In.	Weight: per bushel:	Average: acre Bu.	Yield: Average: 1942-43: Bu.	Rank: Rank	No. years: grown:	Percent: of Kharkof:	Rank
11999	26	33	64.0	47.8	58.4	7	3	115.0	12
12119	27	32	64.0	46.5	....	..	1	128.5	1
12101	28	34	64.0	46.2	54.5	15	3	113.5	13
12102	28	34	64.0	43.3	60.0	4	3	120.3	8
12000	26	34	64.0	43.3	59.3	6	3	119.6	9
12114	28	30	64.0	42.3	60.7	2	2	128.1	2
11669	26	30	64.0	41.0	52.8	19	6	103.7	22
11979	28	32	64.0	41.0	58.2	8	2	122.8	6
12118	27	32	64.0	40.2	....	..	1	111.0	17
12110	27	34	64.0	40.1	53.0	18	2	111.8	16
12113	28	32	64.0	39.3	50.9	20	2	107.4	20
12104	26	33	64.0	38.9	46.4	24	3	96.7	26
12105	28	32	64.0	38.7	59.4	5	3	115.5	11
11964	28	34	63.5	38.5	54.7	14	3	109.4	18
12117	27	34	64.0	38.3	....	..	1	105.8	21
11974	26	32	63.5	36.8	56.9	11	4	117.4	10
6251	28	32	64.0	36.3	61.5	1	6	124.5	4
12103	27	31	64.0	36.3	53.2	17	3	102.6	23
1442	28	34	63.5	36.2	47.4	21	6	100.0	24
12106	28	34	64.0	35.7	57.7	9	3	112.6	15
11972	27	31	64.0	35.3	60.5	3	4	125.1	3
12111	28	34	64.0	35.0	57.6	10	2	121.5	7
11950	25	34	63.5	34.2	53.5	16	5	112.7	14
12112	28	32	64.5	33.5	46.3	25	2	97.7	25
11673	28	32	64.0	32.5	55.2	13	6	124.5	4
11952	27	31	64.0	31.3	46.8	22	5	95.0	27
11956	28	32	64.0	31.0	56.0	12	4	108.4	19
12116	27	31	64.0	30.8	....	..	1	85.1	29
12115	26	32	64.0	30.2	....	..	1	83.4	30
8856	28	32	64.0	27.5	46.7	23	6	94.4	28

Standard error of a difference between the mean yields of any
two varieties = 10.38 bushels.

Table 18.--(Continued)

Ames, Iowa										
(Four plots)										
C. I. No.	Stand	Date	Height	Weight	Average	Yield	No.	Percent		
	at	ripe	per	per	per	Average	Rank	years	of	Rank
	harvest		bushel	bushel	bushel	yield		grown	Kharkof	
	Oct.	July	In.	Lbs.	Bu.	Bu.				
11956	50	12	34	55.8	23.5	29.8	1	4	106.8	4
12000	80	11	34	55.9	23.2	28.1	5	3	95.6	13
12114	85	14	35	55.3	19.1	28.8	3	2	113.4	1
12102	80	13	34	54.6	19.0	27.7	6	3	94.0	15
11964	50	14	32	54.1	18.4	25.6	9	3	85.7	20
11950	40	10	35	50.3	18.0	28.7	4	4	107.1	3
12112	90	13	34	55.4	17.7	25.9	8	2	102.0	6
11669	70	10	35	52.7	17.0	29.1	2	4	110.0	2
8856	80	13	36	53.3	16.2	23.8	17	4	91.3	17
11673	50	10	36	49.2	14.3	24.4	14	4	93.2	16
11412	50	14	34	50.9	13.4	25.4	11	4	100.0	7
12101	60	12	32	51.5	12.4	24.9	12	3	99.6	8
11952	60	11	36	52.6	12.2	25.5	10	4	103.9	5
11999	75	12	36	54.1	12.1	23.4	20	3	90.9	18
11974	80	9	30	44.4	11.2	23.6	19	4	97.7	10
12103	50	10	36	51.6	11.1	26.0	7	3	94.4	14
11972	70	11	36	49.4	11.0	24.5	13	4	98.4	9
12104	60	10	36	51.0	10.5	23.8	17	3	84.9	21
12111	40	11	30	50.0	10.1	24.4	14	2	96.1	11
6251	50	11	35	53.8	9.8	21.2	22	4	90.0	19
12106	50	9	30	45.6	8.7	22.1	21	3	71.0	23
12117	90	9	33	42.2	7.5	....	..	1	56.0	25
12118	60	9	33	42.6	6.8	....	..	1	50.7	26
12113	10	16	28	52.4	6.4	20.2	23	2	79.5	22
12110	75	9	33	44.4	5.9	24.3	16	2	95.7	12
12115	40	9	31	....	5.1	....	..	1	38.1	27
12116	10	9	30	....	4.9	....	..	1	36.6	28
12119	20	12	33	....	4.2	....	..	1	31.3	29
11979	10	14	28	....	3.4	17.7	24	2	69.7	24
12105	20	9	30	....	1.3	....	..	2	14.1	30

Standard error of a difference between the mean yields of any two varieties = 5.88 bushels.

Table 18.--(Continued)

Lincoln, Nebraska

(Five plots; seeded September 29; emerged October 4, 1942)

C. I. No.	Winter: sur- vival	Date Head- ed	Ripe	Ht.	Leaf: rust	Wt. per bu.	Av. acre yield:	Yield Average: 1942-43	Rank	No. years: grown	Percent of Kharkof:	Rank
	Pct.			In.	Pct.	Lbs.	Bu.	Bu.				
11956	83	5/31	7/2	33	8	57.8	36.1	42.3	2	4	129.5	3
11669	85	5/27	6/29	32	25	57.6	32.9	43.7	1	9	134.9	1
11950	82	5/28	7/2	33	25	59.9	31.2	38.5	3	5	130.6	2
12000	76	5/26	7/2	32	65	59.0	25.9	35.1	11	3	113.8	10
11999	68	5/29	7/5	33	70	58.2	24.8	36.8	6	3	113.1	11
12101	76	5/30	7/5	32	50	57.1	24.6	37.7	4	3	121.5	6
11952	74	5/25	6/29	32	65	58.7	23.9	36.8	6	5	120.9	7
6251	72	6/1	7/5	36	65	55.9	23.3	29.8	21	12	113.8	9
12115	77	5/26	7/1	32	40	57.5	23.2	....	..	1	116.0	8
12103	72	5/31	7/5	33	55	57.2	22.7	35.5	9	3	108.1	16
12102	74	5/30	7/5	35	70	57.4	22.7	36.8	6	3	122.7	5
11972	71	5/31	7/6	33	35	56.1	22.3	37.4	5	4	110.0	14
12117	75	5/30	7/3	34	65	52.8	21.8	....	..	1	109.0	15
8856	69	5/25	7/1	33	65	59.5	21.1	35.1	11	12	125.0	4
11964	70	5/30	7/4	32	30	56.5	20.8	34.9	13	3	111.2	13
12118	80	5/29	7/3	33	70	54.7	20.5	....	..	1	102.5	18
1442	71	6/2	7/6	32	60	54.0	20.0	31.8	15	12	100.0	19
12114	70	5/31	7/5	33	55	58.1	19.9	35.4	10	2	111.3	12
11979	59	6/3	7/7	31	10	54.0	17.7	30.5	19	2	95.9	24
12112	66	6/1	7/7	32	40	56.7	17.3	30.9	18	2	97.2	22
12110	69	5/29	7/5	33	20	55.3	16.4	31.6	17	2	99.4	20
12104	63	5/30	7/6	33	50	56.7	16.0	31.9	14	3	99.2	21
12116	48	5/31	7/6	30	25	55.2	14.1	....	..	1	70.5	29
11974	70	5/29	7/4	30	50	53.9	14.0	31.8	15	4	96.7	23
12111	68	6/1	7/6	31	30	54.5	14.0	28.1	24	2	88.4	26
11673	68	5/28	7/5	31	35	54.5	13.9	29.1	22	7	106.6	17
12113	57	5/29	7/5	31	20	54.9	13.1	30.3	20	2	95.3	25
12119	44	6/3	7/7	32	30	52.8	10.8	....	..	1	54.0	30
12106	50	5/28	7/3	30	55	53.2	10.6	28.3	23	3	86.9	27
12105	24	5/31	7/7	28	30	51.0	4.2	26.8	25	3	76.9	28

Standard error of a difference between the mean yields of any two varieties = 2.84 bushels.

Table 18.--(Concluded)

Alliance, Nebraska

(Three plots)

C. I. No.	Winter: sur- vival	Date headed	Height: In.	Weight: per bushel	Average: acre yield	Yield: Average: 1942-43	Rank	No. years: grown	Percent: of Kharkof	Rank
	Pct.	June	In.	Lbs.	Bu.	Bu.				
11972	50	14	39	58.9	30.0	37.3	1	4	109.5	2
12112	72	14	38	61.5	29.8	35.5	3	2	106.9	3
12114	63	13	37	61.5	28.7	37.0	2	2	111.4	1
1442	73	14	41	60.5	28.1	33.2	12	9	100.0	7
11669	73	12	37	59.5	27.1	35.4	4	6	105.2	5
11979	53	14	37	59.0	26.8	31.0	17	2	93.4	16
12117	77	14	40	59.5	25.2	....	..	1	89.7	21
12115	73	12	38	60.0	24.2	....	..	1	86.1	22
12110	60	13	40	59.5	24.1	35.2	5	2	106.0	4
6251	62	15	40	61.5	23.6	30.3	18	9	92.7	17
12118	68	14	41	59.0	23.3	....	..	1	82.9	24
12101	50	14	36	61.5	23.1	33.8	11	3	102.4	6
12000	52	14	36	60.0	22.8	33.9	10	3	94.1	15
11950	70	12	39	60.0	22.8	34.3	8	5	99.2	8
11956	78	13	39	59.0	22.7	34.6	6	4	91.7	19
11999	45	14	38	61.0	22.7	34.5	7	3	95.5	14
12102	57	14	38	60.5	22.7	32.0	15	3	99.0	9
12103	47	14	40	60.0	21.3	32.5	13	3	97.6	10
12111	62	14	39	60.0	20.7	32.1	14	2	96.7	11
11964	65	14	35	59.5	20.4	31.7	16	3	90.9	20
11974	38	14	39	55.5	20.0	34.1	9	4	95.9	13
12104	38	15	39	60.0	19.3	28.7	21	3	84.7	23
11673	45	13	37	59.5	19.2	28.9	20	6	96.4	12
11952	47	12	37	59.0	19.1	29.1	19	5	92.7	17
8856	42	15	36	60.5	13.8	23.1	23	9	82.7	25
12106	30	12	35	57.5	11.8	24.8	22	3	75.6	26
12119	15	14	36	57.0	9.8	....	..	1	34.9	29
12113	25	13	36	57.0	8.8	21.7	24	2	65.4	27
12105	17	14	35	57.0	6.8	18.6	25	3	64.1	28
12116	8	13	34	....	3.9	....	..	1	13.9	30

Standard error of a difference between the mean yields of any two varieties
= 3.35 bushels.

STANDARD ERRORS

Standard errors were calculated for each station as outlined on page 13 of this report. In table 19 will be found the number of plots, average yields, and standard errors for the uniform yield nursery grown at each of the 13 stations.

Table 19.--Number of plots, average yield, and standard errors for the uniform yield nursery at each cooperating station in 1943.

Station	No. of plots	Average yield of varieties	Standard error of a			
			Single plot	Difference between means	Mean in	
					Bushels	Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton	4	24.84	5.66	4.00	2.83	11.39
Chillicothe	4	26.76	4.01	2.84	2.01	7.51
Amarillo (Dry)	4	14.13	3.14	2.22	1.57	11.11
Oklahoma:						
Stillwater	4	9.49	2.64	1.87	1.32	13.91
Woodward	4	25.25	3.58	2.53	1.79	7.09
Kansas:						
Manhattan	3	29.42	3.52	2.87	2.03	6.90
Hays	3	15.22	2.52	2.06	1.45	9.53
Colorado:						
Akron	5	17.52	2.64	1.66	1.18	6.74
Fort Collins	5	45.80	7.32	4.62	3.27	7.14
Hesperus	3	37.60	12.70	10.38	7.34	19.52
Iowa:						
Ames	4	23.61	23.61	5.88	4.15	17.58
Nebraska:						
Lincoln	5	20.00	4.50	2.84	2.01	10.01
Alliance	3	20.75	4.10	3.35	2.37	11.42

SUMMARY OF NURSERY YIELDS

The yields of the 30 varieties of winter wheat grown at 13 stations are summarized in table 20, where the varieties are listed in order of the 13-nursery average yield. These averages are of interest only insofar as they show the general adaptation of the variety. A more detailed study is possible as the varieties also have been averaged and ranked by States.

The highest yield was recorded for Cheyenne x Early Blackhull (C. I. 12114) with an average that was 0.9 bushel above all other varieties in the nursery. The performance of this strain was fairly consistent in that it ranked first in Colorado, second in Kansas, third in Iowa and Oklahoma, sixth in Nebraska, and seventh in Texas. In 1942 this same wheat ranked eleventh for average yield in the uniform nursery. In second and third places, respectively, were Kawvale x Tenmarq (C. I. 11956) and Cheyenne x Early Blackhull (C. I. 12000). It will be remembered that C. I. 11956 had a good yield record in plots, but it did very poorly in the Colorado nursery which pulled down its average. Cheyenne x Tenmarq (C. I. 11972) ranked fourth with an average yield that was 0.9 bushel less than for the variety in third place. In fifth place was Pawnee with an average yield just 2 bushels less than for the leading variety. Of the six highest yielding

varieties, three are selections of Cheyenne x Early Blackhull, two are selections from Kawvale x Tenmarq and one is a Cheyenne x Tenmarq strain. Wichita ranked tenth and Comanche thirteenth which was considerably lower than their placings in 1942. Blackhull was in eighteenth place while Kharkof ranked twenty-third and Early Blackhull twenty-fifth. As in previous years Hope x Turkey (C. I. 11964) was low as was Marquillo x Tenmarq (C. I. 12113) and Kanred x Tenmarq (C. I. 12105). Five strains in the nursery for the first time in 1943, and carrying C. I. numbers 12115 to 12119, failed to make good yield records, since the best one (C. I. 12115) ranked fifteenth and the others were still lower.

Twenty-five varieties have been grown in the nursery for the 2-year period, 1941-42 at 11 stations. These data are presented in table 21 where the yields are averaged by States, and the varieties listed in order of yield at all stations. The range in yield between the highest and lowest variety was only 7.1 bushels. The two highest yielding varieties were Cheyenne x Early Blackhull (C. I. numbers 12000 and 12114) with averages differing by 0.3 bushel. These two strains ranked fairly high in all States except Kansas. Kawvale x Tenmarq (C. I. 11950) ranked third and Pawnee fourth, each having made a good record in all States except Texas. Ten strains had averages above Comanche, and 19 averaged higher than Blackhull, while Kharkof was the lowest. Wichita had an average yield that was lower than Pawnee, but slightly above Comanche and more than 3 bushels above Early Blackhull.

Table 20.—Summary of the average yields of the 30 varieties grown as uniform yield nurseries at 13 stations in the hard red winter wheat region, 1943.

Variety or cross	C. I. No.	Bushels per acre												
		Texas				Oklahoma				Kansas				
		Denton	Chilli- cothe	Ama- rillo	Av.	Rank	Still- water	Wood- ward	Av.	Rank	Man- hattan	Hays	Av.	Rank
Cheyenne x E. Blackhull	12114	27.3	26.7	18.9	24.3	7	8.3	33.4	20.9	3	30.7	23.8	27.3	2
Kawvale x Tenmarq	11956	29.6	32.9	15.0	25.8	4	13.6	28.3	21.0	2	37.9	10.3	24.1	13
Cheyenne x E. Blackhull	12000	21.5	24.1	16.2	20.6	21	13.2	26.6	19.9	4	30.0	19.9	25.0	8
Cheyenne x Tenmarq	11972	33.8	31.4	15.4	26.9	1	11.2	25.3	18.3	13	30.1	16.4	23.3	16
Pawnee	11669	25.5	24.3	13.1	21.0	19	6.7	26.9	16.8	21	33.0	16.4	24.7	11
Cheyenne x E. Blackhull	11999	22.0	25.9	16.5	21.5	17	10.9	28.5	19.7	5	27.2	21.3	24.3	12
Kawvale x Tenmarq	11950	26.5	30.0	10.8	22.4	12	11.1	26.5	18.8	9	33.8	17.7	25.8	5
Cheyenne x Tenmarq	12103	31.6	29.4	15.8	25.6	5	9.8	27.4	18.6	10	32.5	17.5	25.0	8
Blackhull x Cheyenne	12101	25.6	26.1	17.7	23.1	9	8.2	28.4	18.3	13	30.5	20.9	25.7	6
Wichita	11952	27.8	21.4	16.3	21.8	16	17.7	24.8	21.3	1	36.5	15.4	26.0	4
Blackhull x Tenmarq	12102	18.9	24.4	12.6	18.6	26	10.2	25.6	17.9	16	32.7	17.8	25.3	7
Kan.-Hd.Fed. x Tenmarq	12110	30.9	29.9	17.7	26.2	2	9.2	27.9	18.6	10	33.9	19.2	26.6	3
Comanche	11673	25.4	28.7	14.9	23.0	10	9.3	30.0	19.7	5	30.0	16.3	23.2	17
Cheyenne x Tenmarq	12104	29.0	24.4	15.6	23.0	10	12.3	26.9	19.6	7	31.3	15.9	23.6	14
Kan.-Hd.Fed. x Tenmarq	12115	28.1	29.9	15.3	24.4	6	9.4	25.0	17.2	19	36.8	18.6	27.7	1
Kan.-Hd.Fed. x Tenmarq	11974	19.9	31.8	14.7	22.1	13	7.6	24.2	15.9	24	28.8	18.2	23.5	15
Cheyenne x Blackhull	12112	22.2	20.4	12.5	18.4	27	13.7	23.3	18.5	12	21.8	12.1	17.0	27
Blackhull	6251	21.2	24.0	14.5	19.9	22	9.6	22.9	16.3	23	25.2	10.7	18.0	25
Marquillo x Oro	11979	24.0	25.8	13.5	21.1	18	8.9	22.8	15.9	24	28.8	12.8	20.8	20
Kan.-H.F. x Minh.-Mint.	12118	22.5	25.0	11.8	19.8	23	9.1	25.2	17.2	19	29.4	11.1	20.3	22
Tenmarq x Oro	12111	29.2	32.4	16.2	25.9	3	10.8	25.3	18.1	15	28.4	11.7	20.1	24
Kan.-H.F. x Minh.-Mint.	12117	18.5	22.0	11.6	17.4	30	10.0	24.7	17.4	18	27.6	14.1	20.9	19
Kharkof	1442	22.5	23.5	12.0	19.3	25	4.0	18.9	11.5	28	25.3	8.3	16.8	28
Kan.-Hd.Fed. x Tenmarq	12106	27.7	28.5	16.1	24.1	8	7.4	25.9	16.7	22	24.6	16.1	20.4	21
Early Blackhull	8856	23.7	22.7	12.9	19.8	23	7.7	22.8	15.3	26	29.3	11.1	20.2	23
Quivira x Tenmarq	12116	23.5	28.6	14.3	22.1	13	11.8	27.2	19.5	8	32.6	16.9	24.8	10
Marquillo x Tenmarq	12113	24.8	24.3	13.8	21.0	19	10.0	25.7	17.9	16	28.3	15.8	22.1	18
Hope x Turkey	11964	23.1	23.3	8.4	18.3	28	4.5	23.6	14.1	27	24.4	6.6	15.5	29
Akron sel. 864	12119	19.7	26.8	7.9	18.1	29	4.7	17.6	11.2	29	16.7	11.8	14.3	30
Kan.-Hd.Fed. x Tenmarq	12105	19.4	34.5	12.0	22.0	15	4.7	16.3	10.5	30	24.1	11.8	18.0	25

Table 20.—(Concluded)

Variety or cross	C. I. No.	Bushels per acre											Average of 13 stations
		Iowa		Nebraska			Colorado						
		Ames	Rank	Lincoln	Alliance	Av.	Rank	Akron	Fort Collins	Hesperus	Av.	Rank	
Cheyenne x E. Blackhull	12114	19.1	3	19.9	28.7	24.3	6	21.4	53.6	42.3	39.1	1	27.2
Kawvale x Tenmarq	11956	23.5	1	36.1	22.7	29.4	2	14.2	46.5	31.0	30.6	28	26.3
Cheyenne x E. Blackhull	12000	23.2	2	25.9	22.8	24.4	5	26.1	47.4	43.3	38.9	2	26.2
Cheyenne x Tenmarq	11972	11.0	17	22.3	30.0	26.2	4	19.9	47.3	35.3	34.2	13	25.3
Pawnee	11669	17.0	8	32.9	27.1	30.0	1	16.2	47.6	41.0	34.9	8	25.2
Cheyenne x E. Blackhull	11999	12.1	14	24.8	22.7	23.8	9	20.8	47.1	47.8	38.6	3	25.2
Kawvale x Tenmarq	11950	18.0	6	31.2	22.8	27.0	3	13.6	50.0	34.2	32.6	22	25.1
Cheyenne x Tenmarq	12103	11.1	16	22.7	21.3	22.0	16	18.0	49.9	36.3	34.7	9	24.9
Blackhull x Cheyenne	12101	12.4	12	24.6	23.1	23.9	8	23.0	36.2	46.2	35.1	6	24.8
Wichita	11952	12.2	13	23.9	19.1	21.5	18	20.6	46.2	31.3	32.7	21	24.1
Blackhull x Tenmarq	12102	19.0	4	22.7	22.7	22.7	14	21.5	41.1	43.3	35.3	5	24.0
Kan.-Hd.Fed. x Tenmarq	12110	5.9	25	16.4	24.1	20.3	20	13.3	40.3	40.1	31.2	25	23.8
Comanche	11673	14.3	10	13.9	19.2	16.6	25	16.7	52.3	32.5	33.8	14	23.3
Cheyenne x Tenmarq	12104	10.5	18	16.0	19.3	17.7	21	15.2	45.4	38.9	33.2	18	23.1
Kan.-Hd.Fed. x Tenmarq	12115	5.1	26	23.2	24.2	23.7	10	13.7	39.9	30.2	27.9	30	23.0
Kan.-Hd.Fed. x Tenmarq	11974	11.2	15	14.0	20.0	17.0	24	17.3	48.8	36.8	34.3	11	22.6
Cheyenne x Blackhull	12112	17.7	7	17.3	29.8	23.6	11	19.9	49.6	33.5	34.3	11	22.6
Blackhull	6251	9.8	20	23.3	23.6	23.5	12	21.2	47.7	36.3	35.1	6	22.3
Marquillo x Oro	11979	3.4	29	17.7	26.8	22.3	15	15.8	46.4	41.0	34.4	10	22.1
Kan.-H.F. x Minn.-Mint.	12118	6.8	23	20.5	23.3	21.9	17	14.5	46.3	40.2	33.7	15	22.0
Tenmarq x Oro	12111	10.1	19	14.0	20.7	17.4	23	12.0	40.3	35.0	29.1	29	22.0
Kan.-H.F. x Minn.-Mint.	12117	7.5	22	21.8	25.2	23.5	12	12.3	44.5	38.3	31.7	24	21.4
Kharkof	1442	13.4	11	20.0	28.1	24.1	7	16.9	48.0	36.2	33.7	15	21.3
Kan.-Hd.Fed. x Tenmarq	12106	8.7	21	10.6	11.8	11.2	26	15.2	48.1	35.7	33.0	19	21.3
Early Blackhull	8856	16.2	9	21.1	13.8	17.5	22	25.5	39.5	27.5	30.8	27	21.1
Quivira x Tenmarq	12116	4.9	27	14.1	3.9	9.0	29	17.4	48.9	30.8	32.4	23	21.1
Marquillo x Tenmarq	12113	6.4	24	13.1	8.8	11.0	27	18.1	43.4	39.3	33.6	17	20.9
Hope x Turkey	11964	18.4	5	20.8	20.4	20.6	19	15.6	39.1	38.5	31.1	26	20.5
Akron sel. 864	12119	4.2	28	10.8	9.8	10.3	28	16.0	46.8	46.5	36.4	4	18.4
Kan.-Hd.Fed. x Tenmarq	12105	1.3	30	4.2	6.8	5.5	30	13.8	45.8	38.7	32.8	20	18.0

Table 21.—Summary of average yields of 25 winter wheat varieties grown in uniform yield nurseries at 11 stations in the hard red winter wheat region, 1942 and 1943.

Variety or cross	C. I. No.	Bushels per acre											
		Texas		Oklahoma		Kansas		Iowa					
		Ama- rillo	Rank	Wood- ward	Still- water	Av.	Rank	Hays	Man- hattan	Av.	Rank	Ames	Rank
Cheyenne x E. Blackhull	12000	19.7	4	25.8	16.4	21.1	3	23.4	26.4	24.9	10	28.1	5
Cheyenne x E. Blackhull	12114	19.8	3	24.6	12.4	18.5	11	25.0	23.0	24.0	12	28.8	3
Kawvale x Tenmarq	11950	16.4	17	25.2	16.8	21.0	4	24.0	28.3	26.2	5	28.7	4
Paynee	11669	15.4	21	23.0	15.0	19.0	8	25.8	29.6	27.7	2	29.1	2
Kawvale x Tenmarq	11956	18.4	8	25.6	17.7	21.7	2	15.9	31.3	23.6	13	29.8	1
Wichita	11952	18.1	10	23.4	20.7	22.1	1	23.8	35.6	29.7	1	25.5	10
Kan.-Hd.Fed. x Tenmarq	11974	17.4	13	23.5	13.5	18.5	11	23.3	27.8	25.6	7	23.6	19
Cheyenne x Tenmarq	11972	17.3	14	20.0	15.2	17.6	16	22.0	27.3	24.7	11	24.5	13
Blackhull x Tenmarq	12102	18.7	6	20.6	12.8	16.7	20	23.1	29.4	26.3	4	27.7	6
Cheyenne x E. Blackhull	11999	20.4	2	25.3	12.6	19.0	8	23.8	20.4	22.1	16	23.4	20
Comanche	11673	16.4	17	26.7	13.8	20.3	5	22.4	28.0	25.2	9	24.4	14
Blackhull x Cheyenne	12101	20.8	1	24.3	11.5	17.9	15	19.9	25.7	22.8	14	24.9	12
Cheyenne x Tenmarq	12103	18.2	9	19.8	14.5	17.2	18	21.3	29.8	25.6	7	26.0	7
Kan.-Hd.Fed. x Tenmarq	12110	19.3	5	22.7	15.8	19.3	7	22.6	31.0	26.8	3	24.3	16
Kan.-Hd.Fed. x Tenmarq	12106	18.6	7	24.0	15.2	19.6	6	19.9	23.4	21.7	18	22.1	21
Cheyenne x Tenmarq	12104	17.3	14	21.4	15.5	18.5	11	22.4	28.9	25.7	6	23.8	17
Tenmarq x Oro	12111	18.0	11	19.8	16.9	18.4	14	18.3	24.6	21.5	19	24.4	14
Hope x Turkey	11964	10.6	25	20.4	10.8	15.6	21	14.1	28.6	21.4	20	25.6	9
Early Blackhull	8856	16.0	19	22.7	15.1	18.9	10	19.0	26.4	22.7	15	23.8	17
Blackhull	6251	16.9	16	21.3	12.2	16.8	19	15.1	21.4	18.3	23	21.2	22
Cheyenne x Blackhull	12112	15.0	22	19.6	14.9	17.3	17	17.7	15.9	16.8	24	25.9	8
Kan.-Hd.Fed. x Tenmarq	12105	18.0	11	18.7	12.5	15.6	21	20.1	20.8	20.5	21	....	..
Marquillo x Oro	11979	14.7	23	17.3	12.2	14.8	24	16.8	23.5	20.2	22	17.7	24
Marquillo x Tenmarq	12113	15.5	20	18.3	12.6	15.5	23	20.1	24.1	22.1	16	20.2	23
Kharkof	1442	13.8	24	16.3	8.7	12.5	25	12.7	17.3	15.0	25	25.4	11

Table 21.--(Concluded)

Variety or cross	C. I. No.	Bushels per acre										Average of 11 stations
		Nebraska				Colorado						
		Lincoln	Alliance	Av.	Rank	Akron	Fort Collins	Hes- perus	Av.	Rank		
Cheyenne x E. Blackhull	12000	35.1	33.9	34.5	8	39.2	48.6	59.3	49.0	3	32.4	
Cheyenne x E. Blackhull	12114	35.4	37.0	36.2	5	35.6	51.0	60.7	49.1	2	32.1	
Kawvale x Tenmarq	11950	38.5	34.3	36.4	4	33.5	52.6	53.5	46.5	5	32.0	
Pawnee	11669	43.7	35.4	39.6	1	33.2	48.0	52.8	44.7	12	31.9	
Kawvale x Tenmarq	11956	42.3	34.6	38.5	2	31.4	41.1	56.0	42.8	19	31.3	
Wichita	11952	36.8	29.1	33.0	14	36.9	47.3	46.8	43.7	16	31.3	
Kan.-Hd.Fed. x Tenmarq	11974	31.8	34.1	33.0	14	37.1	54.2	56.9	49.4	1	31.2	
Cheyenne x Tenmarq	11972	37.4	37.3	37.4	3	37.6	41.2	60.5	46.4	6	30.9	
Blackhull x Tenmarq	12102	36.8	32.0	34.4	9	36.7	40.7	60.0	45.8	8	30.8	
Cheyenne x E. Blackhull	11999	36.8	34.5	35.7	7	34.4	44.0	58.4	45.6	9	30.4	
Comanche	11673	29.1	28.9	29.0	22	34.8	53.0	55.2	47.7	4	30.2	
Blackhull x Cheyenne	12101	37.7	33.8	35.8	6	36.3	46.2	54.5	43.7	16	30.0	
Cheyenne x Tenmarq	12103	35.5	32.5	34.0	10	33.7	45.5	53.2	44.1	13	30.0	
Kan.-Hd.Fed. x Tenmarq	12110	31.6	35.2	33.4	11	31.7	38.1	53.0	40.9	24	29.6	
Kan.-Hd.Fed. x Tenmarq	12106	28.3	24.8	26.6	23	33.0	46.9	57.7	45.9	7	28.5	
Cheyenne x Tenmarq	12104	31.9	28.7	30.3	18	32.1	44.4	46.4	41.0	23	28.4	
Tenmarq x Oro	12111	28.1	32.1	30.1	19	31.9	39.6	57.6	43.0	18	28.3	
Hope x Turkey	11964	34.9	31.7	33.3	12	37.1	39.9	54.7	43.9	15	28.0	
Early Blackhull	8856	35.1	23.1	29.1	21	39.8	38.8	46.7	41.8	22	27.9	
Blackhull	6251	29.8	30.3	30.1	19	34.9	38.9	61.5	45.1	11	27.6	
Cheyenne x Blackhull	12112	30.9	35.5	33.2	13	33.5	46.8	46.3	42.2	21	27.5	
Kan.-Hd.Fed. x Tenmarq	12105	26.8	18.6	22.7	25	32.3	44.9	59.4	45.5	10	27.2	
Marquillo x Oro	11979	30.5	31.0	30.8	17	30.6	43.6	58.2	44.1	13	26.9	
Marquillo x Tenmarq	12113	30.3	21.7	26.0	24	33.2	43.1	50.9	42.4	20	26.4	
Kharkof	1442	31.8	33.2	32.5	16	32.0	39.4	47.4	39.6	25	25.3	

Table 22.--Summary of agronomic data other than yield for 30 varieties of winter wheat grown as uniform yield nurseries at 13 stations in the hard red winter wheat region, 1943.

Variety or cross	C. I. No.	Winter:	Date		Height: In.	Lodg- ing	Leaf: rust	Weight per bushel lbs.
		sur- vival	Head- ed	Ripe				
		Pct.	May	June		Pct.	Pct.	
Number of stations		4	10	8	11	3	6	12
Kharkof	1442	74	24	30	34.0	12.0	46	58.2
Blackhull	6251	71	21	28	34.5	28.7	49	59.5
Early Blackhull	8856	70	13	24	33.2	26.3	51	59.5
Comanche	11673	66	19	26	33.3	8.3	22	58.0
Pawnee	11669	82	19	25	32.1	6.3	21	58.7
Kawvale x Tenmarq	11950	73	19	26	34.2	11.7	12	58.0
Wichita	11952	70	14	23	32.7	19.0	46	59.7
Kawvale x Tenmarq	11956	77	21	27	33.1	15.0	7	58.9
Hope x Turkey	11964	70	19	26	31.5	10.0	16	58.6
Cheyenne x Tenmarq	11972	73	22	27	32.8	8.3	33	58.6
Kanred-Hard Fed. x Tenmarq	11974	72	18	25	32.3	2.0	25	56.5
Marquillo x Oro	11979	55	21	29	31.4	4.7	5	57.9
Cheyenne x Early Blackhull	11999	72	19	26	33.5	12.7	59	59.7
Cheyenne x Early Blackhull	12000	77	15	24	32.8	26.0	50	59.5
Blackhull x Cheyenne	12101	72	20	28	32.4	14.3	44	59.5
Blackhull x Tenmarq	12102	77	20	28	33.7	10.7	54	59.7
Cheyenne x Tenmarq	12103	67	21	27	33.3	6.0	36	58.9
Cheyenne x Tenmarq	12104	65	19	27	33.4	8.3	35	59.2
Kanred-Hard Fed. x Tenmarq	12105	32	18	28	31.5	16.0	12	58.7
Kanred-Hard Fed. x Tenmarq	12106	57	16	25	32.9	23.7	32	57.4
Kanred-Hard Fed. x Tenmarq	12110	75	19	26	34.4	5.3	8	58.2
Tenmarq x Oro	12111	68	21	27	33.3	9.3	24	58.6
Cheyenne x Blackhull	12112	82	21	28	32.6	7.3	50	59.8
Marquillo x Tenmarq	12113	47	18	27	31.5	14.3	20	57.5
Cheyenne x Early Blackhull	12114	80	20	28	33.1	21.3	55	59.8
Kanred-Hard Fed. x Tenmarq	12115	72	16	24	32.8	6.0	22	59.9
Quivira x Tenmarq	12116	40	19	26	32.6	11.3	24	59.9
Kanred-Hd. Fed. x Minh.-Mint.	12117	86	21	26	34.6	17.3	47	57.0
Kanred-Hd. Fed. x Minh.-Mint.	12118	77	19	26	34.9	19.7	47	57.1
Akron sel. 864	12119	40	21	28	33.0	6.7	22	58.3

SUMMARY OF AGRONOMIC DATA

Data for characters other than yield are averaged and presented in table 22. Since all stations did not report the same data, the number of stations entering the averages is shown at the top of each column.

Differential winterkilling was reported from four stations and at these Pawnee, C. I. 12112, and C. I. 12114 had the highest average survivals and C. I. numbers 12105, 12116, and 12119 the lowest.

Dates of heading were reported from 10 stations and at these Early Blackhull was the earliest, although the spread was not as great as in some years. Wichita averaged 1 day later than Early Blackhull, while Comanche and Pawnee were 6 days, Blackhull 8 days, and Kharkof 11 days later in heading. Ripening dates from eight stations show the same general ranking of varieties, but the differences are narrower since there was only a 6-day spread between the earliest and latest strains.

Straw was shorter than in 1942, the average heights ranging from 31.4 to 34.9 inches. C. I. numbers 11979, 11964, 12105, and 12113 had the shortest straw, while C. I. numbers 12118 and 12117 were the tallest.

Lodging data were reported from three stations and at these no strain stood up perfectly although there were varietal differences. Blackhull, Early Blackhull, and hybrids having Early Blackhull as a parent seemed to have had the weakest straw. One Kanred-Hard Federation x Temmarq strain (C. I. 12106) had a high lodging figure, while another selection from the same cross (C. I. 11974) stood up better than any variety in the nursery.

Leaf rust readings were obtained at three stations and at these C. I. numbers 11956, 11979, and 12110 were the most resistant, and C. I. 11999 the most susceptible. Comanche and Pawnee were in the intermediate class and the reading for Wichita was nearly as high as for Early Blackhull.

Test weights per bushel did not vary over an especially wide range, and no strain averaged as much as 60 pounds per bushel. The range was from 56.5 pounds for C. I. 11974 to 59.9 pounds for C. I. numbers 12115 and 12116. This year the Blackhull strains were not as outstanding as in years past.

DATA FROM THE DISEASE NURSERIES

BUNT NURSERY

For convenience, the data from the uniform winter wheat bunt nursery are included in this summary. These data were secured in cooperation with Agronomists and Pathologists working in the area, and the report is included just as issued, with no change in table numbers.

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

[NOT FOR PUBLICATION]

SUMMARY OF RESULTS OF THE GREAT PLAINS UNIFORM
 WINTER WHEAT BUNT NURSERIES, 1943

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The uniform winter wheat bunt nursery for the Great Plains area was continued in 1943 in a slightly different manner than in previous years. The number of nurseries was reduced and the inoculum used at the various stations was different from that used in the past. This report presents a summary of the data obtained in 1943, together with the averages for the varieties grown during different periods from 1932 to 1943.

In the fall of 1942, 50 varieties and strains of winter wheat were sown in duplicate 8-foot rows at Denton, Tex.; Woodward, Okla.; Manhattan, Kans.; Fort Collins, Colo.; and Lincoln, Nebr., in the hard red winter wheat area and at Bozeman, Mont.; Beltsville, Md.; and Logan, Utah. The stations selected for growing were so located that each represented a State or a distinct region that might include parts of several States. Usable data were obtained from four stations as shown in Table 1. No data were obtained at Bozeman, Beltsville, and Logan, and at Lincoln infection was so low that it was felt the readings were of little value. The 1943 average, therefore, is based on readings from four stations.

The inoculum used at each station was made up of a mixture of races known to be prevalent in the area represented by that station, except at Beltsville, Md., where the inoculum consisted of a composite of all races used in the other nurseries. The inoculum for the different stations included the following races:

<u>Station</u>	<u>Races</u>
Denton	L2, L3, L4, L5, L10
Woodward	L3, L4, L10
Manhattan	L3, L5, L7
Fort Collins	L3, L8, L10
Lincoln	L2, L3, L7
Bozeman	L2, L3, L4, L8, T3, T6, T8, T11
Beltsville	Composite of above
Logan	Soil carried dwarf bunt

In addition to the regular nursery, a so-called Supplementary Nursery of seven tester varieties was included. The inoculum used in the latter was a group of bulk collections made in the State, or in the immediate vicinity of the station in question. Any new collections made during the year were added to this bulk and put on these seven tester varieties in order to detect any new or unusual races for the area involved.

The varieties in the regular nursery are listed (Table 1) in order of the average infection at the four stations. The averages range from 0.4 to 73.1 percent. The average infections for some of the standard varieties were as follows: Relief, 1.0; Hussar, 1.7; Nebred, 2.2; Comanche, 3.7; Redit, 4.4; Oro, 7.6; Minturki, 8.0; and Pawnee, 9.4. Of the susceptible varieties grown as checks Kharkof had an average of 33.0; Cheyenne, 44.6; and Red Chief, 73.1. Four strains, each of which is a selection from a cross, had averages slightly lower than Relief and a larger number had infections lower than Redit. Comanche again had an average considerably lower than Oro, and Pawnee was somewhat higher. As in the nursery for the preceeding year, Red Chief showed the highest infection at all stations.

The varieties in the Supplementary Nursery are shown in Table 2 and are ranked in the order of average infection at the four stations. It will be noticed that Oro x Turkey-Florence showed no infection at any of the stations. Redit was slightly lower than Hussar while Chiefkan was extremely high.

At the bottom of Table 1 are shown the average infections by stations for the uniform nursery. The highest average was obtained at Fort Collins and the lowest at Denton. A careful study of the data indicate differential reaction of certain wheats to races at the different stations. This is probably brought out more clearly this year than in previous years because of the type of inoculum used. The higher infections on Comanche and Oro at Fort Collins are known to be due to the presence in the inoculum of race 8, while higher infections on Turkey selection (C.I. 11530) and the Martin x Tenmarq³ selections at Manhattan are due to the presence of race 7 in the inoculum.

While there may be some question regarding averaging the 1943 data with those from previous years, it is felt that it is a safe procedure in general since the reactions were not greatly different. For the period 1932-1943 data for seven strains only are available, of which Hussar and Nebred had the lowest average infections closely followed by Redit. For the periods 1941-43 and 1942 and 1943, the averages are much the same. Some of the strains showing the least infection during these periods were Oro x Turkey-Florence (Pullman selection 9), Marquillo x Minturki (Kansas sel. BN381231), Relief, and Hussar. It is rather encouraging to note that for the longer periods several strains have averages somewhat lower than Redit, Oro, and Minturki, three commercially grown varieties having some resistance to bunt. Several varieties that have been highly resistant in these tests and are otherwise agronomically desirable are being tested with individual races found in all the wheat-growing areas.

Table 1. - Summary of bunt infection of 50 varieties and strains of winter wheat grown in the Great Plains uniform winter wheat bunt nursery at 4 stations in 1943, and average bunt infections for 1932-1943

Variety or cross	C. I. or selection No.	Average percentage of bunt at				Average for 1943	Weighted average		
		Denton, Tex.	Woodward, Okla.	Manhattan, Kans.	Fort Collins, Colo.		1942 and 1943	1941 to 1943	1932 to 1943
Oro x Turkey-Florence	Pullman sel. 9	0.0	0.0	0.0	1.3	0.4	0.4	0.3	—
Oro x Marquillo-Tenmarq	Kans. sel. 402411	0.0	0.6	0.9	1.0	0.6	—	—	—
Marquillo x Minturki	Kans. sel. BN381231	0.2	0.0	0.0	2.2	0.6	0.9	1.5	—
Hope x Turkey 1069	N.P. 151	0.0	0.6	0.0	2.8	0.9	1.3	2.1	—
Relief	10082	0.0	0.0	3.8	0.0	1.0	0.9	1.6	—
Oro x Marquillo-Tenmarq	Kans. sel. 402427	0.2	0.2	0.0	4.4	1.2	—	—	—
Hussar	4843	0.2	0.5	6.2	0.0	1.7	1.3	2.1	3.0
Oro x Marquillo-Tenmarq	Kans. sel. 402430	0.0	0.8	0.2	6.0	1.8	—	—	—
H-44 x Minturki ²	Minn. No. 2709	0.0	0.0	1.3	6.6	2.0	—	—	—
H-44 x Minturki ²	Minn. No. 2711	0.0	0.4	1.2	6.4	2.0	—	—	—
Nebred	10094	0.2	3.7	3.0	1.7	2.2	3.2	6.1	3.1
Turkey 1069 x Cheyenne	Nebr. sel. 372765	1.4	0.0	0.4	7.7	2.4	2.9	4.3	—
Hope x Turkey 1069	Kans. sel. 383110	0.2	0.0	1.7	8.5	2.6	3.1	3.4	—
Turkey selection	11530	1.0	0.0	9.7	0.0	2.7	—	—	—
Turkey x Blackhull	Wd. 39h3283-30-3	0.0	0.4	0.0	10.6	2.8	—	—	—
H-44 x Minturki ²	Minn. No. 2710	1.3	0.8	1.8	8.9	3.2	—	—	—
H-44 x Minturki ²	Minn. No. 2701	0.5	1.8	0.8	10.8	3.5	—	—	—
Comanche	11673	0.0	1.2	0.4	13.3	3.7	8.1	11.1	—
Turkey x Early Blackhull	Wd. 37B-16-4	0.2	0.8	0.8	14.2	4.0	—	—	—
Yogo x Oro	Mont. sel. 5	0.0	0.0	1.5	14.8	4.1	3.7	—	—
Ridit x Quivira	Wd. No. 1177	1.2	1.6	1.8	12.3	4.2	2.4	3.1	—
Turkey x Early Blackhull	Wd. 37B-16-12	3.0	0.0	0.4	13.2	4.2	—	—	—
Ridit	6703	0.0	1.4	0.4	15.7	4.4	2.4	2.3	4.2
Utah Kanred x Ridit	544-40	0.0	2.6	6.2	8.8	4.4	3.8	—	—
Turkey x Early Blackhull	Wd. 37B-16-13	1.4	0.0	1.0	15.4	4.5	—	—	—
Turkey selection	11984	0.5	1.2	0.6	16.7	4.8	4.5	5.7	—
Blackhull x Oro	Wd. 37h1176-27	0.0	0.0	0.0	19.7	4.9	5.0	—	—
Quivira x Fulhard-Oro	Kans. sel. 396242	1.0	0.8	0.2	19.8	5.5	9.1	—	—
H-44 x Minturki ³	Minn. No. 2714	1.5	1.4	2.0	17.8	5.7	—	—	—
H-44 x Minturki ⁴	Minn. No. 2713	0.2	1.6	2.4	18.8	5.8	—	—	—
Martin x Tenmarq ³	Denton 50-37-85	0.9	3.5	17.7	1.2	5.8	3.7	4.3	—
Oro x C.I. 8034	Mont. sel. 26	1.5	0.4	1.1	20.0	5.8	5.6	—	—
Martin x Tenmarq ³	Denton 50-37-92	0.7	4.1	19.0	0.8	6.2	3.7	4.6	—
Turkey 1005 selection	Nebr. sel. 4F-381	0.0	2.2	1.0	21.9	6.3	4.7	6.0	—
Mont. 36-Beloglina x Kanred	12108	0.5	2.2	2.8	23.0	7.1	3.5	—	—
Turkey x Early Blackhull	Wd. 37B-16-3	2.7	0.0	0.6	25.4	7.2	—	—	—
Turkey x Early Blackhull	Wd. 37B-16-7	1.9	0.8	2.5	23.5	7.2	—	—	—

Table 1. (Continued)

Oro	8220	1.0	0.6	0.4	28.3	7.6	12.4	14.3	7.9
Turkey x Early Blackhull	Wa. 37B-16-1	1.5	0.4	0.2	29.5	7.9	—	—	—
H-44 x Minhardi	Minn. I-38-2	1.9	4.0	9.2	17.0	8.0	6.9	—	—
Minturki	6155	1.4	4.1	3.3	23.2	8.0	7.9	8.4	6.0
Turkey x Early Blackhull	Wa. 37B-16-8	0.0	0.0	0.7	32.2	8.2	—	—	—
Pawnee	11669	1.3	8.6	4.8	23.0	9.4	12.7	—	—
Oro x Marquillo-Tenmarq	Kans. sel. 402404	4.7	19.8	24.6	38.0	21.8	22.3	—	—
Early Blackhull x Tenmarq	11952	10.4	29.4	56.5	34.7	32.8	40.1	46.4	—
Kharkof	1442	8.5	31.8	47.0	44.5	33.0	38.1	37.3	41.5
Early Blackhull x Tenmarq	Kans. sel. 363516	17.7	59.5	54.8	24.3	39.1	—	—	—
Early Blackhull x Tenmarq	Kans. No. 2757	16.2	51.7	56.9	37.6	40.8	—	—	—
Cheyenne	8885	25.7	48.4	56.7	47.7	44.6	43.4	41.6	43.7
Red Chief	12109	48.4	83.8	83.1	76.9	73.1	82.9	—	—
Average		3.2	7.6	9.8	17.0				

Table 2. - Bunt infection on 7 varieties and strains of winter wheat grown in the Great Plains Supplementary Bunt Nursery at 4 stations in 1943

Variety or cross	C. I. No.	Average percentage of bunt at				Average
		Denton, Texas	Woodward, Okla.	Man- hattan, Kans.	Fort Collins, Colo.	
Oro x Turkey-Florence (Comp. 2)	----	0.0	0.0	0.0	0.0	0.0
Ridit	6703	0.0	0.0	2.4	1.1	0.9
Russar	4843	0.0	0.0	4.0	0.0	1.0
Berkeley Rock selection (T-47-55)	----	0.0	4.8	9.7	6.8	5.3
White Odessa	4655	0.0	1.0	18.1	5.0	6.0
Oro	8220	1.5	6.2	5.5	22.3	8.9
Chiefkan	11754	30.5	43.0	52.5	63.0	47.3

UNIFORM WINTER WHEAT RUST NURSERIES

In tables 23 and 24 are presented data on severity of leaf-rust and stem-rust infection on the 31 varieties of winter wheat grown in rust observation nurseries throughout the country in 1943. These nurseries are maintained from year to year as a part of a rust research program carried on in cooperation with agronomists and pathologists employed in the several States concerned. These preliminary data are included in this report through the kindness of Dr. H. A. Rodenhiser. Later, a complete report of these nurseries will be issued and the rust percentages may not agree entirely with those presented here, since the data shown in this less detailed report include only figures for the severity of infection.

Differential data for leaf-rust infection were obtained for the varieties at 22 stations (table 23). Among those classed as semi-hard Hope x Hussar (C. I. 11682) had the lowest average infection, being considerably lower than Kawvale and Minturki. Of the hard wheats several varieties made good records especially Mediterranean-Hope x Pawnee (C. I. 12287), Marquillo x Oro (C. I. 11979), and H44 Minturki x Minturki (C. I. 12022), all of which had averages below 10 percent. Comanche had an average of 17.9 and Pawnee 24.9 compared to 38.8% for Tenmarq. Kharkof had the heaviest infection as indicated by an average of 46.4 percent.

Stem-rust readings showing differential reaction were reported from 12 stations (table 24). Hope x Hussar (C. I. 11682) again had the lowest average infection among the semi-hard wheats but in this case it was not so outstanding as it was for leaf-rust resistance. Of the hard wheats Hope x Cheyenne (C. I. 11969) and Mediterranean-Hope x Pawnee (C. I. 12287) had the lowest average infections. These wheats were very consistent in performance and in only one case did either of them have a reading above 5 percent. The infection on Comanche averaged 21.3 compared to 21.7 for Pawnee and 25.0 percent for Tenmarq. Kharkof was the most susceptible with an average of 35 percent.

Mediterranean-Hope x Pawnee (C. I. 12287), developed in Kansas, was especially outstanding for resistance to both rusts and should be watched, if not as a possibility for a commercial variety, most certainly as a parent in crosses.

Table 23.--Severity of leaf rust infection on winter wheat varieties grown in Uniform Rust Observation Nurseries, 1943.

Class, variety, or cross	No.	Percent severity of leaf rust infection at:											
		C. I.	College	Den-	Fayette-	Still-	Man-	Lexing-	Wooster-	Lafay-	Ur-	Kana-	Co-
		Station	ton	ville	water	hattan	ton	Ohio	ette	bang	Ames	wha	lumbia
		Tex.	Tex.	Ark.	Okla.	Kans.	Ky.		Ind.	Ill.	Iowa	Iowa	Mo.
<u>Soft Red</u>													
Med.-Hope sel.	12288	0	10	0	10	10	10	10	10	5	5	5	3
Fultz x Minturki	12218	T	10	5	5	5	5	10	10	2	10	5	3
Fultz x Hungarian	12017	T	2	T	0	20	50	3	3	2	5	5	2
Trumbull x Fultz	12217	10	5	20	1	25	50	5	15	5	15	5	3
Wabash	11384	5	10	20	1	20	85	10	10	5	20	10	10
Trumbull x Fultz	12220	5	5	50	5	25	48	30	10	10	30	20	3
Denton	8265	5	25	75	25	40	18	5	5	10	25	30	40
Wabash x Trumbull	12216	15	10	75	5	80	63	8	20	10	20	20	5
Michigan Amber	5620	25	35	90	50	80	57	10	75	50	50	30	60
Mediterranean	3332	15	25	75	60	80	85	20	65	40	50	50	60
Fulcaster	6471	35	70	90	50	80	63	15	85	40	50	50	30
Trumbull	5657	15	50	90	100	100	63	10	85	50	40	50	40
Minhardi	5149	80	80	90	75	100	85	35	85	75	65	60	15
<u>Semi-hard Red</u>													
Hope x Hussar	11682	T	15	T	1	15	1	3	T	10	5	5	3
Kawvale	8180	10	25	75	40	60	30	7	65	10	40	20	15
Hussar	4843	90	60	15	60	45	30	10	35	40	40	40	3
Minturki	6155	50	45	75	100	90	30	15	80	40	40	30	60
<u>Hard Red</u>													
Med.-Hope x Pawnee	12287	T	T	T	5	T	0	5	T	30	0	T	3
Marquillo x Oro	11979	5	5	0	10	40	0	5	2	5	0	5	3
Min. x Mint.	12022	T	25	0	10	20	20	1	0	1	10	10	3
Hope x Cheyenne	11969	T	5	T	15	15	20	3	2	3	5	0	3
Kawvale x Tenmarq	11956	10	10	10	70	30	30	8	35	30	20	10	10
Comanche	11673	25	25	T	25	40	1	5	10	10	40	15	5
Hope x Turkey	11964	30	30	T	40	50	30	3	2	5	5	10	5
Cheyenne x Tenmarq	11972	15	40	10	80	65	5	12	15	2	10	10	15
Pawnee	11669	25	30	10	25	60	20	5	25	25	30	10	5
Marquillo x Tenmarq	12113	25	25	10	80	80	20	5	5	5	20	5	5
Kanred	5146	30	60	10	75	90	20	5	20	1	40	40	10
Malakof	4898	60	60	10	40	90	20	25	35	5	30	40	5
Tenmarq	6936	15	50	10	80	65	20	10	20	0	50	30	5
Kharkof	1442	50	70	10	80	100	20	25	35	2	40	40	20

Table 23.---(Concluded).

Class, variety, or cross	Percent severity of leaf rust infection at:											Average
	C. I.	Lin-	St.	Cha-	Blacks-	Sulphur-	West-	Harts-	Experi-	Gaines-		
	No.	coln	Paul	Madison	tham	burg	Springs	minster	ville	ment	ville	all
		Nebr.	Minn.	Wis.	Mich.	Va.	W. Va.	S. C.	S. C.	Ga.	Fla.	stations
<u>Soft Red</u>												
Med.-Hope sel.	12288	..	..	T	..	T	T	5	5	..	1	3.2
Fultz x Minturki	12218	T	5	2	5	T	5	5	5	..	10	4.2
Fultz x Hungarian	12017	2	..	2	25	T	25	5	25	..	5	9.1
Trumbull x Fultz	12217	2	10	5	30	..	T	5	10	50	20	13.9
Wabash	11384	2	10	5	15	15	10	5	10	..	30	14.2
Trumbull x Fultz	12220	10	5	5	20	15	10	10	25	25	15	17.3
Denton	8265	70	..	5	50	..	5	65	25	25	25	28.7
Wabash x Trumbull	12216	70	..	30	20	..	25	25	65	50	40	32.8
Michigan Amber	5620	60	..	40	100	20	10	100	100	100	60	57.2
Mediterranean	3332	80	40	80	80	20	10	100	100	100	30	57.5
Fulcaster	6471	80	65	70	100	20	25	100	100	100	85	63.8
Trumbull	5657	70	..	70	100	..	10	100	100	100	70	65.7
Minhardi	5149	80	65	70	100	..	25	100	100	100	60	73.6
<u>Semi-hard Red</u>												
Hope x Hussar	11682	..	..	2	100	..	5	1	65	..	2	13.4
Kawvale	8180	30	30	30	25	30	5	5	65	100	10	33.0
Hussar	4843	50	..	30	65	30	5	25	65	100	5	40.1
Minturki	6155	50	40	40	40	40	10	10	65	100	75	51.1
<u>Hard Red</u>												
Med.-Hope x Pawnee	12287	2	..	T	5	0	T	2	25	25	5	5.2
Marquillo x Oro	11979	5	..	2	10	0	T	1	40	25	1	7.7
H44 Min. x Mint.	12022	20	..	1	25	0	5	1	..	25	0	8.9
Hope x Cheyenne	11969	5	..	T	10	..	5	1	100	..	0	10.1
Kawvale x Tenmarq	11956	10	3	15	20	..	T	2	25	25	1	17.8
Comanche	11673	60	15	10	40	..	T	5	10	25	2	17.9
Hope x Turkey	11964	15	..	2	15	..	2	10	100	50	3	19.9
Cheyenne x Tenmarq	11972	40	15	30	65	5	5	2	65	25	10	24.6
Pawnee	11669	50	15	30	60	..	5	2	25	25	40	24.9
Marquillo x Tenmarq	12113	2	..	10	10	..	T	2	65	100	70	27.2
Kanred	5146	40	10	10	100	5	10	25	65	25	35	33.0
Malakof	4398	65	25	25	50	5	25	10	65	100	25	37.0
Tenmarq	6936	40	25	20	80	..	5	25	100	100	65	38.8
Kharkof	1442	90	20	30	40	..	..	25	65	100	65	46.4

Table 24.—severity of stem rust infection on winter wheat varieties grown in Uniform Rust Observation Nurseries, 1943.

Class, variety, or cross	Percent severity of stem rust infection at:													Average all stations
	C. I.	Man-	Lafay-	Ames	Kana-	Lin-	St.	Madi-	Cha-	East	Belts-	Blacks-	Sulphur-	
	No.	hattan	ette	Iowa	Iowa	coln	Paul	son	tham	Lansing-	ville	burg	Springs-	
		Kans.	Ind.	Iowa	Iowa	Nebr.	Minn.	Wis.	Mich.	Mich.	Md.	Va.	W. Va.	
Soft Red														
Med.-Hope sel.	12288	0	..	5	..	..	..	T	...	T	5	0	T	1.5
Fultz x Minturki	12218	5	2	10	5	20	3	30	100	10	30	5	5	18.8
Wabash x Trumbull	12216	40	30	40	5	40	..	50	100	70	80	1	10	42.4
Trumbull x Fultz	12217	40	30	50	15	50	2	50	100	60	80	10	25	42.7
Trumbull x Fultz	12220	40	40	50	10	70	15	50	100	50	80	2	10	43.1
Fulcaster	6471	25	40	50	10	50	45	60	100	40	90	5	10	43.8
Denton	8265	40	50	60	10	40	..	60	100	50	80	1	10	45.5
Wabash	11384	40	50	60	10	70	10	50	100	50	85	10	25	46.7
Trumbull	5657	10	50	50	10	60	..	60	100	70	90	2	25	47.9
Mediterranean	3332	25	50	65	10	70	5	60	100	80	80	10	25	48.3
Minhardi	5149	25	50	60	10	70	35	60	100	70	80	T	25	48.8
Fultz x Hungarian	12017	40	50	40	5	60	..	60	100	70	80	7	40	50.2
Michigan Amber	5620	15	50	65	10	60	..	70	100	50	90	3	40	50.3
Semi-hard Red														
Hope x Hussar	11682	T	T	..	0	20	..	T	100	30	40	0	10	20.1
Minturki	6155	10	10	20	5	10	65	20	75	2	50	T	10	23.1
Kawvale	8180	5	30	30	10	20	1	40	100	5	75	1	5	26.8
Hussar	4843	25	50	30	10	40	..	60	100	70	80	5	25	45.0
Hard Red														
Hope x Cheyenne	11969	T	0	5	0	T	..	2	T	0	5	0	T	1.2
Med.-Hope x Pawnee	12287	T	0	5	0	T	..	T	0	10	2	0	T	1.6
Hope x Turkey	11964	T	T	5	0	T	..	2	T	15	10	T	2	3.2
Hill Min. x Mint.	12022	T	0	5	0	T	..	2	25	T	15	0	T	4.3
Marquillo x Oro	11979	T	T	5	0	T	..	5	10	15	20	T	2	5.3
Kanred	5146	5	5	20	5	10	25	40	50	30	15	T	10	17.9
Marquillo x Tenmarq	12113	T	10	20	5	10	..	50	50	0	75	T	10	20.9
Comanche	11673	T	5	20	10	10	10	40	100	30	25	T	5	21.3
Pawnee	11669	T	5	30	5	20	3	30	80	2	75	T	10	21.7
Kawvale x Tenmarq	11956	T	5	20	5	10	50	40	75	5	65	T	10	23.8
Cheyenne x Tenmarq	11972	5	10	20	5	20	65	70	50	10	30	T	10	24.6
Tenmarq	6936	T	20	40	10	20	15	50	85	30	25	T	5	25.0
Malakof	4898	15	10	40	10	10	35	40	80	40	50	T	5	27.9
Kharkof	1442	15	20	50	10	20	20	60	70	40	80	T	..	35.0

