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

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1945

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Lincoln, Nebraska
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By

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Contents

	Page
Experiments in 1945	2
Cooperating Agencies, Stations, and Personnel	2
Accession Numbers Assigned	4
New Varieties	4
Uniform Varieties in Plots	7
Plot Data	7
Standard Errors	11
Summary of Yields	33
Districts	34
States	37
Summary of Agronomic Data	41
Summary of Plot Data	43
Uniform Yield Nursery	44
Data Obtained	46
Standard Errors	61
Summary of Nursery Yields	61
Summary of Agronomic Data	67
Data from the Disease Nurseries	67
Uniform Winter Wheat Rust Nurseries	69
Bunt	73

1/ The writer wishes to express his appreciation to Dorothy M. Wilson, Agent, of Lincoln, Nebr., for her assistance in assembling the data, making calculations, typing, and stencilling this report. Mary McFarland, Ruth E. Lebo, and Vaunia J. Burbank, Student Assistants, helped with the calculations and in assembling the data.

EXPERIMENTS IN 1945

The 1945 crop was the 15th one harvested since the cooperative hard red winter wheat improvement program was [illegible] in 1930. In spite of the absence of some of the cooperators and a general shortage of help and equipment, the program has gone on in an encouraging manner due to the tireless efforts of the men on the job. In many cases the practical phases of wheat improvement have been continued at the expense of more technical problems, but it is hoped that in the near future a more balanced program may be developed.

A number of changes in methods were outlined in the 1944 report, such as the substitution of nursery rows for field plots for yield determinations and the use of combines for harvesting the larger plots. Both of these changes were tried at more stations the past year. In some cases small mowers have been converted into nursery harvesters with considerable success. In general, the practice of saving time and labor has been continued, thus making possible the study of more material.

A workers' conference held at Manhattan, Kansas, in February, 1945, was well attended and served as a stimulus for greater and more efficient efforts. At the same time attention was focused on many problems still unsolved.

This report presents a summary of the 1945 data from all cooperating stations. Where possible, averages or yields for the 1944-45 period are presented. No attempt has been made to give averages for longer periods since such data were presented in considerable detail in the 1944 report. The cooperating agencies, stations, and personnel concerned in these experiments are as follows:

COOPERATING AGENCIES, STATIONS, AND PERSONNEL

(The asterisk (*) indicates Government field station)

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

Division of Cereal Crops and Diseases

Wheat Investigations		
Hard Red Winter Wheat		[illegible] Quisenberry
Rust and Smut		C. O. [illegible]ton
Milling and Baking		[illegible] Bayfield and [illegible] Shrewsberger

TEXAS AGRICULTURAL EXPERIMENT STATION:

Agronomy (Corn and Small Grains)		C. [illegible]
College Station	Agricultural Experiment Station	[illegible]
Denton	Substation No. 6	[illegible]
Chillicothe	Substation No. 12	[illegible] M. Atkins
Iowa Park	Substation No. 16	[illegible] E. Brooks
Bushland	Amarillo Experiment Station	F. G. Ackerman

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Field Crops and Soils		E. T. Murphy
Lawton	U. S. Dry Land Field Station*	W. M. Osborn
Stillwater	A. & M. College	[illegible]
Woodward	Southern Great Plains Field Sta.*	[illegible]
Goodwell	Panhandle Agricultural Experiment Station	[illegible]

KANSAS AGRICULTURAL EXPERIMENT STATION:

Agronomy		
Manhattan	Kansas State College	R. T. Throckmorton, H. H. Laude, E. P. Reitz, E. G. Heyne
Hays	Hays Branch Exp. Station	A. F. Swanson
Colby	Colby Branch Station	H. H. Coles
Garden City	Garden City Agr. Exp. Station	A. E. Lowe, L. M. Sloan

COLORADO AGRICULTURAL EXPERIMENT STATION:

Agronomy		
*Akron	U. S. Dry Land Field Station	Alvin Kezer, N. W. Robertson, J. F. Brandon
Fort Collins	State Agricultural College	D. W. Robertson
Hesperus	Fort Lewis Substation	D. W. Koonce

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Agronomy		
Crops Research		J. D. Reim, T. A. Kiesselbach
Lincoln	Agricultural Experiment Station	K. S. Quisenberry
North Platte	North Platte Substation	C. J. Webster, L. L. Zook
Alliance	Box Butte Experiment Farm	K. S. Quisenberry

WYOMING AGRICULTURAL EXPERIMENT STATION:

Agronomy		
Laramie	Agricultural Experiment Station	Dayton Klingman
*Sheridan	U. S. Dry Land Field Station 2/	R. S. Towle, Mary E. Towle

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy		
Brookings	Agricultural Experiment Station	J. E. Grafius

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy and Plant Genetics		
St. Paul	University Farm	H. K. Hayes, E. R. Ausemus
Waseca	Southeast Experiment Station	R. E. Hodgson
Grand Rapids		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	A. H. Post, R. H. Bamberg
Moccasin	Judith Basin Branch Station	R. H. Bamberg
Havre	Northern Montana Branch Station	J. J. Sturm

IOWA AGRICULTURAL EXPERIMENT STATION:

Ames	Iowa State College	L. C. Burnett, H. C. Murphy

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

On July 20, 1945, Mr. R. S. Towle, Superintendent of the U. S. Dry Land Field Station, Sheridan, Wyoming, passed away after an extended illness. For many years Mr. Towle had been a splendid cooperator, always having a great, well-arranged variety test, and constantly showing an interest in better wheats. He made a real contribution to Dry Land Agriculture during a long and faithful service, and will be sorely missed as a coworker and as a real friend.

In August, 1945, Dr. John H. Parker, Secretary of the Kansas Wheat Improvement Association, formerly Plant Breeder at Kansas State College, resigned to take up barley improvement work in Wisconsin, Minnesota, North Dakota, South Dakota, and Iowa. Dr. Parker is the "father" of many of the present cooperators, and his enthusiasm, energy and philosophy will be missed. A number of crosses from which new varieties are now developing were made under his direction. The wheat variety survey will show that in 1944 Tenmarq, the apple of Dr. Parker's eye, was the leading variety in Texas, Oklahoma, and Kansas, as well as having a greater seeded acreage than any other variety in the United States.

On July 1, 1945, Dr. E. G. Bayfield resigned as head of the Department of Milling Industry at Kansas State College, Manhattan, and was succeeded by Dr. J. A. Shellenberger. All quality evaluations of wheats from the area will be continued in the laboratory maintained in cooperation with the Kansas Agricultural Experiment Station.

ACCESSION NUMBERS ASSIGNED

The following C. I.[3] numbers have been assigned to wheats of the Region during the past year.

C. I. No.	Name	State No.
12140	Oro x Mediterranean-Hope	Oklahoma Nor. 21
12141	Mediterranean-Hope x Pawnee	Kansas No. 2789
12142	Cheyenne x Turkey 1062	North Platte No. 40410
12143	Turkey	North Platte Local
12144	Reliant	.....
12403	Nebred x Ceres H44	Kans. sel. 43RN1446
12404	Nebred x Mediterranean-Hope	Kans. sel. 425811
12405	Comanche x Hope	Kans. sel. 425879
12406	Marquillo-Oro x Oro-Tenmarq	Kans. sel. 431420
12407	Marquillo-Oro x Oro-Tenmarq	Kans. sel. 431413
12414	H44 x Minturki	Minn. NSF II-29-62
12415	Hope x Minturki	Minn. NSF II-31-27

NEW VARIETIES

No new varieties were named during the year.

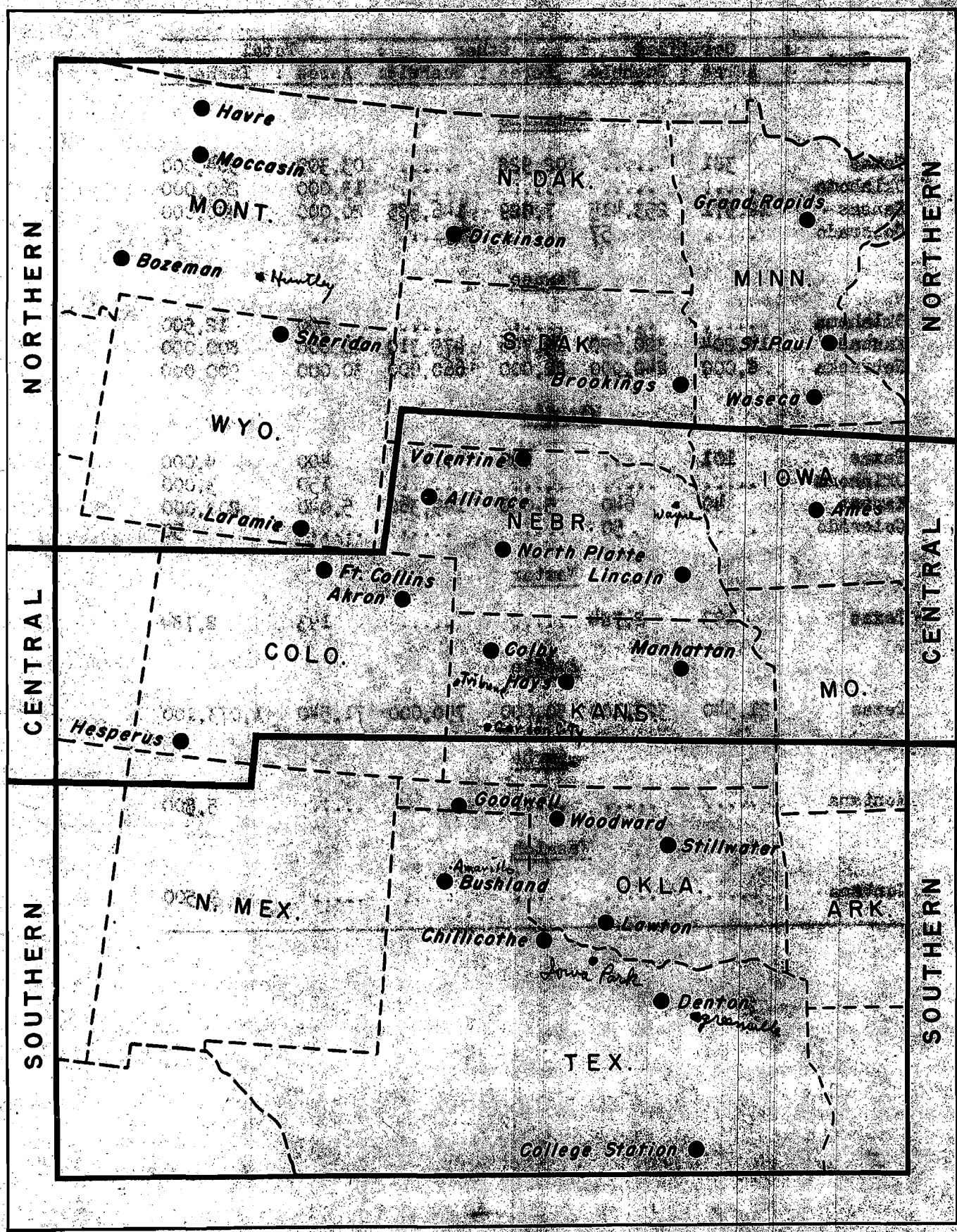
An early variety named Early Triumph and distributed by Joseph Danne of El Reno, Oklahoma, was meeting with considerable favor in Oklahoma, Texas, and Kansas, and was grown on possibly 100,000 acres in 1945. This variety will be designated as Triumph in this report and in the wheat survey. Its origin will not be disclosed by the originator.

The acreage and seed stocks of new varieties continued to increase

3/ C. I. refers to accession number of the Division of Cereal Crops & Diseases.

in 1945. The estimates for the 1945 acreage and total yields are as follows:

State	Certified		Other		Total	
	Acres	Bushels	Acres	Bushels	Acres	Bushels
Comanche						
Texas	381	.....	102,928	.....	103,309	964,000
Oklahoma	.....	.....	.....	.....	13,000	260,000
Kansas	12,971	253,415	7,029	146,585	20,000	400,000
Colorado	.....	57	.....	.....	.....	57
Pawnee						
Oklahoma	.....	.....	.....	.....	500	12,500
Kansas	14,204	320,690	25,796	479,310	40,000	800,000
Nebraska	8,000	240,000	22,000	660,000	30,000	900,000
Wichita						
Texas	101	.....	299	.....	400	4,000
Oklahoma	.....	.....	.....	.....	150	3,000
Kansas	40	640	5,000	149,360	5,040	200,000
Colorado	.....	50	.....	.....	.....	50
Westar						
Texas	193	2,784	.....	.....	193	2,784
Austin						
Texas	21,540	323,100	50,000	750,000	71,540	1,073,100
Oache						
Montana	.....	.....	.....	.....	.....	5,500
Wasatch						
Montana	.....	.....	.....	.....	.....	9,500


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

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 opposite page, and the varieties grown uniformly at the co-operating experiment stations are somewhat different in each of the three districts. The varieties grown uniformly in each district in 1945 were as follows:

Variety	C. I. No.	Southern	Central	Northern
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	
Early Blackhull	8856	X		
Westar	12110	X		
Cheyenne x Early Blackhull	12122	X	X	
Nebred	10094			X
Cheyenne	8885		X	
Minturki	6165			X
Turkey	8033			X
Kaymont	6700			X
Marquis	11502			X
Mont. 36 - Belgium x Kanred	12108			X
Hill x Minturki	12133			X
Hill x Minturki	12139			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 lists, were grown. The data on all varieties reported as grown in replicated plots at each station are included in this report.

CROP DATA

Conditions for seeding the winter wheat crop in the fall of 1944 were fairly good over the entire area, and with few exceptions germination was prompt and good stands were obtained. In general, the behavior at the different stations reflected the general condition of the wheat crop in the immediate vicinity. In the Central and Southern districts fall growth was normal to heavy and in the Central District leaf rust became extremely heavy over a wide area, and in some places there was a deficiency of available nitrates, causing many fields to turn yellow. The winter was generally mild with little killing and spring growth started early causing predictions of an early harvest. The weather then turned damp and cool, there was a late cold spell in mid-April, and with leaf rust, Septoria, and a deficiency of nitrates growth was retarded, and as late as May 20 little heading was

observed north of the Oklahoma line. Harvest was normal to early in the Southern, but late in the Central and Northern districts. Leaf rust over-wintered in Texas and Oklahoma and was widely present at various times during the spring. Stem rust was present in Oklahoma and Texas. The disease was generally light and rusts did not become serious. Some of this stem rust survived the hot, dry summer and was present in Oklahoma and Texas and Oklahoma, and locally in southern Colorado and Nebraska. Grasshoppers were reported as doing damage in some places in the eastern part of the Region.

Varieties were tested in field tests at 25 stations during fall of 1944. Two new stations were added to the list, namely, Iowa Park, Texas, and Garden City, Kansas. Hail ruined the plots at Amarillo just before harvest, and winterkilling was so heavy at Blackmen, North Dakota, that the plots were abandoned. At Lincoln, Nebraska, lodging was so severe that no data were obtained, but early season data were obtained. Yield and other data on varieties grown at each of the 23 stations are presented in Table 1. Tables also contained standard errors for most stations are given and are summarized in Table 2.

To save space data are shown only for those characteristics that showed a contrasting reaction and therefore have an economic importance. For each station the varieties are listed in order of yield. Wherever possible average yields for 1944-1945 are shown. No longer averages are included in this report since such data would be much in the 1944 report. For the most part the data need little explanation.

Texas

The crop at Denton was very poor with yields ranging from 3.4 to 6.2 bushels per acre. Septoria was heavy, with most varieties being very susceptible. Leaf rust developed early and was heavy on all susceptible varieties, but in this case some strains showed good resistance. Stem rust was very light. The earliest strains showed considerable stem rust. Tenmarq (C. I. 11972), Cheyenne x Early Blackhull (C. I. [illegible]), and Early Blackhull gave the best yields. A number of strains with Hope x Mediterranean as one parent showed good leaf rust resistance but failed to give good yields. Varieties were quite free with [illegible] except that Wichita was somewhat susceptible to leaf spot (Helminthosporium sativum) and Tenmarq was susceptible to stem rot.

At Iowa Park the yields were considerably better than at Denton and best yields were obtained from Tenmarq (C. I. 12122), [illegible] (C. I. 12122), Early Blackhull, Hope x Mediterranean gave the highest yield and were among the lowest in the number of the list.

Yields at Chillicothe ranged from 30.1 bushels for Forward-Hard Federation x Tenmarq (C. I. 12115) to [illegible] for Hunter. Cheyenne x Early Blackhull (C. I. 12122), Early Blackhull, Hope, Comanche, and Westar all had good average yields. With the exception of Hunter, which was higher in yield than Tenmarq, the same strain (C. I. 12122) of Cheyenne x Early Blackhull had the best yield. Hope x Mediterranean was the best of the Hope x Mediterranean strains. Wichita, Oklahoma Selection, and Westar had good resistance to leaf rust. Wichita was susceptible to stem rot. Cheyenne x Early Blackhull developed stem rust but was good in resistance to leaf rust. Hunter had good resistance to leaf rust and was free from stem rot. Hunter had the highest yield. Tenmarq x Cheyenne x Tenmarq (C. I. 12122) [illegible] also gave good yields. Hope was as good as Hope x Mediterranean.

At Stillwater yields were fairly good, but test weights were rather low. Although not reported it is known that leaf rust infection was very heavy at this station. Pawnee, Comanche, Early Blackhull, Austin, and Triumph yielded in the order named, with Wichita being rather low. Based on the 1944-45 averages Pawnee, Comanche, and Early Blackhull have given the best yield records.

Considerable leaf rust developed on the varieties at Woodward, with Westar, Pawnee, and Comanche showing the most resistance. In spite of a high leaf rust reading Cheyenne x Early Blackhull (C. I. 12122) gave the highest yield followed by Blackhull x Hard Federation (C. I. 12120), Cheyenne x Tenmarq (C. I. 11972), Pawnee, and Wichita. At this station Wichita gave a higher yield than did Early Blackhull. For the 2-year period the varieties rank for yield as follows: Cheyenne, Cheyenne x Tenmarq (C. I. 11972), Red Chief, and Blackhull x Hard Federation (C. I. 12120).

Comanche, Wichita, Cheyenne x Tenmarq (C. I. 11972), and Blackhull had the best records at Goodwell. Here the yields ranged from 21.8 to 9.8 bushels per acre, all of which were lower than in 1944. Test weights per bushel ranged from 55.5 to 59.9 pounds per bushel. Wichita, Comanche, Nebred, and Cheyenne x Tenmarq (C. I. 11972) rank in the order named, based on the 2-year average yields.

At Manhattan lodging was rather severe and leaf rust heavy, but in spite of this test weights were fairly good and yields ranged from 52.2 to 26.6 bushels per acre. Plant growth was tall with heights ranging from 44 to 54 inches. Two new wheats, Mediterranean-Hope x Pawnee (C. I. 12287) and Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128), showing real leaf rust resistance gave the highest yields. Pawnee, Marquillo-Tenmarq x Kawvale-Tenmarq (C. I. 12127), Comanche, and Westar ranked in the order named. A very complete set of data are given for the 1945 crop at this station. Based on the 1944-45 average yields the varieties rank as follows: Pawnee, Cheyenne x Early Blackhull (C. I. 12122), Quivira x Tenmarq (C. I. 12116), Wichita, and Comanche.

Yields from Garden City, reported for the first time, show Pawnee, Cheyenne x Early Blackhull (C. I. 12122), Quivira x Tenmarq (C. I. 12116), and Cheyenne x Tenmarq (C. I. 11972) to be at the top of the list, while at the bottom are Turkey, Wichita, and Early Blackhull x Tenmarq (C. I. 12124).

The crop at Hays was not up to standard, although it was much better than in that general area of Kansas. The April freeze seemed to have hurt the plants in this area and they never fully recovered. Aphid counts were obtained which indicated that Pawnee may be very susceptible as has been indicated in previous years. On fallow some of the later varieties lodged rather badly. Leaf rust readings showed rather heavy infection on most varieties. Test weights varied rather widely and yields ranged from 28.1 to 13.3 bushels per acre. Chiefkan, Quivira x Tenmarq (C. I. 12116), and Cheyenne x Early Blackhull (C. I. 12122) gave the highest yields. Two Chiefkan x Oro-Tenmarq selections, C. I. No. 12133 and H. C. 43-111, also gave very good yields. Cheyenne x Early Blackhull (C. I. 12122), Early Blackhull, Quivira x Tenmarq (C. I. 12116), and Chiefkan have the highest 2-year average yields.

Again Colby had a bumper wheat crop with the leading variety Pawnee having a yield of 72.8 bushels per acre, and the lowest one Turkey yielding "only" 51.8 bushels. Test weights per bushel were all above 60 pounds per bushel. Quivira x Tenmarq (C. I. 12116), Cheyenne x Tenmarq (C. I. 11972),

and Cheyenne x Early Blackhull (C. I. 12122) yielded in the order named. The 2-year averages are in much the same order as for 1945 and all are above 47 bushels per acre. It should be remembered that some of these were Colby was in a dust bowl, the land all but ruined by soil blowing, and the future of the country very bleak. In view of this, the yields reported for 1944 and 1945 are most encouraging.

At Akron a good crop was harvested especially on fallow. Test weights were a little low, while average yields ranged from 37.1 to 35.6 bushels per acre. Giving the highest yields were Cheyenne x Early Blackhull (C. I. 12122), Wichita, and Nebred. The later strains, Pawnee, Minturki, and Alton gave the lowest yields. Comanche, Wichita, and Nebred rank in the order named based on the 2-year averages.

At Fort Collins variations in stand were reported which seemed to be the result of differences in germination of the seed of different varieties. Blackhull had the poorest stand and Early Blackhull the best. The crop was late, straw of moderate height, there was no lodging, but both leaf and stem rust became very heavy. Pawnee showed the greatest resistance to stem rust, Blackhull, and Early Blackhull developed the least stem rust. Test weights were variable and yields were lowest on fallow. Early Blackhull, Pawnee, Wichita, and Cheyenne ranked in the order named, while Cheyenne and Tenmarq were the lowest. Wichita, Pawnee, and Blackhull have the highest 2-year average yields.

The variety test at Lincoln was not harvested, but was presented. Heading was late, leaf rust was heavy throughout the plot, and powdery mildew heavy on some varieties. In fact, so heavy that it was impossible to tell Nebraska No. 60 and Turkey are not nearly as resistant as the others. One test was on a new piece of land and contained many volunteers before heading and got very little water, and this plot was abandoned. Only one variety stood up and that was Early Blackhull, with Turkey and Nebraska next best. By harvesttime the plots were much tangled up and the plots were abandoned. A very sad put trick.

At North Platte the two replications on cowpea stubble were damaged up in the spring because stands were too thin to be [illegible] but the two replications on fallow gave a bumper crop. [illegible] and before harvest lodging of [illegible] Chief, Wichita, and Pawnee. The lodging was not so serious as to cause difficulty in harvesting, or reduce yields. Test weights were all very good, and yields ranged from 70.3 for Early Blackhull (C. I. 12122) to 56.0 bushels for Nebraska No. 60. Cheyenne x Tenmarq (C. I. 12172), Wichita, and Cheyenne x Tenmarq (C. I. 12142) were good yields, but Nebraska No. 60 yielded above 60.0 bushels. The 2-year averages do not agree too well, but based on the 2-year average Wichita, Minturki, Blackhull (C. I. 12122), and Cheyenne x Tenmarq (C. I. 12142) have the highest records.

The varieties all survived the winter at Sidney and yields ranged from 41.9 to 30.8 bushels per acre were recorded. Maturity was good, test weight well, and some lodging was reported. While test weights were good, all were above 60 pounds per bushel. Cheyenne x Early Blackhull (C. I. 12142), Cheyenne x Turkey (C. I. 12142), Tenmarq, and Cheyenne x Tenmarq (C. I. 12172) yielded above Cheyenne. Pawnee and Red Chief gave the lowest yields. The 1944 crop was hailed out so no 2-year averages are available.

At Waseca, some winterkilling was recorded and there was considerable lodging in all varieties except Blackhawk. A number of the new varieties showed leaf rust resistance. Blackhawk had the highest yield followed by several Hope and H44 x Minturki backcrosses, while Marmin and Minturki gave the lowest yields. For the 2-year period H44 x Minturki^2 (D. I. 12138), Blackhawk, and H44 x Minturki^2 (Minn. 2710) have had the best yield records.

At St. Paul, there was no winterkilling and no lodging, but there was considerable leaf rust on susceptible varieties. Blackhawk, H44 x Minturki^2 (C. I. 12139), and Marmin gave the highest yields and Minturki the lowest.

Winterkilling was reported from Grand Rapids, and there was a light infection of stem rust. Here H44 x Minturki (C. I. numbers 12138 and 12139) outyielded Minturki and Marmin while Blackhawk ranked last.

Some winterkilling was recorded at Sheridan, with Marmin having the best survival. Straw was tall ranging from 45 to 52 inches in height. Kanred, Kharkof, and Marmin had the highest yields while Nebred and H44 x Minturki^2 (C. I. 12139) had the lowest. Kanred, Kharkof, and Cheyenne have the best 2-year average yields.

At Bozeman, Martin x Tenmarq^3 (C. I. 11804), Nebred, and Tenmarq gave the best records and Minturki, Cache, and Marmin the poorest. Although not in comparable tests with the rest of the varieties a comparison of the two new Minnesota wheats, H44 x Minturki^2, with Karmont and Yogo is shown. C. I. 12139 outyielded Karmont and C. I. 12139 and C. I. 12138 ranked above Yogo.

Yields at Moccasin ranged from 43.6 to 30.5 bushels per acre, with Martin x Tenmarq^3 (C. I. numbers 11804 and 11823) giving the highest yields, followed by Nebred and Martin x Tenmarq^3 (C. I. 11824). At the bottom of the list are Marmin, Yogo, and Yogo x Oro (Sel. 5). In another test H44 x Minturki^2 (C. I. numbers 12139 and 12138) outyielded Yogo.

Stand differences are reported from Havre but these probably represent differences in germination and not winter survival. Straw was short and yields rather low. Martin x Tenmarq^3 (C. I. 11804), Compound Hybrid (C. I. 11744), and Yogo x Oro (Sel. 5) ranked the highest, while Yogo and Marmin were the lowest. H44 x Minturki^2 (C. I. 12138) gave a better yield than did C. I. 12139. For the 2-year period the varieties rank for yield as follows: Nebred, Karmont, Kharkof, and Mont. 36 x Beloglina-Kanred (C. I. 12108).

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, although random arrangements were used at some stations, especially those using nursery plots. 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.

The analysis of variance was used for the 1945 yield data at each station. To obtain the standard error of the mean, the square root of the mean square due to error, or the standard deviation, was divided by the square root of the number of replications for each variety. The standard error of a difference was obtained by multiplying the standard error of a mean by $\sqrt{2}$.

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

Table 1.--Yield and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 23 experiment stations in the hard red winter wheat area in 1945, and average yields for 1944-45.

Variety	C. I. No.	Denton, Texas (Rod-row plots, 8 replications) Date Headed	Date Ripe	Ht.	Sep-ortia 1/	Rust Leaf	Rust Stem	Weight per bushel	At. acre yield	Yield Average 1944-45	Yield Rank
				In.		%	%	Lbs.	Bu.	Bu.	
Comanche	11673	5/2	6/2	32	S	34	0	57.0	13.4	18.5	1
Cheyenne x Tenmarq	11972	5/7	6/6	32	MS	41	T	57.0	13.4	19.1	2
Early Blackhull x Cheyenne	12152	4/23	5/28	28	MS	39	0	60.5	12.5	.....	.....
Pawnee	11699	5/1	6/2	27	S	30	0	60.0	10.7	17.8	5
Early Blackhull	8896	4/16	5/24	29	VS	56	0	60.5	10.0	17.8	3
Hope-Med. x Fulcaster 114-40-16[illegible]	[illegible]	5/5	[illegible]	29	VS	0	10	58.0	10.0	.....	.....
Red May U.S. 7450-[illegible]	[illegible]	5/1	6/2	26	S	20	[illegible]	57.0	9.6	17.0	8
Mediterranean selection	10036	5/4	6/4	30	S	11	T	58.0	9.3	17.0	8
Karred	5146	5/9	6/9	30	S	44	T	44.0	9.2	14.7	16
Tenmarq	8855	5/8	6/5	29	MS	6	T	57.0	8.9	15.5	13
Fulcaster	6175	5/3	6/2	31	VS	55	T	57.0	8.7	15.5	13
Cache	11754	5/7	6/5	30	S	39	0	56.0	8.6	16.4	10
Blackhull	6825	5/10	6/6	27	VS	40	T	59.0	8.6	15.0	17
Brown	[illegible]	5/[illegible]	[illegible]	28	VS	T	0	55.0	8.5	17.7	5
Hd. Fed. x Hope-Med. 124-41-238	[illegible]	5/3	6/5	29	[illegible]	0	0	56.0	8.2	.....	.....
Westar	[illegible]	5/5	6/5	30	VS	54	T	56.0	8.2	17.4	6
Hd. Fed. x [illegible] 124-[illegible]	[illegible]	[illegible]	[illegible]	27	[illegible]	0	0	56.0	8.1	.....	.....
Hope-Med. x Med. 115-41-45	[illegible]	5/[illegible]	6/[illegible]	28	[illegible]	0	0	55.0	8.1	.....	.....
Hope-Med. x Fulcaster 114-41-3[illegible]	[illegible]	5/[illegible]	6/[illegible]	27	[illegible]	0	0	57.0	8.1	.....	.....
Clarkan	[illegible]	5/8	6/6	32	[illegible]	35	2	57.0	8.0	15.1	14
Clarkan-Hd. Fed. x Hope-Med. 124-40-354	[illegible]	5/[illegible]	6/[illegible]	28	[illegible]	0	0	55.0	7.8	.....	.....
Kharkof	[illegible]	5/9	6/6	29	[illegible]	16	T	57.0	7.7	12.1	18
Tenmarq	[illegible]	5/[illegible]	6/[illegible]	31	[illegible]	5	T	56.0	7.6	16.0	11
Hope-Hybrit x Med. 115-40-1464	[illegible]	5/[illegible]	6/[illegible]	28	[illegible]	0	0	56.0	7.4	.....	.....
Clarkan-Hd. Fed. x Hope-Med. 124-41-268	[illegible]	[illegible]	[illegible]	29	[illegible]	0	0	57.0	7.3	.....	.....
Red Chief	12203	5/6	[illegible]	29	[illegible]	51	T	59.0	7.0	15.7	12
Hope-Med. x Med. 115-41-31[illegible]	[illegible]	5/[illegible]	[illegible]	30	[illegible]	0	0	56.0	7.0	.....	.....
Hd. Fed. x Hope-Med. 124-[illegible]	[illegible]	4/30	[illegible]	30	VS	0	0	57.0	6.8	.....	.....
Michigan	11952	4/28	5/[illegible]	27	VS	53	0	59.0	6.8	17.[illegible]	9
Clarkan-Hd. Fed. x Hope-Med. 125-40-[illegible]	[illegible]	5/[illegible]	[illegible]	29	VS	0	0	50.0	6.2	.....	.....

1/ Degree of susceptibility. S = susceptible, MS = medium susceptible, VS = very susceptible.

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

Table 1.--(Continued.)

Iowa Park, Texas

(Four plots)

Variety	C. I. No.	Date Headed	Date Ripe	Weight per bushel	Average acre yield
				Lbs.	Bu.
Cheyenne x Early Blackhull	12122	4/28	5/30	61.0	30.6
Austin	12346	5/4	6/1	58.0	30.2
Comanche x Hope-Medit. 157-42-61	.....	5/2	5/30	58.0	29.6
Westar	12110	5/7	6/2	59.5	28.4
Pawnee	11669	5/7	6/1	60.0	28.2
Martin-Tenmarq x Kharkof 42-2857	.....	5/10	6/3	57.0	27.5
Kanred-Hd. Federation x Tenmarq	12115	5/4	6/1	60.0	26.4
Blackhull	6251	5/10	6/3	61.0	26.0
Cheyenne x Tenmarq	11972	5/10	6/3	59.0	25.0
Chiefkan x Martin-Tenmarq	12130	5/5	6/1	60.0	24.3
Denton	8265	5/8	6/2	57.5	24.0
Cheyenne x Chiefkan	12129	5/9	6/2	60.0	24.0
Comanche	11673	5/5	6/1	58.0	23.5
Quivira-M.T. x Hope-Medit. 146-42-30	.....	5/9	6/4	56.0	23.4
Martin-Tenmarq x Kharkof 42-2862	.....	5/10	6/4	56.0	23.0
Martin-Tenmarq x Kharkof 43-2142	.....	5/9	6/2	57.5	22.7
Red Chief	12109	5/8	6/2	61.0	22.2
Comanche x Hope-Medit. 157-42-183	.....	5/3	6/1	59.5	21.1
Kharkof	1442	5/8	6/4	58.0	21.0
Early Blackhull	8856	4/22	5/26	61.0	20.8
Tenmarq	6936	5/10	6/3	59.0	20.6
Chiefkan	11754	5/9	6/2	60.5	19.9
Chiefkan x Martin-Tenmarq 42-2887	12131	5/9	6/2	57.5	19.2
Turkey	1558	5/12	6/4	59.0	19.2
Wichita	11952	4/24	5/27	60.0	18.5

Standard error of a difference between the mean yields of any two varieties = 3.41 bushels.

Table 1.--(Continued.)

Chillicothe, Texas

(Rodrow plots: 4 replications)

Variety	P. I. No.	Date headed	Weight: bushel	Average: yield	Yield 1944	Rank
Kanred Hd. Federation x Tehmarq	12115	4/29	58	30.1	26.6	1
Cheyenne x Early Blackhull	12122					
Early Blackhull	5856					6
Pawnee	11669	5/7	53	24.3		5
Comanche	11673	5/4	54			3
Westar	12110	5/4				4
Cheyenne x Tenmarq	11972	5/11	55	22.8		2
Wichita	11952	4/27	57			7
Chieftan x Martin-Tenmarq	12130	5/4	53	20.9		
Cheyenne x Chieftan	12129					
Martin-Ten. x Kharkof (42-2442)						
Red Chief	12109					9
Chieftan	11754	5/10	56	16.8		8
Tenmarq	6936					11
Blackhull	6251	5/16	57	14.2		10
Kanred	5146	5/21	55			14
Martin-Ten. x Kharkof (42-2491)		5/21	52	13.4		
Kharkof	11442	5/21	54	13.2		12
Chieftan x Martin-Tenmarq	12131					
Turkey	11558	5/21	55	11.9		13

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

Table 1.--(Continued.)

Lawton, Oklahoma

(Three, 1/69-acre plots; seeded October 12, 1944)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Leaf rust 4/10	Leaf rust 4/19	Leaf rust 5/13	Wt. per bu.	Av. acre yield	Yield Average 1944-45	Rank
			June	In.	%	%	%	Lbs.	Bu.	Bu.	
Chey. x E. Blackhull	12122	4/25	1	45	75	75	75	62	33.1	...	..
Pawnee	11669	5/2	2	40	25	25	65	60	29.3	34.3	1
Comanche	11673	5/1	3	44	50	65	65	59	28.9	33.8	2
Westar	12110	5/4	3	46	0	10	65	57	28.7	32.4	4
Cheyenne x Tenmarq	11972	5/7	7	42	25	40	65	58	26.5	32.5	3
Cheyenne	8885	5/8	7	42	50	90	100	60	23.5	27.6	6
Blackhull	6251	5/6	7	46	50	90	100	60	21.9	26.9	9
Kharkof	1442	5/8	8	41	50	50	90	58	21.7	26.4	10
Kanred	5146	5/8	7	42	25	25	65	57	21.4	27.0	8
Wichita	11952	4/23	5/30	43	75	95	100	61	21.0	30.6	5
Red Chief	12109	5/6	6	45	50	90	100	63	18.9	24.8	13
Chiefkan	11754	5/8	5	46	50	90	100	60	18.6	25.5	11
Tenmarq	6936	5/7	7	43	25	65	100	57	17.8	27.1	7
Clarkan	8858	5/9	7	47	50	65	90	60	17.1	25.0	12

Standard error of a difference between the mean yields of any two varieties = 0.73 bushel.

Table 1.--(Continued.)

Stillwater, Oklahoma

(Four plots)

Variety	Date	Ht.	Weight per bu.	Average acre yield	Yield Average 1944-45	Rank
Ponnee				30.2	31.3	1
Comanche				29.3	30.9	2
Early Blackhull			57.3	28.2	29.7	3
Austin			54.4	28.2	....	..
Triumph						
Reliant				28.9	28.8	4
Cheyenne x Tenmarq				28.6	27.4	
Denton				28.1	27.9	6
Cheyenne				27.8		
Blackhull				27.8	26.0	
Chief				27.8	26.6	
Kawvale				27.9	26.8	10
Red Chief				27.9	25.7	14
Sibley 51				27.6	26.9	
Tenmarq				27.9	25.3	
Kharkov				27.2	25.3	
Clarkan				27.8	26.6	12
Wichita				27.3	....	..
Turkey (Station strain)		10	57	56.9	17.9	21.6	17
Early Premium			57	54.6	10.0	19.2	18

Standard error of a difference between the mean yields of any two varieties = 2.11 bushels.

Table 1.--(Continued.)

Woodward, Oklahoma

(Four, 1/51st-acre plots; seeded September 30; emerged October 7, 1944)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Leaf rust	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
			June	In.	%	Lbs.	Bu.	Bu.	
Cheyenne x E. Bkl.	12122	5/2	9	40	65	62	40.2	....	..
Blackhull x H. Red	12120	5/2	12	40	45	62	36.2	43.0	4
Cheyenne x Tenmarq	11972	5/9	13	42	33	61	34.5	44.4	2
Pawnee	11669	5/5	10	40	15	60	34.2	41.0	7
Wichita	11952	4/26	9	38	61	62	33.2	40.1	8
Comanche	11673	5/7	11	41	16	59	32.1	39.5	9
Westar	12110	5/7	12	46	T	59	31.9	42.1	5
Ceres-38h x Kaw.	12121	4/26	9	34	68	60	31.5	41.5	6
Red Chief	12109	5/7	13	45	75	58	31.3	43.7	3
Early Triumph	12132	4/26	9	35	75	62	31.1	....	..
Cheyenne	8885	5/11	13	41	63	61	30.6	44.8	1
Kharkof	1442	5/13	15	42	54	60	29.1	41.2	7
Blackhull	6251	5/7	12	43	46	62	28.7	37.5	12
Tenmarq	6936	5/7	13	44	44	59	28.5	38.9	10
Chiefkan	11754	5/7	14	45	34	59	28.1	37.9	11
Early Blackhull	8856	4/26	9	42	60	61	24.1	33.3	13

Standard error of a difference between the mean yields of any two varieties = 1.84 bushels.

Goodwell, Oklahoma

(Four plots)

Variety	C. I. No.	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
		Lbs.	Bu.	Bu.	
Comanche	11673	59.9	21.8	27.4	2
Wichita	11952	56.9	21.6	29.5	1
Cheyenne x Tenmarq	11972	56.7	21.0	26.3	4
Blackhull	6251	57.5	20.5	25.9	5
Cheyenne x Early Blackhull	12122	57.2	19.1	....	..
Westar	12110	56.5	18.7	25.3	8
Red Chief	12109	58.4	18.0	25.7	6
Cheyenne	8885	58.0	18.0	23.5	10
Early Blackhull	8856	56.0	17.5	23.4	11
Pawnee	11669	55.7	17.5	25.4	7
Chiefkan	11754	59.0	17.4	25.1	9
Nebred	10094	55.5	15.2	26.7	3
Tenmarq	6936	57.0	14.2	19.0	12
Kharkof	1442	56.0	9.8	17.6	13

Standard error of a difference between the mean yields of any two varieties = 2.50 bushels.

C. I. No.	Lodging	Loose smut 1/	Leaf rust 1/	No. of kernels per pound	Size of kernels	Size of head	Number of kernels per head
12284	L	0.1	43	268	24.7	[illegible]	[illegible]
Ks. 2778	L	0.0	90	214	29.7	15.75	336
12101	M	0.1	83	308	24.3	13.22	402
11952	E	4.0	100	[illegible]	[illegible]	13.59	327
8885	L	0.2	[illegible]	[illegible]	25.5	13.19	373
6936	M	2.0	77	[illegible]	24.9	13.68	376
12100	L	1.5	[illegible]	[illegible]	26.7	[illegible]	326
[illegible]	M	[illegible]	[illegible]	[illegible]	27.5	13.88	338
[illegible]	M	[illegible]	[illegible]	[illegible]	23.9	[illegible]	390
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	343
6471	M	0.1	100	[illegible]	27.0	13.63	337
1442	M	0.8	70	[illegible]	24.1	12.38	369
10094	M	0.6	[illegible]	[illegible]	23.5	12.02	[illegible]
6251	M	0.0	[illegible]	[illegible]	23.7	11.84	[illegible]
8856	M	0.0	100	[illegible]	27.9	[illegible]	[illegible]
12124	M	0.0	100	[illegible]	29.4	11.01	[illegible]
5146	M	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5558	E	0.0	[illegible]	[illegible]	24.6	9.63	[illegible]
6199	M	0.2	[illegible]	[illegible]	24.1	13.41	[illegible]
[illegible]	[illegible]	0.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	2.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Table 1.--(Continued.)

Manhattan, Kansas

(Three, 1/50-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
		May	July	In.	Lbs.	Bu.	Bu.	
Medit.-Hope x Pawnee	12287	23	3	45	60.7	52.2	....	..
Kaw.-Marq. x Kaw.-Tenq.	12128	23	2	45	60.5	48.6	....	..
Pawnee	11669	22	2	46	60.9	47.3	42.5	1
Marq.-Tenq. x Kaw.-Tenq.	12127	23	2	44	58.8	41.6	....	..
Comanche	11673	24	3	47	59.2	40.5	35.3	5
Westar	12110	25	4	47	58.6	40.5	....	..
Quivira x Tenmarq	12116	22	3	47	60.3	40.4	35.6	3
Tenmarq selection	12125	25	4	49	59.2	39.8	33.6	10
Cheyenne x Tenmarq	11972	27	5	46	58.9	39.7	34.2	8
Kawvale	8180	26	4	49	58.8	39.6	34.5	7
Kawvale x Fultz (Ks.No.2779)		26	4	50	59.9	39.2	....	..
Cheyenne x Tenmarq	12123	24	3	46	60.6	39.0	35.2	6
Iobred selection	11997	26	4	51	60.0	37.8	32.4	11
Cheyenne x E. Blackhull	12122	21	2	45	60.4	37.5	36.2	2
Harvest Queen x Kawvale	12284	27	5	51	57.8	37.0	33.7	9
Kawvale x Oakley (Ks.No.2778)		26	4	51	60.2	36.7	....	..
Blackhull x Cheyenne	12101	26	4	45	59.2	35.9	....	..
Wichita	11952	20	1	46	60.1	35.7	35.4	4
Cheyenne	8885	29	5	46	58.2	35.0	29.4	21
Tenmarq	6936	25	4	48	57.6	34.4	29.6	19
Red Chief	12109	24	4	49	61.9	34.3	31.8	14
Clarkan	8858	28	5	54	59.0	34.2	30.0	17
Tenmarq x Blackhull	12126	24	3	46	58.2	34.1	32.4	12
Chiefkan	11754	27	5	48	60.2	33.4	29.7	18
Fulcaster	6471	26	4	51	59.8	33.4	28.6	22
Kharkof	1442	29	6	49	57.1	31.9	25.6	23
Nebred	10094	27	5	47	58.7	31.6	29.6	20
Blackhull	6251	28	5	49	60.1	31.4	30.2	16
Early Blackhull	8856	17	6/30	45	60.3	30.9	30.9	15
Early Blackhull x Tenmarq	12124	19	1	46	60.1	30.4	32.4	13
Kanred	5146	29	5	49	57.1	27.7	24.6	24
Turkey	1558	29	6	50	58.1	27.0	23.4	25
Harvest Queen	6199	27	5	54	58.0	26.6	22.0	26

Standard error of a difference between the mean yields of any two varieties = 2.05 bushels.

Table 1.--(Continued.)

Garden City, Kansas

(Three, 1/20-acre plots)

Variety	Weight per bushel	Average yield per acre
	Lbs.	
Garden City, Kansas		
(Three plots)		
Variety		
Pawnee	58.2	36.6
Cheyenne x Early Blackhull	59.5	
Quivira x Tenmarq	58.5	
Cheyenne x Tenmarq	60.0	
Chiefkan	61.5	
Red Chief	59.[illegible]	
Early Blackhull	57.7	
Comanche	59.3	32.7
Cheyenne x Tenmarq	57.4	32.3
Nebred	57.6	31.9
Tenmarq	58.3	31.8
Blackhull	58.5	28.6
Tenmarq selection	56.8	
Turkey	60.0	26.8
Wichita	60.2	
Early Blackhull x Tenmarq		

Standard error of a difference between the mean yields of any two varieties = 2.05 bushels.

Table 1.--(Continued.)

Hays, Kansas

(Four, 1/50-acre plots; 2 on fallow, 2 on cropped land; emerged October 7)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Estimated No. aphids 5/30	Lodging on fallow	Leaf rust	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
		May		In.		%	%	Lbs.	Bu.	Bu.	
Chiefkan	11754	19	7/2	35	15	5	34	60.8	28.1	29.9	4
Quivira x Tenmarq	12116	16	6/30	35	25	3	29	58.5	26.7	30.3	3
Cheyenne x E. Blackhull	12122	16	6/29	33	15	20	25	58.5	26.5	31.1	1
Chiefkan x Oro-Tenmarq	12133	18	6/30	36	10	0	46	59.5	26.0	....	..
Early Blackhull	8856	12	6/27	32	20	3	62	57.8	25.8	30.5	2
Chiefkan x Oro-Tenmarq (H.C.43-111)		19	7/1	36	10	3	39	60.5	25.0	....	..
Cheyenne x Tenmarq	12123	22	7/1	34	15	5	46	58.5	24.3	28.4	7
Cheyenne x E. Blackhull	12114	14	6/28	28	25	0	34	56.3	23.9	....	..
Pawnee	11669	17	6/29	31	200	3	23	57.3	23.5	29.7	5
Blackhull x Cheyenne	12101	22	7/1	35	20	10	52	56.5	23.4	28.7	6
Cheyenne x Tenmarq	11972	23	7/1	35	10	8	52	55.0	22.8	26.7	12
Blackhull x Tenmarq	12102	21	7/1	35	30	5	84	57.3	21.6	26.1	13
Red Chief	12109	19	7/2	35	20	5	61	62.5	21.5	26.9	10
Comanche	11673	18	6/30	33	30	35	22	56.8	21.4	26.8	11
Early Blackhull x Tenmarq	12124	14	6/28	30	15	10	25	58.8	21.0	27.7	8
Chiefkan x Oro-Tenmarq	12134	18	6/30	33	15	5	59	56.8	20.9	....	..
Tenmarq x Blackhull	12126	18	7/1	34	15	8	75	57.5	20.7	26.0	14
Blackhull	6251	19	7/2	35	15	5	54	57.3	19.9	24.5	15
Wichita	11952	14	6/28	30	15	15	80	56.8	19.8	27.4	9
Cheyenne	8885	23	7/2	34	5	20	35	53.3	17.1	22.8	16
Kanred	5146	23	7/2	34	5	45	31	50.3	16.6	20.9	18
Tenmarq	6936	18	7/1	31	30	45	32	53.8	15.7	22.8	16
Kharkof	1442	24	7/2	34	5	35	21	51.8	13.3	19.3	20
Turkey	1558	22	7/2	32	40	50	41	53.5	11.6	19.9	19

Standard error of a difference between the mean yields of any two varieties = 1.84 bushels.

Table 1.--(Continued.)

Colby, Kansas

(Three plots)

Variety	C. I. No.	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
		Lbs.	Bu.	Bu.	
Pawnee	11669	62	72.8	63.4	1
Quivira x Tenmarq	12116	63	70.8	61.1	3
Cheyenne x Tenmarq	11972	63	67.5	61.5	2
Cheyenne x Early Blackhull	12122	63	66.7	...	
Cheyenne x Tenmarq	12123	62	64.7	60.3	4
Tenmarq selection	12125	62	64.5	58.7	7
Comanche	11673	62	63.5	58.9	5
Wichita	11952	62	62.4	58.9	5
Nebred	10094	63	61.7	56.6	8
Tenmarq	6936	61	60.9	53.3	11
Cheyenne	8885	62	60.9	53.5	10
Red Chief	12109	64	60.7	51.8	13
Chiefkan	11754	63	60.3	52.2	12
Early Blackhull x Tenmarq	12124	63	55.6	55.2	9
Early Blackhull	8856	63	55.6	50.8	14
Blackhull	6251	61	55.1	49.9	15
Kanred	5146	61	54.2	48.6	16
Turkey	1558	61	51.8	47.7	17

Standard error of a difference between the mean yields of any two varieties = 3.17 bushels

Table 1.--(Continued.)

Akron, Colorado

(Four, 1/41-acre plots; 2 on fallow and 2 on corn land)

Variety	C. I. No.	Weight per bushel	Average acre yield	Yield Average 1944-45	Yield Rank
		Lbs.	Bu.	Bu.	
Comanche	11673	55	37.7	26.6	1
Chey. x Early Blackhull	11222	58	37.4	....	..
Wichita	11952	56	35.9	26.5	2
Nebred	10094	56	35.1	24.5	6
Cheyenne	8885	57	35.2	24.6	5
Kan.-H.Fed. x Minhardi-Mint	11970	56	34.9	24.9	4
Chiefkan	11754	54	33.6	25.1	3
Early Blackhull	8856	59	32.4	24.4	7
Tenmarq	6936	53	32.5	23.4	10
Pawnee	11669	54	31.9	22.8	12
Cheyenne x Tenmarq	11972	55	31.9	23.3	11
Blackhull	6251	56	31.6	23.7	8
Red Chief	12109	58	31.4	23.6	9
Kanred	5146	53	31.2	22.5	13
Kharkof	1442	56	30.8	22.0	14
Minturki	6155	53	29.6	20.0	16
Alton	1438	55	28.6	21.3	15

Standard error of a difference between the mean yields of any two varieties = 2.25 bushels.

Table 1.--(Continued.)

Torrington, Colorado

(Red-row plots; 4 replications; 1-1/1 acre)

Variety	Plant Number	Stand-fed Rye	Lodged	Height	Wt. per Bu.	Av. acre yield	Yield Average 1944-45	Rank
	No.	%	%	In.	Lbs.	Bu.	Bu.	
Early Blackhull	8855	58	14	37	86	19	60.8	....	..
Pawnee	11659	56	22	36	1[illegible]	25	[illegible]	28.4	2
Wichita	11052	46	19	36	76	20	62.3	28.9	1
Chiefkan	11754	50	22	40	50	22	60.2	25.6	4
Comanche	11673	56	20	36	57	22	58.3	25.4	5
Nebred	10994	53	23	3[illegible]	[illegible]	23	[illegible]	25.2	6
Cheyenne x Tenmarq	11072	46	24	38	61	28	57.0	22.5	7
Chey. x E. Blackhull	12[illegible]	45	21	37	96	22	[illegible]	....	..
Red Chief	12109	48	21	39	56	27	62.0	....	..
Blackhulls	6251	40	22	39	79	19	60.4	26.4	3
Kanred	5246	49	25	40	54	[illegible]	57.7	18.9	8
Cheyenne	8885	46	26	39	61	26	54.5	17.4	10
Tenmarq	6936	46	23	40	79	28	57.1	18.1	9

Standard error of a difference between the mean yields of any two varieties = 4.57 bushels.

Lincoln, Nebraska

(Five, 1/40-acre plots; seeded Sept. 25; emerged Oct. 2)

Variety	C. I. No.	Lodging	Date headed	Bunt	Leaf rust 6/11	Leaf rust 6/20
		%		%	%	%
Pawnee	11669	50	5/31	23	15	20
Blackhull	6251	74	6/3	25	35	20
Tenmarq	6936	34	5/31	21	35	25
Minturki x Blackhull	11817	56	6/2	3	35	20
Chiefkan	11754	29	6/2	65	30	15
Nebred	10094	60	6/3	0	35	30
Turkey	12137	51	6/13	12	35	50
Kharkof	1442	46	6/13	42	25	40
Clarkan	8858	30	6/3	42	25	50
Nebr. No. 60	6250	52	6/12	3	35	50
Red Chief	12109	10	5/30	67	35	40
Cheyenne	8885	46	6/12	34	35	50
Cheyenne x Blackhull	12112	36	6/3	31	35	15
Cheyenne x Tenmarq	11972	36	6/2	41	15	20
Comanche	11673	64	5/31	4	15	20
Cheyenne x Early Blackhull	12122	92	5/30	43	35	25
Wichita	11952	81	5/26	39	40	30

North Platte, Nebraska

(Two, 1/40-acre plots on fallow; seeded Sept. 14)

Variety	C. I. No.	Date Headed	Date Ripe	Ht.	Lodging	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
			July	In.	%	Lbs.	Bu.	Bu.	
Turkey (Local)	12143	6/1	15	46	88	60.6	70.3	46.6	5
Cheyenne x Tenmarq	11972	5/31	11	41	88	60.1	69.7	48.7	3
Wichita	11952	5/28	12	43	5	61.8	69.7	51.8	1
Chiefkan	11754	5/31	14	47	50	63.2	68.3	48.0	4
Minturki x Blackhull	11817	5/31	14	45	88	60.5	67.0	49.1	2
Cheyenne	8885	6/1	14	45	75	60.7	66.0	41.5	11
Tenmarq	6936	5/30	13	44	88	61.2	65.3	44.0	9
Cheyenne x E. Blackhull	12122	5/28	14	41	88	62.2	65.3	....	..
Red Chief	12109	5/31	14	47	3	62.2	65.0	46.0	6
Pawnee	11669	5/28	10	38	5	62.6	64.3	44.8	7
Comanche	11673	5/29	11	42	13	62.8	63.7	43.7	10
Nebred	10094	5/31	13	40	75	62.4	63.0	44.4	8
Kharkof	1442	6/6	16	48	90	60.3	62.0	38.8	13
Blackhull	6251	5/31	13	45	100	61.6	60.0	40.0	12
Nebr. No. 60	6250	6/7	16	47	75	60.8	58.0	36.9	14

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

Table 1.--(Continued.)

Alliance, Nebraska

(Rod-row plots; 7 replications; seeded Sept. 13)

Variety	Coll. No.	Date Ripe	Height	Lodging	Weight per bushel	Average acre yield
		June	July	In.	%	Lbs.	Bu.
Cheyenne x Early Blackhull	12122	12	25	42	13	60.8	41.9
Cheyenne x Turkey	12142	11	26	44	7	60.9	41.6
Tenmarq	6936	15	26	47	6	60.6	41.4
Cheyenne x Tenmarq	11972	14	26	41	0	62.3	40.7
Cheyenne	8885	17	27	44	0	60.3	40.3
Nebr. No. 60	6250	16	28	45	4	61.3	40.2
Wichita	11952	16	24	43	0	62.6	39.6
Minturki x Blackhull	13017	15	24	43	0	60.0	39.2
Blackhull	6251	13	25	43	13	62.9	39.1
Comanche	14673	12	26	43	0	60.8	38.9
Khapli	14442	12	27	45	7	60.7	38.9
Nebred	10094	13	28	43	1	61.9	37.4
Marquillo x Oro (Ks. 38-34)		16	28	44	0	60.7	37.4
Chiefkan	11754	14	27	46	11	63.0	37.2
Cheyenne x Blackhull	12112	16	27	[illegible]	0	62.7	37.2
Pawnee	11669	14	25	[illegible]	0	60.4	36.9
Red Chief	12109	13	27	[illegible]	0	63.5	30.8

Standard error of a difference between the mean yields of any two varieties = 2.59 bushels.

Table 1.--(Continued.)

Waseca, Minnesota

(Three, 1/40-acre plots)

Variety	Number C. I.	Number Minn.	Winter surv.	Date Headed	Date Ripe	Ht.	Lodging Per cent	Lodging Degree	Leaf rust	Grain Plumpness	Grain Texture	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
			%	June	July	In.			%	%	%	Lbs.	Bu.	Bu.	
Blackhawk	12218	2725	87	25	31	45	0	0	T	95	67	60.5	38.7	21.4	2
H44 x Minturki^2	12138	2713	100	23	29	42	100	23	T	95	77	60.8	36.1	24.2	1
H44 x Minturki^2	.....	2710	83	24	29	41	67	10	40	95	75	59.8	34.4	20.0	3
H44 x Minturki^2	12139	2714	100	24	28	43	67	15	20	93	73	59.0	33.5	19.7	4
H44 x Minturki^2	.....	2711	97	25	31	43	67	10	50	95	72	59.3	33.2	18.4	6
Hope x Minturki^2	.....	2719	97	24	29	43	67	15	5	95	78	61.3	32.5	18.3	7
Marmin	11502	2614	100	22	28	45	67	10	60	95	68	57.5	31.3	18.5	5
Minturki	6155	1507	100	23	28	44	100	17	40	95	65	60.7	30.4	18.2	8

Standard error of a difference between the mean yields of any two varieties = 1.98 bushels.

Table 1.--(Continued.)

St. [illegible] Minnesota

(Three, 1/40-acre plots)

Variety	Number C. I.	Number Minn.	Date Headed	Date Ripe	Lean Test	Stand	Grain Texture	Wt. per bu.	Av. acre yield
			June	July	%	%	%	Lbs.	Bu.
Blackhawk	12218	2725	[illegible]	[illegible]	[illegible]	[illegible]	65	61.5	28.9
H44 x Minturki^2	12139	2714	24	31	39	5	95	67	60.2	28.4
Marmin	11502	2614	[illegible]	[illegible]	48	[illegible]	70	62.5	27.4
H44 x Minturki^2	.....	2711	23	29	37	7	[illegible]	60	61.2	26.9
H44 x Minturki^2	.....	2710	23	30	38	10	95	65	62.0	26.5
Hope x Minturki^2	.....	2719	23	30	34	5	95	78	62.3	25.6
H44 x Minturki^2	12138	2713	[illegible]	[illegible]	24	[illegible]	75	62.5	23.8
Minturki	6155	1507	24	30	37	37	95	65	61.5	23.7

Standard error of a difference between the mean yields of any two varieties = 1.94 bushels.

Grand Rapids, Minnesota

(Three, 1/40-acre plots)

Variety	Number C. I.	Number Minn.	Number per survey	Date Headed	Date Ripe	Lean Test	Stand	Grain Texture	Wt. per bu.	Average acre yield
			%	June	July	%	%	%	Lbs.	Bu.
H44 x Minturki^2	12138	2713	86	7	4	44	5	95	77	61.7	42.4
H44 x Minturki^2	12139	2714	87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	63	58.6	40.9
Minturki	6155	1507	85	5	4	45	4	[illegible]	65	59.8	37.7
Marmin	11502	2614	82	[illegible]	[illegible]	[illegible]	11	[illegible]	65	60.9	36.3
H44 x Minturki^2	.....	2710	78	[illegible]	[illegible]	[illegible]	2	[illegible]	68	60.0	35.5
H44 x Minturki^2	.....	2711	77	7	3	42	1	[illegible]	70	59.2	35.0
Blackhawk	12218	2725	88	6	3	44	5	[illegible]	65	60.5	31.1

Standard error of a difference between the mean yields of any two varieties = 2.07 bushels.

Table 1.--(Continued.)

Sheridan, Wyoming

(Three, 1/55-acre plots; seeded Oct. 11; emerged April 20, 1945)

Variety	C. I. No.	Winter survived	Date Headed	Date Ripe	Ht.	Wt. per bu.	Average acre yield	Yield Average 1944-45	Rank
		%	June	Aug.	In.	Lbs.	Bu.	Bu.	
Kanred	5146	85	29	6	48	56	40.0	28.8	1
Kharkof	1442	88	26	4	50	53	38.2	28.3	2
Marmin	11502	90	28	5	52	54	37.1	25.3	5
Cheyenne	8885	85	28	7	45	55	35.8	27.1	3
Mont.36 x Belog x Kanred	12108	85	28	5	51	55	34.2	24.9	6
Yogo	8033	88	28	4	52	50	32.2	24.2	7
Karmont	6700	87	26	3	47	51	31.8	25.7	4
H44 x Minturki^2	12138	87	29	7	50	55	28.4	....	..
Minturki	6155	87	28	3	49	52	26.6	19.4	9
Nebred	10094	87	28	4	45	54	26.0	22.0	8
H44 x Minturki^2	12139	85	27	5	51	51	23.3	....	..

Standard error of a difference between the mean yields of any two varieties = 3.25 bushels

Table 1.--(Continued.)

Bozeman, Montana

(Rod-row plots; 5 replications)

Variety	C. I. Number	Date Head-ed	Date Ripe	Acre yield
			Aug.	Bu.
Martin x Tenmarq[3]	11804	7/1	6	64.5
Newsed	10094	7/2	8	61.4
Tenmarq	6896	6/30	6	61.[illegible]
Martin x Tenmarq[3]	[illegible]	[illegible]	6	60.5
Karmont	6700	7/3	10	54.8
Newturk	6395	7/3	10	53.1
Mont. 36-Beresgli[illegible] x Kharkof	[illegible]	7/[illegible]	9	52.5
Yogo	[illegible]	7/[illegible]	9	52.4
Yogo x Oro (Sel. [illegible])	[illegible]	7/[illegible]	9	51.9
Wesekch	[illegible]	7/[illegible]	9	50.4
Kharkof	[illegible]	7/[illegible]	[illegible]	[illegible]
Compound Hybrid	[illegible]	7/[illegible]	10	48.8
Marquis x Tenmarq	[illegible]	6/[illegible]	5	48.7
Minturki	6[illegible]	7/[illegible]	8	48.[illegible]
Cache	[illegible]	7/[illegible]	13	44.2
Marquis	[illegible]	7/[illegible]	9	38.7
H44 x Minturki[2]				

(3 replications only)

Karmont	6700	7/3	12	46.[illegible]
H44 x Minturki[2]	12138	7/3	13	43.8
Yogo	8033	7/3	14	38.7

Standard error of a difference between the mean yields of any two varieties = 3.20 bushels.

Table 1.--(Continued.)

Moccasin, Montana

(Rod-row plots; 5 replications)

Variety	C. I. No.	Date Headed	Date Ripe	Height	Average acre yield
				In.	Bu.
Martin x Tenmarq[3]	11804	6/29	8/3	45	43.6
Martin x Tenmarq[3]	11823	6/30	7/31	44	41.5
Nebred	10094	7/2	8/1	42	40.2
Martin x Tenmarq[3]	11824	6/30	7/30	45	39.7
Mont. 36-Beloglina x Kanred	12198	7/4	8/2	43	36.6
Minturki	6155	7/3	8/1	47	35.6
Compound Hybrid	11744	7/4	8/3	44	35.2
Karmont	6700	7/6	8/3	44	34.8
Kharkof	11442	7/4	8/2	45	33.7
Marmin	11502	7/2	8/1	46	32.3
Yogo	8033	7/6	8/2	44	30.6
Yogo x Oro (Sel. 5)	...	7/6	8/2	44	30.5
(3 replications only)					
H44 x Minturki[2]	12139	7/6	8/2	..	39.3
Karmont	6700	7/5	8/2	..	36.7
H44 x Minturki[2]	12138	7/5	8/1	..	33.8
Yogo	8033	7/6	8/2	..	31.9

Standard error of a difference between the mean yield of any two varieties = 2.04 bushels.

Table 1.--(Concluded.)

(Rodgers, Montana von-Bed)

(Rodgers plots; 5 replications; seeded Oct. 6; emerged Oct. 16, 1944)

Variety	Stand No.	Date Head-ed	Date Ripe	Ht.	Wt. per bu.	Av. acre yield	Yield Average 1944-45	Rank
Martin x Tennessee 3	11189	19	21	23	55.7	[illegible]	....	..
Compound Hybrid	[illegible]	22	21	23	[illegible]	[illegible]	....	..
Yogo x Oro (Sel. 5)	[illegible]	23	[illegible]	[illegible]	[illegible]	[illegible]	....	..
H44 x Minturki 2	12138	24	23	24	58.9	[illegible]	17.2	7
Nebred	10094	21	21	21	[illegible]	[illegible]	18.6	1
Kharkof	14[illegible]	24	23	24	59.5	[illegible]	18.2	3
Minturki	61[illegible]	23	21	24	59.5	[illegible]	17.7	6
Mont.36 x Beloggi-Kanred	12108	22	21	22	59.5	[illegible]	18.2	4
Karmont	6700	25	24	24	58.2	13.3	18.3	2
Martin x Tennessee 3	11884	20	22	23	[illegible]	[illegible]	....	..
H44 x Minturki 2	12139	24	21	24	54.4	13.0	17.2	8
Yogo	[illegible]	[illegible]	23	24	59.5	12.8	18.2	5
Marmin	11502	21	21	25	60.2	11.9	16.9	9

Standard error of a difference between the mean yields of two varieties = 2.96 bushels.

Table 2.--Number of plots, average yield, and standard errors for the variety test at each cooperating station, 1945.

Station	No. of plots	Average yield of varieties	Standard error of a Single plot	Difference between means	Mean in Bushels	Mean in Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton 1/	8	8.73	2.11	1.06	0.75	8.59
Iowa Park 1/	4	23.97	4.81	3.41	2.41	10.05
Chillicothe 1/	8	19.21	3.73	1.87	1.32	6.87
Oklahoma:						
Lawton	3	23.45	.89	.73	.51	2.19
Stillwater	4	23.41	2.97	2.11	1.49	6.36
Woodward	4	31.56	2.60	1.84	1.30	4.12
Goodwell 1/	4	17.85	3.54	2.50	1.77	9.92
Kansas:						
Manhattan	3	36.52	2.51	2.05	1.45	3.97
Garden City	3	33.08	....	....	....	....
Hays	4	21.52	2.59	1.84	1.30	6.04
Colby	3	61.59	3.88	3.17	2.24	3.64
Colorado:						
Akron	4	33.03	3.18	2.25	1.59	4.81
Ft. Collins 1/	7	30.54	8.55	4.57	3.23	10.58
Nebraska:						
North Platte	2	65.17	1.21	1.22	.86	1.32
Alliance 1/	7	38.61	4.83	2.59	1.83	4.74
Minnesota:						
Waseca	3	33.76	2.42	1.98	1.40	4.15
St. Paul	3	26.40	2.37	1.94	1.37	5.20
Grand Rapids	3	36.99	2.53	2.07	1.46	3.95
Wyoming:						
Sheridan	3	32.15	3.99	3.25	2.30	7.15
Montana:						
Bozeman 1/	5	52.55	5.06	3.20	2.26	4.30
Moccasin 1/	5	36.18	3.21	2.04	1.44	3.98
Havre 1/	5	14.04	4.68	2.96	2.09	14.89

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 (1944-45) are also given.

Districts

Summaries of the yield data for the uniform varieties grown in 1945 and the 1944-45 averages, where available, are presented in tables 3 to 8.

In the Southern District, 1945 yields were reported from 7 stations with 12 varieties grown uniformly (table 3). Cheyenne x Early Blackhull (C. I. 12122), although missing from one station, gave the highest average for the district having a [illegible] bushel advantage over Pawnee in second place. Cheyenne x Tenmarq (C. I. 11972) [illegible] rather than first as it did in 1943 and 1944. Early Blackhull ranked above Blackhull and Wichita, while Red Chief, Tenmarq, Chiefkan, and Kharkof were at the bottom of the list. For some reason Wichita did not yield so well as in years past.

Table 3.--Summary of average yields of the uniform winter wheat varieties grown in plot tests at 7 stations in the southern district, 1945.

Variety	C. I. No.	Average yield in bushels per acre							
		Denton	Iowa Park	Chillicothe	Lawton	Stillwater	Woodward	Av.	
Chey. x E. Blackhull	12122	12.5	30.[illegible]	26.[illegible]	33.1	....	[illegible]	27.0	1/
Pawnee	11669	10.7	28.2	2[illegible]	29.3	30.2	[illegible]	24.9	
Comanche	116[illegible]	13.4	[illegible]	24.[illegible]	28.9	29.8	32.1	24.8	
Cheyenne x Tenmarq	11972	13.4	25.0	22.[illegible]	26.5	25.6	34.5	24.1	
Westar	12110	8.2	28.4	23.8	28.7	....	31.[illegible]	23.3	1/
Early Blackhull	8855	10.0	[illegible]	24.8	....	28.2	24.1	20.9	2/
Blackhull	625[illegible]	8.6	[illegible]	14.2	21.9	23.8	[illegible]	20.5	
Wichita	11952	6.8	18.5	21.2	21.0	18.3	33.[illegible]	20.1	
Red Chief	12109	7.0	[illegible]	17.7	18.9	22.9	[illegible]	19.7	
Tenmarq	693[illegible]	7.7	[illegible]	15.[illegible]	27.1	21.9	[illegible]	19.3	
Chiefkan	11754	8.6	19.9	16.8	18.6	23.8	28.1	19.0	
Kharkof	1442	7.7	[illegible]	13.[illegible]	26.4	20.2	29.[illegible]	18.2	
Cheyenne	888[illegible]	....	[illegible]	[illegible]	23.5	24.8	36.[illegible]	....	

1/ Missing at Stillwater.
2/ Missing at Lawton.

The yield data for the 2-year period, 1944-45, are summarized in table 4, with averages being shown for 8 stations and a total of 14 station years. Pawnee had the highest average exceeding Cheyenne x Tenmarq (C. I. 11972) by .6 and Comanche by 1.1 bushels per acre. Westar, although missing from one station, ranked fourth and Early Blackhull fifth. Wichita averaged 1.2 bushels lower than Early Blackhull. Chiefkan and Red Chief again were rather low in yield, both being near the bottom of the list, while all varieties ranked higher than Kharkof. This indicates that progress is being made in the wheat breeding work.

In the Central District yields were reported from 8 stations and these are presented and summarized in table [illegible]. Pawnee [illegible] yield of 44.0 bushels compared with 42.7 bushels for Cheyenne x Early Blackhull (C. I. 12122) and 42.2 bushels for Cheyenne x Tenmarq (C. I. 11972). Pawnee, grown at only 7 stations ranked fourth, followed by Comanche, Chiefkan, and Wichita. Red Chief had an average 2.6 bushels below Chiefkan, while Tenmarq averaged 1.0 bushel higher than Blackhull and 1.5 bushels above Kharkof. Although comparable averages are not shown, Wichita outyielded Early Blackhull at 4 of 6

stations where both were grown. The yields of several varieties not grown at all stations are included in the table.

Table 4.--Summary of average yields of winter wheat varieties grown in the plot tests at 8 stations in the southern district for all or part of the period 1944-45.

Variety	C. I. No.	Average yield in bushels per acre at: Denton	Iowa Park	Chillicothe	Amarillo	Lawton	Stillwater	Woodward	Goodwell	Av.
No. of years grown		2	1	2	1	2	2	2	2	14
Pawnee	11669	17.8	28.2	33.6	38.6	34.3	27.4	41.0	25.4	30.4
Cheyenne x Tenmarq	11972	19.1	25.0	25.3	33.9	32.5	31.3	44.4	26.3	29.8
Comanche	11673	19.5	23.5	23.8	37.3	33.8	30.9	39.5	27.4	29.3
Westar	12110	17.4	28.4	23.7	36.6	32.4	....	42.1	25.3	28.9
Early Blackhull	8856	17.8	20.8	23.4	31.6	37.9 1/	29.7	33.3	23.4	27.4
Red Chief	12109	15.7	22.2	19.3	34.8	24.8	25.7	43.7	25.7	26.2
Wichita	11952	17.5	18.5	22.6	30.8	30.6	18.3 2/	40.1	29.5	26.2
Chiefkan	11754	16.4	19.9	19.9	37.8	25.5	26.6	37.9	25.1	25.8
Blackhull	6251	13.0	26.0	19.2	34.5	26.9	26.0	37.5	25.9	25.5
Tenmarq	6936	16.0	20.6	18.9	33.5	27.1	25.3	38.9	19.0	24.6
Kharkof	1442	12.1	21.0	18.2	30.7	26.4	25.3	41.2	17.6	23.8

1/ 1944 yield only.

2/ 1945 yield only.

Table 5.--Summary of average yields of the uniform winter wheat varieties grown in plot tests at 8 stations in the central district, 1945.

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Garden City	Hays	Colby	Akron	Fort Collins	North Platte	Alliance	Av.
Pawnee	11669	47.3	37.7	23.5	72.8	31.9	37.8	64.3	36.9	44.0
Chey. x E. Blackhull	12122	37.5	36.6	26.5	66.7	37.4	29.4	65.3	41.9	42.7
Cheyenne x Tenmarq	11972	39.7	35.3	22.8	67.5	31.9	30.3	69.7	40.7	42.2
Nebred	10094	31.6	32.7	....	61.7	35.1	31.8	63.0	37.4	41.9
Comanche	11673	40.5	34.1	21.4	63.5	37.7	32.2	63.7	38.9	41.5
Chiefkan	11754	33.4	34.9	28.1	60.3	33.6	32.4	68.3	37.2	41.0
Wichita	11952	35.7	28.4	19.8	62.4	35.9	33.3	69.7	39.6	40.6
Cheyenne	8885	35.0	....	17.1	60.9	35.2	24.6	66.0	40.3	39.9
Red Chief	12109	34.3	34.5	21.5	60.7	31.4	29.2	65.0	30.8	38.4
Tenmarq	6936	34.4	32.3	15.7	60.9	32.5	22.8	65.3	41.4	38.2
Blackhull	6251	31.4	31.9	19.9	55.1	31.6	28.8	60.0	39.1	37.2
Kharkof	1442	31.9	28.6 1/	13.3	54.8 1/	30.8	36.1 2/	62.0	38.9	36.7
Early Blackhull	8856	30.9	34.4	25.8	55.6	32.4	37.9	....	....	....
Kanred	5146	27.7	....	16.6	54.2	31.2	26.5	....	....	....
E. Blackhull x Tenmarq	12124	30.4	26.8	21.0	55.6	....	....	....	....	....

1/ Yield of Turkey used.

2/ Yield of adjoining test used.

For the 2-year period, data are shown for 9 stations in the Central District with a total of 15 station-years' results. At the top of the list is Pawnee, with an average yield 1.2 bushels per acre. In Wichita, which ranked second, Cheyenne x Tenmarq (C. I. 11972) ranked third and Comanche fourth. Red Chief and Chiefkan, above the average, which were 2.1 bushels above Blackhull, while at the bottom of the list will be found Cheyenne and Kharkof.

Table 6.--Summary of average yields of winter wheat varieties grown in uniform tests at 9 stations in the Central District, 1944-45.

Variety	C. I. No.	Average yield in bushels per acre									
		Manhattan	Garden City	Hays	Colby	Alva	Fort Hays	Tribune	North Platte	All stations	
No. yrs. grown		2	2	2	2	2	2	1	2	1	14
Pawnee	11669	42.5	36.7	29.7	34.4	22.2	29.4	29.2	44.8	[illegible]	[illegible]
Wichita	11052	35.4	26.4	27.4	28.9	26.1	29.9	22.0	51.8	39.5	[illegible]
Cheyx Tenmarq	11972	34.2	36.3	26.7	31.7	25.4	25.4	24.6	48.7	40.[illegible]	[illegible]
Comanche	11673	35.3	34.1	26.8	28.9	26.[illegible]	25.4	20.6	43.7	[illegible]	[illegible]
Nebred	10094	29.6	33.7	....	56.5	34.[illegible]	22.2	23.4	44.4	37.[illegible]	1/
Red Chief	12109	31.8	35.0	26.9	31.8	22.2	21.3	18.6	46.0	30.[illegible]	1/
Chiefkan	11754	28.7	34.9	29.9	32.2	25.[illegible]	22.6	19.6	45.0	37.2	[illegible]
Blackhull	6251	30.2	31.9	24.5	49.9	23.7	26.4	21.2	40.0	39.1	32.1
Tenmarq	6936	29.6	32.3	22.8	53.3	23.4	18.1	[illegible]	[illegible]	[illegible]	31.9
Cheyenne	8885	29.4	....	22.8	53.5	24.6	17.4	[illegible]	[illegible]	[illegible]	31.8 1/
Kharkof	1442	25.6	28.6	19.3	47.7 2/	22.0	21.9	20.7	38.8	38.9	29.3

1/ Missing from one station.

2/ Yield on Turkey used.

In the Northern District 4 varieties were grown at all 7 stations (table 7). H44 x Minturki[2] (C. I. 12139) ranked first, H44 x Minturki[2] (C. I. 12138) second, Minturki third, and Marmin fourth. Nine were grown uniformly at 4 stations and six were grown at 3 stations. The highest yield of 35.5 bushels was made by 34[illegible] bushels for Nebred, 36-Belgian Kanred (C. I. [illegible]) and 33.[illegible] bushels for Kharkof. In this comparison the two H44 x Minturki[2] strains ranked just above Minturki.

Table 7.--Summary of average yields of varieties of winter wheat grown in uniform tests at 7 stations in the Northern District, 1945.

Variety	C. I. No.	Average yield in bushels per acre								Average
		Sidney	Akron	Scottsbluff	Lincoln	Mead	Ashland	Havre	Sta.	7 Sta.
H44 x Minturki[2]	12139	33.5	40.9	33.3	[illegible]	[illegible]	[illegible]	31.0	32.[illegible]	[illegible]
H44 x Minturki[2]	12138	36.1	23.8	42.4	28.4	43.8	33.6	31.6	31.8	30.2
Minturki	6155	30.4	23.7	31.7	26.8	48.7	33.6	29.7	30.[illegible]	30.2
Marmin	11502	31.3	27.4	36.3	37.1	38.[illegible]	32.2	31.9	[illegible]	30.0
Nebred	10094	....	....	....	26.0	61.4	40.2	14.4	....	35.5
Mont. 36-Bel. x Kan.	12108	....	....	....	34.8	52.5	36.6	13.5	[illegible]	34.2
Kharkof	1442	....	....	....	38.2	49.2	33.7	13.9	....	33.8
Karmont	6700	....	....	....	31.8	54.8	34.8	13.3	....	33.7
Yogo	8033	....	....	....	32.2	52.4	30.6	12.8	....	32.0

For the 2-year period in the Northern District the data are summarized in table 8, but in this case averages for the entire district were impossible to obtain. For the three Minnesota stations H44 x Minturki^2 (C. I. numbers 12138 and 12139) have had the highest average yields, with Blackhawk ranking third and H44 x Minturki^2 (Minn. 2710) fourth. At these stations Minturki had the lowest average yield. For the Montana and Wyoming stations Nebred gave the best average yield, being slightly above Karmont and Kharkof. At the bottom of the list for these stations were Minturki and Marmin.

Table 8.--Summary of average yields of winter wheat varieties grown in plot tests at 7 stations in the northern district for all or a part of the period 1944-45.

Variety	C. I. No.	Average yield in bushels per acre at: Wa-seca	St. Paul	Grand Rapids	Sheri-dan	Boze-man	Moc-casin	Havre	Weighted av. 3 sta.	Weighted av. 4 sta.
									Bu.	Bu.
No. of years grown		2	1	1	2	1	1	2		
H44 x Minturki^2	12138	24.2	23.8	42.4	....	....	....	17.2	28.7	....
H44 x Minturki^2	12139	19.7	28.4	40.9	....	....	....	17.2	27.2	....
Blackhawk	12218	21.4	28.9	31.1	....	....	....	....	25.7	....
H44 x Mint.^{2}(Minn.	2710)	20.0	26.5	35.5	....	....	....	....	25.5	....
Marmin	11502	18.5	27.4	36.3	25.3	38.7	32.3	16.9	25.2	25.9
H44 x Mint.^{2}(Minn.	2711)	18.4	26.9	35.0	....	....	....	....	24.7	....
Minturki	6155	18.2	23.7	37.7	19.4	48.7	35.6	17.7	24.5	26.4
Nebred	10094	....	....	....	22.0	61.4	40.2	18.6	....	30.5
Karmont	6700	....	....	....	25.7	54.8	34.8	18.3	....	29.6
Kharkof	1442	....	....	....	28.3	49.2	33.7	18.2	....	29.3
Mont.36 x Bel. x Kan.	12108	....	....	....	24.9	52.5	36.6	18.2	....	29.2
Yogo	8033	....	....	....	24.2	52.4	30.6	18.2	....	28.0

States

In several States there were two or more cooperating stations from which data were received in 1945. 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 the State. In 1945 data were reported from more than one station in Texas, Oklahoma, Kansas, Colorado, Nebraska, Minnesota, and Montana, and summaries have been made up for these.

In Texas, 12 varieties were grown at 3 stations with the average yields being shown in table 9. For 1945 Cheyenne x Early Blackhull (C. I. 12122) had the highest average, exceeding Pawnee by 2 bushels. Comanche, Cheyenne x Tenmarq (C. I. 11972), and Westar ranked in the order named. Early Blackhull outyielded Wichita by 3 bushels per acre. For the 1944-45 period Cheyenne x Tenmarq (C. I. 11972) ranked first, followed by Pawnee, Westar, Comanche, and Early Blackhull. Again Westar and Comanche show a decided yield advantage over Tenmarq. At the bottom of the list is Kharkof.

Table 9.--Average yield in bushels per acre of winter wheat varieties grown in uniform tests in Oklahoma in 1944-45 and weighted average for 1944-45

Variety	C. I. No.	Average yield in bushels (4 stations)	Average yield in bushels (8 stations)	Rank
Cheyenne x E. Blackhull	12123	21.1	22.2	2
Pawnee	11669	20.4	22.0	4
Comanche	11673	20.1	22.1	3
Cheyenne x Tenmarq	11972	18.5	20.6	5
Westar	12116	16.3	18.1	9
Early Blackhull	8856	15.10	19.0	7
Red Chief	12109	15.5	19.0	6
Wichita	11951	14.9	16.5	8
Chiefkan	11751	14.5	18.1	10
Tenmarq	6936	14.0	16.3	11
Kharkof	1442			

At the 4 Oklahoma stations, Comanche ranked first and Pawnee second (Table 10). Cheyenne x Tenmarq (C. I. 11972) had an average yield 2 bushels above Cheyenne, while Wichita was a close second to Red Chief and Chiefkan. For the 2-year period, Pawnee, Comanche, Cheyenne x Tenmarq (C. I. 11972), and Cheyenne ranked in the order named, while Tenmarq and Kharkof were tied for last place with yields 3.4 bushels lower than Pawnee.

Table 10.--Average yield in bushels per acre of winter wheat varieties grown in uniform tests in Oklahoma in 1944-45 and weighted average for 1944-45

Variety	C. I. No.	Average yield in bushels (4 stations)	Average yield in bushels (8 stations)	Rank
Comanche	11673	28.2	32.9	2
Pawnee	11669	27.8	33.0	1
Cheyenne x Tenmarq	11972	26.8	30.8	3
Cheyenne	8856	26.6	29.9	4
Blackhull	8221	26.3	29.6	5
Wichita	11952	26.1	29.4	6
Red Chief	12109	25.9	29.2	7
Chiefkan	11751	25.7	29.0	9
Tenmarq	6936	26.6	27.9	8
Kharkof	1442	26.2	27.6	10

Fourteen varieties were grown uniformly at 8 stations in Kansas, and at these Pawnee had the highest average yield (Table 11). Other varieties giving good yields were Quivira x Tenmarq (C. I. 12116), Cheyenne x Blackhull (C. I. 12122), and Cheyenne x Tenmarq (C. I. 11972). Blackhull had a higher average yield than Turkey and ranked above Turkey. For the average of 2 years, including 7 station years, Pawnee ranked first, followed by Quivira x Tenmarq (C. I. 12116), Cheyenne x Tenmarq (C. I. 12123), and Cheyenne x Tenmarq (C. I. 11972). Tenmarq, Blackhull, and Turkey had the lowest yields for the 2-year period.

Table 11.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Kansas in 1945 and weighted average for 1944-45.

Variety	C. I. No.	Average yield in bushels 1945 (4 stations)	1944-45 (7 station yrs.)	Rank
Pawnee	11669	45.3	44.1	1
Quivira x Tenmarq	12116	43.6	41.5	2
Chey. x Early Blackhull	12122	41.8	....	..
Cheyenne x Tenmarq	11972	41.3	40.0	4
Cheyenne x Tenmarq	12123	40.3	40.1	3
Comanche	11673	39.9	39.4	5
Chiefkan	11754	39.2	36.9	8
Red Chief	12109	37.8	36.5	10
Early Blackhull	8856	36.7	37.0	7
Wichita	11952	36.6	38.8	6
Tenmarq	6936	35.8	34.8	11
Blackhull	6251	34.6	34.4	12
E. Blackhull x Tenmarq	12124	33.5	36.8	9
Turkey	1558	29.8	30.1	13

In Colorado, Early Blackhull, Comanche, Pawnee, and Wichita ranked for yield in the order listed (table 12). At the bottom of the list will be found Cheyenne, Kanred, and Tenmarq. For the 2-year period, Wichita has had the best yield record followed by Comanche, Pawnee, and Chiefkan, while Kanred and Tenmarq have been at the bottom.

Table 12.--Average yield in bushels per acre of varieties of winter wheat grown in plot tests in Colorado in 1945, and weighted average for 1944-45.

Variety	C. I. No.	Average yield in bushels 1945 (2 stations)	1944-45 (4 station yrs.)	Rank
Early Blackhull	8856	35.2	....	..
Comanche	11673	35.0	26.0	2
Pawnee	11669	34.9	25.6	3
Wichita	11952	34.6	27.7	1
Nebred	10094	33.5	24.9	6
Chey. x Early Blackhull	12122	33.4	....	..
Chiefkan	11754	33.0	25.5	4
Cheyenne x Tenmarq	11972	31.1	22.9	7
Red Chief	12109	30.3	....	..
Blackhull	6251	30.2	25.1	5
Cheyenne	8886	29.9	21.0	8
Kanred	5146	28.9	20.7	10
Tenmarq	6936	27.7	20.8	9

Data were reported from only 2 stations in Nebraska (table 13), and Cheyenne x Tenmarq (C. I. 11972), Wichita, and Cheyenne x Early Blackhull (C. I. 12122) had the best average yields. Comanche ranked eighth and Pawnee ninth, while at the bottom of the list were Nebraska No. 60 and Red Chief. Wichita, Cheyenne x Tenmarq (C. I. 11972), and Minturki x Blackhull (C. I. 11817) have had the best 2-year average yields, while Kharkof and Nebraska No. 60 have been the lowest.

Table 13.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Nebraska, 1944-45, and weighted average for 1944-45.

Variety	No. stations	1945 (2 stations)	1944-45 (4 station yrs.)	Rank
Cheyenne x Tenmarq	119[illegible]	55[illegible]	40.5	6
Wichita	119[illegible]	54[illegible]	41.6	1
Chey. x Early Blackhull	121[illegible]	53[illegible]	[illegible]	[illegible]
Tenmarq	69[illegible]	53[illegible]	38.1	8
Cheyenne	88[illegible]	53[illegible]	37.4	7
Minturki x Blackhull	118[illegible]	53[illegible]	39.9	2
Chiefkan	117[illegible]	52[illegible]	38.2	5
Comanche	116[illegible]	51[illegible]	36.7	9
Pawnee	116[illegible]	50[illegible]	38.9	3
Kharkof	14[illegible]	50[illegible]	34.3	12
Nebred	100[illegible]	50[illegible]	37.4	7
Blackhull	62[illegible]	49[illegible]	35.1	11
Nebr. No. 60	62[illegible]	49[illegible]	33.4	13
Red Chief	121[illegible]	47[illegible]	35.4	10

[illegible] varieties were grown uniformly and the average yields of these are shown in table 14. The highest yielding varieties were H44 x Minturki[2] (C. I. 12130) and Blackhull, and the lowest averages although in no case was the difference very great.

Table 14.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Minnesota in 1945.

Variety	No.	Av. yield (3 stations)
		Bu.
H44 x Minturki[2]	12[illegible]	34.3
H44 x Minturki[2]	12[illegible]	34.1
Blackhull	12[illegible]	32.9
H44 x Minturki[2] (Min[illegible]10)	[illegible]	32.1
H44 x Minturki[2] (Min[illegible]11)	[illegible]	[illegible]
Marmin	11[illegible]	31.7
Minturki	6[illegible]	30.[illegible]

In Montana 13 varieties were grown uniformly at the 3 stations and the averages are shown in table 15. Marmin x Tenmarq[3] (C. I. 11804) had the highest average yield with more than a bushel advantage over Nebred which ranked second. Good records were made by Karmont, Mont. 36-Baleline x Kenred (C. I. 12108), and Martin x Tenmarq (C. I. 11824). Yogo and Marmin were at or near the bottom of the list. For the [illegible] years the [illegible] average yield 3.1 bushels per acre above Karmont, Mont. 36-Baleline x Kenred (C. I. 12108) and H44 x Minturki[2] (C. I. 12130) have [illegible] Minturki[2] (C. I. 12138) and Marmin [illegible] Minturki x Blackhull (C. I. 11812), and Tenmarq x Tenmarq (C. I. 11[illegible]). [illegible] while Yogo and Marmin have been the lowest.

Table 15.--Average yield in bushels per acre of winter wheat varieties grown in plot tests in Montana in 1945 and weighted average for 1944-45.

Variety	C. I. No.	Average yield in bushels 1945 (3 stations)	Average yield in bushels 1944-45 (4 station yrs.)	Rank
Martin x Tenmarq[3]	11804	41.9	....	..
Nebred	10094	38.7	34.7	1
Karmont	6700	34.3	31.6	2
Mont.36-Belog. x Kanred	12108	34.2	31.4	3
Martin x Tenmarq[3]	11824	33.9	....	..
Compound Hybrid	11744	33.5	....	..
H44 x Minturki[2]	12139	33.3	30.3	4
Minturki	6155	32.7	29.9	5
Yogo x Oro (Sel. 5)	.....	32.5	....	..
Kharkof	1442	32.3	29.8	7
Yogo	8033	31.9	29.9	5
H44 x Minturki[2]	12138	30.7	28.0	8
Marmin	11502	27.6	26.2	9

SUMMARY OF AGRONOMIC DATA

The agronomic (other than yield) and disease data have been summarized for each district for 1945 in tables 16 to 18. 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.

Twelve varieties were grown uniformly at the southern stations and the data are shown in table 16. Early Blackhull was the earliest for date of heading, averaging 2 days earlier than Wichita and 5 days earlier than Cheyenne x Early Blackhull (C. I. 12122). Pawnee, Comanche, and Westar headed before Chiefkan, Red Chief, and Tenmarq, while Blackhull and Kharkof were the latest. The dates of ripening showed about the same order of maturity except that the range was narrower. In this case Pawnee and Comanche had average dates earlier than Wichita. Average plant heights showed a narrow range, namely from 37 inches for several strains to 41 inches for Westar. Early Blackhull was 2 inches shorter than Blackhull. Leaf rust readings, reported from 3 stations, were rather high with the lowest averages for Pawnee, Comanche, and Westar, and the highest for Red Chief. The relatively high reading for Westar is rather disappointing. Test weights per bushel were reported from 7 stations, with Cheyenne x Early Blackhull (C. I. 12122) having the highest average. Red Chief, Blackhull, and Early Blackhull had good test weights, while Pawnee, Comanche, and Westar were considerably lower. The unusually low average for Westar is not in line with results from previous years.

In the Central District heading dates ranged from May 30 for Wichita to June 8 for Cheyenne (table 17). Pawnee and Cheyenne x Early Blackhull (C. I. 12122) were only one day later than Wichita. Average ripening dates ranged from July 13 to 20 and showed the same general order of maturity as did date of heading. Pawnee had the shortest straw and Kharkof the tallest. Lodging notes were reported from 5 stations and seem to show some real differences. Red Chief was outstanding, having an average of only 12 percent while Pawnee, with a reading of 27 percent, ranked second. Nebred went down rather badly

but Cheyenne x Early Blackhull (C. I. 12122) had the weakest straw. This variety has earliness, and [illegible] yield, but seems to have straw that is open to question. Leaf rust readings were very [illegible] and Comanche having the lowest averages and Wichita the highest. Red Chief had the highest test weight with an average of 62.0 pounds per bushel, while Cheyenne x Early Blackhull (C. I. 12122), Wichita, and Chieftan all had averages above 60 pounds.

Table 16.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the southern district, 1945

Variety	No.	Heading	Ripening	Height	Lodging	Test weight per bushel
				In.	%	Lb.
Number of stations		5	5	4	3	7
Kharkof	4442	5/19	6/9	38	68	56.7
Blackhull	6251	5/19	6/7	39	62	59.[illegible]
Tenmarq	6936	5/9	6/7	40	65	56.3
Early Blackhull	8856	4/22 1/	5/31 1/	37 1/	58	59.0 1/
Pawnee	[illegible]	[illegible]	[illegible]	37	37	57.7
Comanche	11673	5/4	6/5	40	38	57.5
Cheyenne	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Red Chief	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Westar	12110	5/5	6/6 1/	41 1/	40	56.9 1/
Cheyenne x Early Blackhull	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1/ One less than number of stations indicated.

Table 17.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the central district, 1945

Variety	No.	Heading	Ripening	Height	Lodging	Test weight per bushel
Number of stations	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kharkof	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Blackhull	6251	6/4	7/10	40	[illegible]	[illegible]
Tenmarq	6936	[illegible]	7/10	[illegible]	[illegible]	[illegible]
Cheyenne	8885	6/8	[illegible]	[illegible]	[illegible]	[illegible]
Nebred	10094	6/7 1/	7/20 1/	42 1/	51 1/	[illegible]
Pawnee	11669	6/1	7/14	39	27	34
Comanche	11673	6/[illegible]	[illegible]	40	[illegible]	[illegible]
Chieftan	11751	6/4	7/11	43	30	[illegible]
Wichita	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cheyenne x Tenmarq	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Red Chief	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cheyenne x Early Blackhull	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1/ One less than number of stations indicated.

Agronomic data for the varieties grown in the Northern District are averaged in table 18, but in this case are rather spotted. For maturity Nebred, Marmin, and Minturki showed the most earliness. Differences in plant height were not large although Nebred and H44 x Minturki^2 (C. I. 12138) proved to be the shortest, and Marmin the tallest. Leaf rust readings were rather limited but indicated that H44 x Minturki^2 (C. I. 12138) had the most resistance. Test weights were reported from 2 stations only and all varieties averaged below 58 pounds per bushel. Mont. 36-Beloglina x Kanred (C. I. 12108) with 57.3, Marmin with 57.1, and H44 x Minturki^2 (C. I. 12138) with 57.0 pounds per bushel had the best average test weights.

Table 18.--Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the northern district, 1945.

Variety	C. I. No.	Date Headed	Date Ripe	Height	Leaf rust	Plumpness	Texture	Weight per bushel
				In.	%	%	%	Lbs.
Number of stations		4	4	3	2	3	3	2
Kharkof	1442	6/29	8/2	40	..	..	..	56.3
Minturki	6155	6/29	8/1	40	39	95	65	55.8
Karmont	6700	6/30	8/2	38	..	..	..	54.6
Yogo	8003	6/31	8/2	40	..	..	..	54.8
Nebred	10094	6/28	8/1	36	..	..	..	56.5
Marmin	11502	6/28	8/1	41	54	95	68	57.1
Mont.36-Belog. x Kanred	12108	6/29	8/2	39	..	..	..	57.3
H44 x Minturki^2	12138	6/30	8/3	37	1	95	76	57.0
H44 x Minturki^2	12139	6/30	8/2	38	13	94	68	52.7

SUMMARY OF PLOT DATA

Southern District:

The winter wheat crop was not so good as in 1944, although there was no insect damage, little or no stem rust, but considerable leaf rust. Leaf rust undoubtedly influenced yields at some stations.

Cheyenne x Early Blackhull (C. I. 12122), in the test for the first time, ranked first for yield with a 2.1-bushel advantage over Pawnee. Comanche, Cheyenne x Tenmarq (C. I. 11972), and Westar ranked third and fourth, respectively.

Pawnee, Cheyenne x Tenmarq (C. I. 11972), and Comanche have had the highest average yields for the last 2 years.

Wichita, although popular because of earliness, was slightly below Early Blackhull in yield.

Central District:

Yields were very [illegible] an abundance of [illegible]

Harvest was very late and [illegible]

Pawnee, Cheyenne [illegible] x Tenmarq (C. I. 11972) gave the highest yields [illegible]

Cheyenne x Early Blackhull (C. I. 12122), in the test for the first time, gave a very good performance [illegible]

Pawnee, Wichita, Cheyenne x Tenmarq (C. I. 11972), and Comanche have had the best 2-year average yields in the district.

Comanche and Wichita are being increased and distributed in eastern Colorado.

Northern District:

In Minnesota two selections of H44 x Minturki[2] (C. I. numbers 12138 and 12139) gave very good yields.

Nebred and Mont. 36-Belgina [illegible] (C. I. 12108) gave good yields at the Wyoming and Montana stations.

In Montana, Cache and Wasatch are being distributed in the Flathead and Gallatin valleys to combat dwarf bunt.

Wheat stem sawflies are reported as causing some damage to winter wheat in north-central and northeastern Montana.

UNIFORM YIELD NURSERY

In the fall of 1944 the uniform yield nursery was seeded at the same 14 stations in the Central and Southern districts as in [illegible] The 1944-45 nursery included 31 varieties and strains, and at each station was seeded in three- or four-row plots with from [illegible] replications. The varieties making up this test, together with the [illegible] are shown in table 19.

A comparison of the 1945 list with that [illegible] a number of changes were made. Four strains were dropped and [illegible] added as follows:

Name	C. I. No.	Remarks
Marquillo-Ten. x Kaw.-Tenmarq	12127	Strains having some rust resistance
Kawvale-Marquillo x Kaw-Ten.	12128	and promising yield at Manhattan.
Cheyenne x Chiefkan	12129	Good yield and test weight in Texas.
Chiefkan x Martin-Tenmarq	12130	Combine high test weight and bunt re-
Chiefkan x Martin-Tenmarq	12131	sistance and give good yields in Kansas.
Triumph	12132	An early, promising strain developed and distributed by Joseph Danne, El Reno, Okla.
Chiefkan x Oro-Tenmarq	12133	High yield and test weight, and bunt
Chiefkan x Oro-Tenmarq	12134	resistance, entered from Hays, Kansas.
Kanred x Hope-Hd. Federation	12135	High yielding, stiff-strawed wheats at
Kanred x Hope-Hd. Federation	12136	Akron and Fort Collins.

As soon as a strain is shown to be lacking in some important character, it is omitted from the nursery although very often it may be continued at an individual station. Strains having the best performance in the nursery are advanced to the plot trials. At present there are a number of duplications between the so-called plot tests and the yield nursery but as rapidly as possible these are being eliminated.

Table 19.--Varieties of hard red winter wheat grown in the uniform yield nursery, 1945.

Variety	State or hybrid No.	C. I. No.
Kharkof		1442
Blackhull		6251
Early Blackhull		8856
Pawnee	Nebr. No. 1086	11669
Comanche	Kans. No. 2729	11673
Wichita	Kans. No. 2739	11952
Cheyenne x Tenmarq	Kans. No. 2748	11972
Cheyenne x Early Blackhull	Woodward No. 1127	12000
Blackhull x Cheyenne	Hays Cereal No. 40-102	12101
Blackhull x Tenmarq	Hays Cereal No. 40-115	12102
Westar	Amarillo sel. No. 25-34-116	12110
Cheyenne x Early Blackhull	Hays Cereal No. 40-91	12114
Kanred-Hd Federation x Tenmarq	Amarillo sel. No. 33-37-90	12115
Quivira x Tenmarq	Kans. No. 2762	12116
Blackhull x Hard Federation	Woodward No. 36h769-150	12120
Cerea-38h x Kawvale	Woodward No. 35h1151-19	12121
Cheyenne x Early Blackhull	Hays Cereal No. 40-95	12122
Cheyenne x Tenmarq	Kans. No. 2758	12123
Early Blackhull x Tenmarq	Kans. No. 2769	12124
Tenmarq selection	Kans. No. 2770	12125
Tenmarq x Blackhull	Hays Cereal No. 40-118	12126
New Strains		
Marquillo-Ten. x Kaw.-Tenmarq	Kans. No. 2773	12127
Kawvale-Marquillo x Kaw.-Tenq.	Kans. No. 2775	12128
Cheyenne x Chiefkan	Denton No. 42-2519	12129
Chiefkan x Martin-Tenmarq	Denton No. 42-2882	12130
Chiefkan x Martin-Tenmarq	Denton No. 42-2887	12131
Triumph		12132
Chiefkan x Oro-Tenmarq	Hays Cereal No. 43-112	12133
Chiefkan x Oro-Tenmarq	Hays Cereal No. 43-113	12134
Kanred x Hope-Hd Federation	Akron No. 536	12135
Kanred x Hope-Hard Federation	Akron No. 869	12136

[illegible] Texas [illegible] Colorado [illegible] listed in order of the 1945 yields and [illegible] identification. Average yields and ranks for the 2-year period, 1944-45, are shown where possible. [illegible] characters concerned seem to be related to yield [illegible] differences believed to be of interest.

The behavior of varieties at Manhattan was the same as in the variety test at that station. Heading ranged from April 19 for C. I. 12132 (Triumph) to May 9 for Kharkof while ripening took place from late May to early [illegible]. Leaf rust was heavy on practically all varieties except C. I. [illegible] which only a trace was recorded. Septoria was heavy on all strains [illegible] a few having even moderate susceptibility. Test weights per bushel were [illegible] high but the yields ranged from 15.9 to [illegible].8 bushels per acre. [illegible] numbers 12128, 12115, 12127, and 12000 had the highest averages for 1945 [illegible] but two wheats in the nursery ranked above C. I. 1442 (Kharkof) [illegible] and 1945 yields are not particularly comparable as [illegible] averages are compared with the yields for 1945. Based on the [illegible], C. I. numbers 12115, 11973 (Comanche), 12122, and 11668 [illegible] best records.

At Chillicothe, heading ranged from April 30 [illegible] (Triumph) and 8856 (Early Blackhull) to May 21 for Kharkof [illegible] except for C. I. 12000 [illegible] were as low as 52 pounds per bushel. The yield range was [illegible] bushels per acre, with all but one variety [illegible] check. The best yield records were reported for C. I. numbers [illegible] 5, and 12000. Based on the 2-year average, C. I. [illegible] 15, and 12120 have the best records.

At Stillwater, a fairly good crop was harvested in spite of the fact that leaf rust was heavy and lodging [illegible] sections. Some of the stronger strawed varieties were C. I. numbers 11669 (Pawnee), 6251 (Blackhull), and 12127. The greatest [illegible] C. [illegible] 356 (Early Blackhull), 12132 (Triumph) [illegible] leaf rust resistance was shown only by [illegible] 12128 since 8 [illegible] was recorded as having a 25 [illegible] C. I. numbers 12115, 12[illegible], 1442, and 12000. [illegible] list were C. I. numbers 12120, 1442 (Kharkof), and 12132.

At Woodward, the range in heading was from April 2[illegible] (Wichita) to May 12 for Kharkof. The range in [illegible] June 10 to June 15. Leaf rust [illegible] C. I. numbers 12128, 12110, 12136, 12130, and 12129 showed the most resistance. The highest yields were made by C. I. numbers 12128, 12115, 12114, and 11952 (Wichita). Apparently both earliness and resistance to leaf rust were characteristic of the higher yielding varieties. C. I. numbers 12101, 11972, 12102, and 11952 (Wichita) have made the best records for yield based on the 2-year average. The rankings for 1945 and 1944-45 yields are not in good agreement.

Complete data were reported from Manhattan where heavy growth was obtained and lodging became very serious before harvest. C. I. 11669 (Pawnee) stood up the best although it had a lodging percentage of 67. Leaf rust was heavy with some varieties being recorded as 100% while C. I. 12128 showed only 8%. Considerable loose smut developed, but in this case a number of strains including C. I. 11669 (Pawnee) showed no infection. The range in test weights was rather wide with only one variety, C. I. 12132 (Triumph), having a weight of 60 pounds per bushel. The following varieties gave the highest yields and ranked in the order listed: C. I. numbers 11669 (Pawnee), 12132 (Triumph), 11952 (Wichita), and 12127. Based on the 2-year average yields the highest ranking varieties are C. I. numbers 11669 (Pawnee), 11952 (Wichita), and 12124.

The spring freeze at Hays retarded growth and the plants never fully recovered. Also there was the heavy infection of leaf rust on most varieties with C. I. numbers 12128 and 12110 (Westar) showing the most resistance. There was a wide range in lodging with C. I. 12136 being recorded as 80% and C. I. 12133 as 0. Grain quality was poor as indicated by test weights ranging from 44 to 56 pounds per bushel and the range in yield was from 30.2 to only 8.2 bushels per acre. At the top of the list are C. I. numbers 12115, 12133, 12110 (Westar), and 8856 (Early Blackhull). C. I. numbers 12115, 12122, 12116, and 12120 rank the highest based on the 2-year average yields.

Some winterkilling was noted at Akron, with the poorest survivals being recorded for C. I. numbers 12129 and 11673 (Comanche). Heading and ripening dates were somewhat later than usual and straw growth was extremely heavy. Leaf rust was unusually heavy at this station with only C. I. numbers 12128 and 12110 (Westar) showing any degree of resistance. Yields were unusually high with C. I. numbers 11972 and 12000 having averages above 50 bushels per acre. Good yields were also recorded for C. I. numbers 12116, 12115, and 12114. In general the 2-year average yields agree rather well with those for 1945 in that C. I. numbers 11972, 12115, 12000, and 12114 rank in the order listed.

At Fort Collins differences in stand were recorded but as in the case of the variety test these differences probably indicate differences in germination and not winter survival. Apparently the variations in stand had considerable influence on yield. As in 1944 the crop at Fort Collins was unusually late, again giving both leaf and stem rust a good opportunity to develop. In the case of leaf rust the most resistance was shown by C. I. numbers 12128 and 12110 (Westar) while for stem rust C. I. numbers 12132, 12135, and 12136 had the lowest readings. Test weights were very good and the yields ranged from 45.1 to 18.9 bushels per acre. The highest yielding strains were C. I. numbers 6251 (Blackhull), 12129, 12128, and 8856 (Early Blackhull). The more outstanding wheats based on 2-year average yields are C. I. numbers 6251 (Blackhull), 8856 (Early Blackhull), and 12120.

The crop at Ames was very good although it was late as at many other stations. Leaf rust was heavy and again the most resistance was displayed by C. I. numbers 12128, 12127, and 12110 (Westar). Loose smut data were also recorded for the varieties with C. I. 11972 having the highest percentage. Test weights were fairly high and yields rather good. C. I. numbers 12000, 11669 (Pawnee), 11952 (Wichita), and 12128 gave the highest yields. For the 2-year period C. I. numbers 12000, 11669 (Pawnee), 11952 (Wichita), and 12122 were the best.

At Lincoln there were [illegible] of the more tender [illegible] differences are [illegible] April caused some damage [illegible] were more erect and [illegible] snow. Heading and [illegible] time the nursery was [illegible] except C. I. [illegible] Considerable [illegible] lodging the last [illegible] yields higher than expected. Although not recorded, [illegible] enough for a 60-bushel crop. At the top of the list for yield was C. I. [illegible] (Early Triumph), and 12124. [illegible] yields. [illegible] (Early Blackhull). There was a wide range in [illegible] C. I. 12133 as C. I. [illegible] vine of [illegible] all at least [illegible] bushels per acre [illegible] numbers 12114, 12101, and 12123. C. I. numbers 11972, 12128, 11952 (Wichita), and [illegible] recorded for C. I. numbers 12129 [illegible] the varieties [illegible] dates were somewhat later than usual and [illegible] were extremely heavy. [illegible] made good growth [illegible] winterkilling were encountered.

Complete data were reported from [illegible] where heavy growth was obtained. [illegible] Two [illegible] 40 [illegible] 12126, and [illegible] and 1442. These results are hardly in line with what might be expected [illegible] winterkilling were encountered.

At Fort Collins differences in stand were recorded but as in the case of the variety test these differences probably indicate differences in germination and not winter survival. Apparently the variations in stand had considerable influence on yield. As in 1941 the crop at Fort Collins was unusually late, again giving both leaf and stem rust a good opportunity to develop. In the case of leaf rust the most resistance was shown by C. I. numbers 12128 and 12110 (Winter) while for stem rust C. I. numbers 12132, 12133, and 12136 had the lowest reading. Test weights were very good and the yields ranged from [illegible] to 18.9 bushels per acre. The highest yielding strains were C. I. numbers 8921 (Blackhull), 12129, 12128, and 8956 (Early Blackhull). The more outstanding wheats based on 5-year average yields are C. I. numbers 8921 (Blackhull), 8956 (Early Blackhull), and 12130.

The crop at Akron was very good although it was late as at many other stations. Leaf rust was heavy and again the most resistance was displayed by C. I. numbers 12128, 12127, and 12110 (Winter). Loose smut data were also recorded for the varieties with C. I. 11972 having the highest percentage. Test weights were fairly high and yields rather good. C. I. numbers 12000, 11969 (Tawnee), 11952 (Wichita), and 12128 gave the highest yields. For the 5-year period C. I. numbers 12000, 11969 (Tawnee), 11952 (Wichita), and 12128 were the best.

Table 20.--Yield and other data for the uniform winter wheat varieties grown in replicated nursery plots in cooperative experiments at 12 stations in the hard red winter wheat area in 1945, and average yields for 1944-45.

Denton, Texas

(Four plots)

C. I. No.	Date Headed	Date Ripe	Height	Leaf rust	Septoria 1/	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
			In.	%		Lbs.	Bu.	Bu.	
12128	5/2	6/2	34	T	S	59.0	15.9	...	..
12115	4/28	6/2	35	55	S	60.0	15.9	23.1	1
12127	4/28	6/1	35	22	VS	59.0	15.8	...	..
12000	4/20	5/27	32	52	VS	60.0	15.0	20.1	6
11972	5/6	6/5	32	45	S	58.0	14.8	19.3	9
12129	5/5	6/5	36	60	S	58.0	14.5	...	..
12133	4/28	5/31	31	52	S	59.0	13.9	...	..
12134	5/1	6/3	34	45	S	59.0	13.8	...	..
11669	4/30	6/1	32	32	VS	60.0	13.6	21.2	4
11673	4/30	6/3	33	27	S	57.5	13.5	22.4	2
12123	5/2	6/3	33	40	MS	58.5	13.4	21.0	5
12122	4/21	5/28	34	45	VS	60.0	13.3	22.1	3
12114	5/5	6/5	33	67	VS	59.0	12.9	18.5	12
12101	5/7	6/6	31	62	S	58.0	12.6	18.5	12
8856	4/15	5/24	31	65	VS	60.0	12.4	19.7	7
12125	5/4	6/5	36	45	S	58.5	12.3	18.7	11
12102	5/4	6/5	32	55	VS	59.0	12.0	17.2	17
12130	5/1	6/3	34	50	VS	59.0	11.9	...	..
12120	5/3	6/2	30	47	S	60.5	11.6	19.4	8
6251	5/7	6/7	33	60	VS	59.0	11.2	16.2	19
12116	5/1	6/1	33	37	MS	59.5	11.1	18.0	14
12110	5/2	6/4	34	55	VS	57.5	11.0	19.0	10
12126	5/6	6/4	33	45	S	58.0	10.6	17.2	17
12132	4/13	5/22	29	72	VS	58.0	10.1	...	..
12131	5/5	6/4	36	42	VS	55.0	9.9	...	..
12121	4/14	5/22	27	35	VS	56.0	9.8	18.0	14
12136	4/30	6/1	30	60	VS	56.0	9.7	...	..
12135	4/30	6/3	31	50	VS	56.0	9.3	...	..
1442	5/9	6/7	30	47	S	56.0	9.0	11.6	21
11952	4/21	5/26	34	55	VS	59.0	8.0	17.8	16
12124	4/20	5/26	31	52	VS	59.0	7.8	16.0	20

1/ Degree of susceptibility.

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

Table 20.--(Continued.)

Chillicothe, Texas

(Four plots)

| No. | [illegible] | [illegible] | [illegible]

Table 20.--(Continued.)

Stillwater, Oklahoma

(Four plots)

C. I. No.	Date ripe	Height	Lodging	Leaf rust	Weight per bushel	Average acre yield
	June	In.	%	%	Lbs.	Bu.
12115	10	39	15	50	59.7	30.5
12128	13	38	5	5	58.0	29.3
12122	10	36	15	40	61.0	29.0
12000	12	36	10	60	60.8	28.4
12110	10	39	5	25	57.0	26.7
11669	11	37	1	30	58.8	25.8
12127	13	38	2	50	58.8	25.1
8856	10	34	90	50	59.6	25.1
12123	12	37	5	60	59.8	24.8
12132	10	33	90	60	57.4	24.8
12116	13	39	5	60	59.6	23.3
12120	10	38	20	70	61.4	23.2
12126	14	37	10	80	57.2	23.0
12130	14	38	5	60	57.8	23.0
12134	13	38	5	50	59.2	22.9
11673	12	37	5	50	57.2	21.8
12114	14	36	10	70	59.8	21.5
12129	14	37	5	60	59.6	20.9
12133	13	38	5	60	60.0	20.7
12124	10	34	90	70	59.0	20.6
12125	13	36	5	50	57.8	20.6
11952	14	36	90	60	58.4	20.4
11972	14	36	5	50	59.0	20.3
12121	10	35	90	40	57.2	20.2
12136	13	39	5	60	55.2	20.2
12102	15	36	5	60	60.4	20.1
6251	14	33	2	80	61.0	18.5
12101	15	35	5	60	60.8	18.3
12135	11	39	10	60	55.2	18.2
1442	15	30	5	75	59.0	14.3
12131	15	34	5	50	56.8	13.8

Standard error of a difference between the mean yields of any two varieties = 2.16 bushels.

Table 20.--(Continued)

Woodward, Oklahoma

(Four plots seeded October 10; emerged October 15, 1944)

C. I. No.	Date seeded	Date headed	Height	Leaf rust	Weight per bushel	Average yield	Yield Average 1944-45	Rank
		June	In.	%	Lbs.	Bu.	Bu.	
12128	5/9	11	35	1	60	36.5	....	..
12115	5/9	10	37	60	60	32.6	35.0	8
12114	5/9	13	36	30	62	32.0	35.0	7
11952	4/28	10	34	18	62	30.0	36.0	4
12124	4/28	10	33	28	62	29.3	36.0	5
12120	5/9	13	36	18	63	29.0	33.8	11
12000	5/9	10	36	28	61	29.0	34.0	10
12110	5/9	13	39	1	60	28.6	33.5	12
12126	5/9	10	38	18	60	28.6	33.5	12
12122	5/9	10	35	40	61	28.0	31.0	19
11972	5/9	13	37	25	60	27.5	38.0	2
12123	5/9	13	37	25	60	27.5	32.0	16
11669	5/9	10	35	6	60	27.0	36.0	5
12136	5/9	16	36	1	60	27.0	....	..
12101	5/9	13	36	25	60	26.0	40.0	1
8856	4/28	10	33	30	63	26.7	31.0	18
12127	5/9	11	33	15	60	26.6	....	..
12102	5/9	13	38	23	62	26.5	36.0	3
11673	5/9	13	36	20	60	26.2	34.0	9
12125	5/9	13	37	10	61	25.7	30.0	21
12134	5/9	11	36	10	60	25.1	....	..
12121	5/9	12	32	30	60	25.0	30.0	20
1442	5/12	15	36	5	60	25.0	32.0	14
6251	5/10	14	38	20	62	24.0	32.0	15
12116	5/9	11	36	6	61	24.2	32.0	17
12131	5/9	15	39	8	59	23.0	....	..
12135	5/9	16	35	16	59	23.0	....	..
12132	5/9	10	30	30	62	23.0	....	..
12130	5/9	11	39	1	60	23.7	....	..
12129	5/9	15	39	1	62	23.0	....	..
12133	5/9	13	29	13	62	20.0	....	..

Standard error of a difference between the mean yields of any two varieties = 4.04 bushels.

Table 20.--(Continued)

Manhattan, Kansas

(Three plots)

C. I. No.	Date Headed	Date Ripe	Height	Lodging	Leaf rust	Loose smut	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
	May		In.	%	%	%	Lbs.	Bu.	Bu.	
11669	25	7/3	47	67	20	0	59.2	36.9	32.5	1
12132	15	6/29	43	80	83	1	60.0	30.8	...	..
11952	21	6/30	48	100	100	14	59.3	30.6	31.6	2
12127	25	7/3	47	83	25	0	58.2	29.3	...	..
12115	24	7/3	51	97	23	47	58.3	29.0	25.8	12
12110	27	7/4	50	93	13	1	54.0	28.8	29.4	6
12116	25	7/2	48	90	45	10	56.5	28.7	29.8	5
12124	21	6/30	48	100	100	99	58.9	28.4	30.9	3
12134	25	7/2	50	95	95	5	58.5	28.2	...	..
12130	24	7/3	51	93	73	0	57.7	28.0	...	..
12128	26	7/4	47	95	8	1	57.1	27.6	...	..
11972	28	7/5	47	95	50	14	52.0	25.7	30.2	4
12133	26	7/4	48	97	90	6	57.0	25.1	...	..
12123	25	7/3	47	95	65	5	58.7	24.5	26.0	11
12102	27	7/3	49	58	95	40	56.5	24.0	26.4	9
12121	21	6/30	42	100	93	2	52.5	23.0	24.6	15
11673	26	7/4	49	97	30	1	55.0	22.9	23.7	16
8856	20	6/30	45	100	100	2	59.0	22.7	25.8	12
12114	29	7/2	49	93	95	8	54.0	22.7	26.2	10
12125	27	7/4	51	90	68	T	54.0	21.3	22.8	17
12000	23	7/2	46	100	100	29	56.0	21.1	25.7	14
12122	24	7/2	45	100	100	29	57.0	20.5	27.6	7
12136	26	7/2	49	72	65	0	56.0	20.3	...	..
12120	22	7/2	45	97	78	3	57.5	20.0	26.6	8
12126	26	7/2	48	100	90	0	55.0	18.3	22.6	18
1442	30	7/7	50	100	78	20	52.0	15.9	20.9	19
12101	27	7/4	48	98	95	5	55.0	15.3	20.2	20
12135	26	7/2	49	92	63	0	48.0	14.5	...	..
12131	28	7/5	50	97	85	0	49.0	13.7	...	..
6251	28	7/4	51	100	93	21	54.7	13.4	19.5	21
12129	27	7/6	50	100	50	3	52.0	11.8	...	..

Standard error of a difference between the mean yields of any two varieties = 3.37 bushels.

Table 20.--(Continued)

Hays, Kansas

(Three plots)

	May		In.	%	%	Lbs.	Bu.	Bu.	
12115	18	7/1	0.[illegible]	[illegible]43	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]
12133	22	7/2	[illegible]	[illegible]40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12110	21	7/1	[illegible]	0.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8856	19	7/27	[illegible]	[illegible]63	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12116	18	7/1	0.[illegible]	[illegible]25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12120	17	7/1	[illegible]	0.28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12000	18	6/30	[illegible]	[illegible]35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12122	19	6/30	[illegible]	[illegible]45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11673	20	7/1	[illegible]	0.38	[illegible]	[illegible]	[illegible]	[illegible]	10
12123	21	7/1	[illegible]	[illegible]50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12132	16	7/2	0.[illegible]	[illegible]45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12134	22	7/2	0.[illegible]	0.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12128	19	7/1	[illegible]	[illegible] 8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12124	21	6/30	[illegible]	0.33	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]
12126	17	7/2	[illegible]	[illegible]65	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]
12129	25	7/3	0.[illegible]	[illegible]18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12130	23	7/2	0.[illegible]	[illegible]28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12101	21	7/1	0.[illegible]	[illegible]60	[illegible]	[illegible]	[illegible]	[illegible]1	[illegible]
12102	19	7/1	0.[illegible]	[illegible]60	[illegible]	[illegible]	[illegible]	[illegible]7	16
11669	22	7/1	0.[illegible]	[illegible]22	[illegible]	[illegible]	[illegible]	[illegible]7	1[illegible]
12131	25	7/2	0.[illegible]	[illegible]18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11972	26	7/2	0.[illegible]	0.35	[illegible]	[illegible]	[illegible]	[illegible]1	2[illegible]
12114	20	6/29	[illegible]	[illegible]45	[illegible]	[illegible]	[illegible]	[illegible]3	1[illegible]
11952	20	6/30	0.[illegible]	0.85	[illegible]	[illegible]	[illegible]	[illegible]8	1[illegible]
12121	16	7/1	0.[illegible]	0.18	[illegible]	[illegible]	[illegible]	[illegible].5	1[illegible]
12125	23	7/2	0.[illegible]	[illegible]40	[illegible]	[illegible]	[illegible]	[illegible].0	1[illegible]
12136	20	7/2	0.[illegible]	0.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6251	23	6/30	0.[illegible]	0.38	[illegible]	[illegible]	[illegible]	[illegible].1	1[illegible]
14[illegible]	26	7/2	[illegible]	[illegible]18	[illegible]	[illegible]	[illegible]	[illegible].3	2[illegible]
12127	19	7/2	0.[illegible]	[illegible]30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12135	22	7/2	[illegible]35	[illegible]60	[illegible]25	[illegible]	[illegible]	[illegible]	[illegible]

Standard error of a difference between the two varieties = 2.45 bushels.

Table 20.--(Continued)

Akron, Colorado

(Five plots)

C. I. No.	Winter survival	Date Headed	Date Ripe	Height	Leaf rust	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
	%	June	July	In.	%	Lbs.	Bu.	Bu.	
11972	80	8	20	48	100	59	51.5	36.6	1
12000	85	4	18	46	100	60	50.9	35.9	3
12116	79	3	18	48	100	57	49.9	35.1	5
12115	81	4	18	47	100	59	49.2	36.1	2
12114	83	9	18	49	100	58	48.8	35.9	3
11669	79	5	18	47	52	58	48.6	34.5	7
12122	80	7	18	47	100	59	47.9	35.0	6
12125	84	8	19	49	100	58	45.9	31.9	16
12123	78	8	19	47	100	60	45.7	32.4	13
12120	76	3	19	43	100	62	45.5	32.9	9
12130	69	6	18	50	100	56	45.1	...	
12124	83	4	18	47	100	59	45.0	32.4	13
12129	67	10	20	49	60	60	44.9	...	
12134	79	7	18	48	100	57	44.3	...	
12110	78	8	20	49	20	57	44.0	30.7	19
11673	71	9	19	47	100	57	43.3	32.7	10
12131	73	8	19	51	100	59	43.2	...	
12102	84	8	18	49	100	61	43.1	32.1	15
12135	84	8	20	48	100	56	43.1	...	
6251	85	9	20	49	100	59	43.0	32.5	11
11952	74	3	18	47	100	59	43.0	32.5	11
8856	79	3	18	47	100	61	42.9	33.1	8
12133	74	5	19	46	100	59	42.6	...	
12136	87	6	20	47	82	57	42.6	...	
12126	86	7	18	48	100	57	42.5	31.3	17
12101	75	10	20	47	100	60	39.9	31.0	18
12128	76	10	18	47	0	59	39.4	...	
12127	80	6	18	44	100	57	38.1	...	
12121	82	8	20	42	100	60	37.5	28.4	20
12132	84	3	18	42	100	58	36.5	...	
1442	79	12	21	50	100	60	36.3	27.7	21

Standard error of a difference between the mean yields of any two varieties = 2.88 bushels.

Table 20.--(Continued.)

Fort Collins, Colorado

(Five plots)

Cond. No.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	%	June		In.	%	%	lbs.	In.	In.	
6251	[illegible]	[illegible]	8/2	43	[illegible]	[illegible]	[illegible]	45.1	34.5	[illegible]
12129	[illegible]	[illegible]	8/2	41	[illegible]	[illegible]	[illegible]	45.0	....	[illegible]
12128	[illegible]	[illegible]	8/1	38	[illegible]	[illegible]	[illegible]	43.0	....	[illegible]
8656	[illegible]	[illegible]	7/30	42	[illegible]	[illegible]	[illegible]	38.9	32.1	[illegible]
12132	[illegible]	[illegible]	7/26	35	[illegible]	[illegible]	[illegible]	37.8	....	[illegible]
12124	[illegible]	[illegible]	7/31	39	[illegible]	[illegible]	[illegible]	37.2	25.8	[illegible]
12120	[illegible]	[illegible]	7/31	34	[illegible]	[illegible]	[illegible]	36.6	30.9	[illegible]
1442	[illegible]	[illegible]	8/3	42	[illegible]	[illegible]	[illegible]	36.1	21.9	[illegible]
12130	[illegible]	[illegible]	8/1	40	[illegible]	[illegible]	[illegible]	36.1	....	[illegible]
12131	[illegible]	[illegible]	8/3	41	[illegible]	[illegible]	[illegible]	36.0	....	[illegible]
11972	[illegible]	[illegible]	8/3	40	[illegible]	[illegible]	[illegible]	35.8	27.0	[illegible]
12134	[illegible]	[illegible]	7/30	44	[illegible]	[illegible]	[illegible]	35.6	....	[illegible]
12122	[illegible]	[illegible]	8/2	39	[illegible]	[illegible]	[illegible]	35.3	30.0	[illegible]
11669	[illegible]	[illegible]	8/1	39	[illegible]	[illegible]	[illegible]	35.2	27.5	[illegible]
12000	[illegible]	[illegible]	8/2	38	[illegible]	[illegible]	[illegible]	35.1	[illegible]	[illegible]
12133	[illegible]	[illegible]	8/1	37	[illegible]	[illegible]	[illegible]	34.7	....	[illegible]
11952	[illegible]	[illegible]	7/31	38	[illegible]	[illegible]	[illegible]	34.5	28.0	[illegible]
12114	[illegible]	[illegible]	8/3	38	[illegible]	[illegible]	[illegible]	34.3	26.1	[illegible]
12101	[illegible]	[illegible]	8/3	40	[illegible]	[illegible]	[illegible]	33.1	21.4	[illegible]
11673	[illegible]	[illegible]	7/31	40	[illegible]	[illegible]	[illegible]	32.8	26.6	[illegible]
12135	[illegible]	[illegible]	8/2	39	[illegible]	[illegible]	[illegible]	32.8	....	[illegible]
12126	[illegible]	[illegible]	8/1	39	[illegible]	[illegible]	[illegible]	32.3	27.9	[illegible]
12102	[illegible]	[illegible]	8/3	39	[illegible]	[illegible]	[illegible]	30.4	25.0	[illegible]
12116	[illegible]	[illegible]	8/2	38	[illegible]	[illegible]	[illegible]	30.4	21.7	[illegible]
12125	[illegible]	[illegible]	8/3	40	[illegible]	[illegible]	[illegible]	29.8	19.4	[illegible]
12127	[illegible]	[illegible]	8/2	35	[illegible]	[illegible]	[illegible]	29.6	....	[illegible]
12123	[illegible]	[illegible]	8/3	40	[illegible]	[illegible]	[illegible]	29.5	19.6	[illegible]
12136	[illegible]	[illegible]	8/3	38	[illegible]	[illegible]	[illegible]	26.1	....	[illegible]
12110	[illegible]	[illegible]	8/3	41	[illegible]	[illegible]	[illegible]	24.9	17.2	[illegible]
12121	[illegible]	[illegible]	8/3	33	[illegible]	[illegible]	[illegible]	24.0	18.0	[illegible]
12115	34	39	8/2	38	55	37	60.2	18.9	17.6	20

Standard error of a difference between the mean yields of any two varieties = 5.16 bushels.

Table 20.--(Continued)

Ames, Iowa

(Three plots)

Variety No.	Date ripe	Height	Leaf rust	Loose smut	Weight per bushel	Average yield per acre 1944-45	Average yield per acre 1945	Average yield per acre 1944	Rank
	July	In.	%	%	Lbs.	Bu.	Bu.	Bu.	
12000	11	37	59	7	60.6	41.0	30.7	4	
11669	2	34	80	0	59.4	40.0	30.6	2	
11952	9	39	80	1	59.8	38.0	29.2	3	
12128	13	35	3	0	59.3	38.0	....	0	
6251	12	43	80	0	60.2	37.7	27.1	8	
11973	12	37	28	24	57.4	36.5	27.5	6	
8856	14	42	59	4	59.8	36.5	27.5	6	
12129	14	41	20	2	59.5	35.7	....	0	
12126	14	38	80	0	59.0	35.7	28.1	5	
12111	14	38	63	6	59.5	35.7	26.9	10	
12110	14	37	20	5	57.8	35.5	24.9	13	
12101	13	38	70	8	59.2	35.3	27.0	9	
12124	9	37	90	6	60.8	34.8	25.6	12	
12125	13	38	56	3	57.7	34.7	24.9	13	
12134	10	36	70	1	59.6	34.3	....	0	
12130	14	40	70	3	58.8	34.2	....	0	
12116	12	36	65	13	60.0	34.2	23.3	17	
12122	11	36	59	12	61.2	34.0	28.3	4	
1442	14	43	72	3	58.5	32.3	26.7	11	
12102	13	38	80	10	61.0	32.2	24.8	15	
12131	14	39	65	0	57.8	32.0	....	0	
12123	11	37	48	17	59.5	31.7	23.4	16	
12127	10	32	9	0	56.8	31.2	....	0	
12136	16	34	90	0	57.4	31.2	....	0	
12115	12	36	48	10	60.0	30.5	19.5	19	
12132	10	33	90	0	59.7	30.2	....	0	
12133	12	34	90	9	59.3	29.2	....	0	
11673	10	38	63	0	56.3	26.0	22.4	18	
12135	14	35	80	2	56.2	27.8	....	0	
12120	15	32	90	0	60.4	26.0	18.5	20	
12121	18	30	90	6	56.3	25.3	17.0	21	

Standard error of a difference between the means yielded of any two varieties = 3.36 bushels.

Table 20.--(Continued)

[illegible]

(Five plots; seeded [illegible]; harvested Sept. 27, 1944)

| C. I. No. | Winter surv. | April freeze damage | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | Yield [illegible] | Yield [illegible] | Yield

Table 20.--(Continued)

North Platte, Nebraska

(Three plots; seeded Sept. 14, 1944)

C. I. No.	Date Headed	Date Ripe	Height	Weight per bushel	Average acre yield	Yield Average 1944-45	Rank
	May	July	In.	Lbs.	Bu.	Bu.	
11972	30	14	42	61.9	55.1	38.3	1
12114	30	13	42	62.3	54.1	35.8	6
12101	30	13	43	62.0	53.0	36.8	3
12123	28	13	42	62.9	49.4	34.8	8
12116	27	9	41	62.7	49.4	31.2	12
12124	27	10	41	62.3	49.3	36.7	5
12128	27	11	41	61.9	49.0	....	..
12130	30	15	44	60.9	47.8	....	..
12120	27	13	38	64.4	47.4	34.6	10
12129	30	13	44	61.7	47.4	....	..
12136	28	14	41	61.1	47.3	....	..
12122	27	13	41	62.9	47.1	38.3	1
11952	27	10	42	62.8	46.4	36.8	3
12131	28	13	46	62.1	46.4	....	..
12134	28	9	43	61.6	46.4	....	..
11669	27	10	40	62.6	46.2	35.0	7
12135	28	14	44	59.9	46.0	....	..
12133	28	13	40	62.4	45.8	....	..
12125	30	15	46	61.3	43.6	28.0	18
12110	28	12	44	61.7	42.9	28.5	17
12000	27	13	41	62.6	42.6	34.7	9
12102	28	13	44	63.1	42.0	29.8	15
12121	29	14	35	60.3	41.6	29.2	16
12115	26	10	41	62.1	41.2	30.8	13
12127	30	10	38	61.1	40.2	....	..
8856	25	12	41	62.6	39.6	33.2	11
6251	31	14	46	61.7	39.0	27.2	19
11673	28	12	43	62.4	37.9	29.9	14
1442	6/1	15	45	61.4	35.2	23.6	21
12132	25	9	36	63.0	29.4	....	..
12126	29	12	43	64.0	29.0	26.9	20

Standard error of a difference between the mean yields of any two varieties = 4.57 bushels.

Table 20.--(Concluded)

[illegible]

(Three plots, seeded September [illegible])

Plot No.	Variety	Date Harvested	Height	Weight per bushel	Average yield
		July	In.	Lbs.	Bu.
	12114	30	40	63.6	42.3
	12110	27	44	62.4	40.1
	12121	27	39	68.4	39.8
	12126	26	41	61.9	39.2
	12131	27	42	62.3	39.2
	11972	29	40	62.0	39.0
	12116	26	41	62.4	37.6
	12128	23	40	62.5	37.3
	12120	27	39	63.1	37.0
	12130	28	41	61.3	36.6
	12101	27	39	62.4	36.3
	12000	24	39	61.8	35.8
	12127	23	39	61.4	35.8
	11952	23	40	62.4	35.1
	12129	28	42	62.8	35.0
	12133	27	39	62.0	34.9
	12122	25	37	62.2	34.6
	12134	25	40	61.8	33.8
	12132	23	38	63.6	33.2
	11673	26	40	60.6	33.1
	11669	24	39	61.4	32.8
	12125	26	40	60.4	32.8
	12115	24	41	62.2	32.6
	12135	28	40	60.8	32.6
	12123	25	40	60.0	32.2
	6251	30	45	62.8	32.0
	6256	23	40	62.2	31.6
	12124	23	39	62.4	31.4
	12102	28	39	63.5	30.4
	12136	26	40	61.2	30.4
	11442	29	41	62.0	29.2

Standard error of a difference between the mean yields of any two varieties = [illegible] bushels.

STANDARD ERRORS

Standard errors were calculated for each station as outlined on page 11 of this report. In table 21 will be found the number of plots, average yields, and standard errors for the uniform yield nursery grown at each of the 12 stations.

Table 21.--Number of plots, average yield, and standard errors for the uniform yield nursery at several cooperating stations in 1945.

Station	No. of plots	Average yield of varieties	Standard error of a single plot	Difference between means	Mean in Bushels	Mean in Percent
		Bu.	Bu.	Bu.		
Texas:						
Denton	4	12.14	2.07	1.47	1.04	8.57
Chillicothe	4	23.78	2.78	1.97	1.39	5.85
Oklahoma:						
Stillwater	4	22.41	3.06	2.16	1.53	6.83
Woodward	4	26.95	5.71	4.04	2.86	10.61
Kansas:						
Manhattan	3	23.32	4.13	3.37	2.38	10.21
Hays	3	16.44	3.00	2.45	1.73	10.52
Colorado:						
Akron	5	44.00	4.55	2.88	2.04	4.64
Ft. Collins	5	33.77	8.16	5.16	3.65	10.81
Iowa:						
Ames	3	33.47	4.08	3.36	2.38	7.11
Nebraska:						
Lincoln	5	23.48	4.45	3.15	2.23	9.50
North Platte	3	44.59	5.60	4.57	3.23	7.24
Alliance	3	35.00	2.16	3.05	2.16	6.17

SUMMARY OF NURSERY YIELDS

The yields of the 31 varieties of winter wheat grown at the 12 stations are summarized in table 22 where the varieties are listed in order of their 12-nursery average yields. These averages are of interest only insofar as they show the general adaptation of the varieties. A more detailed study is possible as the varieties have also been averaged and ranked by states. Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128), with an average yield of 32.7 bushels per acre, ranked first exceeding the second strain, Cheyenne x Early Blackhull (C. I. 12000), by 1.4 bushels per acre. The performance of the leading strain was quite consistent in that it ranked first in Texas and Oklahoma, fourth in Iowa and Nebraska, eighth in Colorado, and ninth in Kansas. This strain apparently was able to make this good yield record because of outstanding resistance to leaf rust. This strain appears in the nursery for the first time in 1945. In third place is Kanred-Hard Federation x Tenmarq (C. I. 12115), a sister strain of Westar, and this year outyielded Westar by .4 bushel. This selection would have ranked much higher had it not made a very poor record in Colorado, Iowa, and Nebraska. Pawnee and Quivira x Tenmarq (C. I. 12116) were tied for fourth place. Early Blackhull had an average yield of 1.5 bushels per acre higher than Wichita and

both were slightly above Triumph and Comanche. All but one of the wheats in the nursery outyielded Turkey and Kanred. Of the winter wheats, the Kharkof strain was the most outstanding while C. I. 12122 and 12000 were definitely superior strains in yield, and were tested at the 12 stations.

Twenty-one varieties have been grown in the nursery for the 2-year period 1929-30. Data on these varieties are presented in table 23 where the yields are arranged in order of average yield at all stations. Two strains of Cheyenne x Early Blackhull (C. I. numbers 12122 and 12000) rank at the top of the list with the first having a very slight advantage over the second. Both varieties had a slight advantage over Turkey which ranked third, and Cheyenne x Tenmarq (C. I. 11978) which ranked fourth. Early Blackhull and Wichita had identical average yields and were tied for fifth place. Comanche ranked fourteenth, Kanred eighteenth, Blackhull eighteenth, and Kharkof twenty-first. From the standpoint of the plant breeder it is always encouraging to find some new wheats that will consistently outyield those now in production. Cheyenne x Early Blackhull (C. I. 12122) appears to be a strain worthy of careful consideration although, as will be shown later, it has rather weak straw.

Oklahoma:					
Stillwater	4	22.41	3.06	2.16	1.53
Woodward	4	26.95	3.71	4.04	2.86
Kansas:					
Manhattan	3	23.32	4.13	3.17	2.38
Hays	3	16.44	3.00	2.45	1.73
Colorado:					
Akron	5	44.00	4.93	2.88	2.04
Ft. Collins	5	33.17	2.16	3.16	3.65
Iowa:					
Ames	3	33.47	4.08	3.36	2.38
Nebraska:					
Lincoln	5	23.48	4.42	3.15	2.23
North Platte	3	44.39	5.60	4.37	3.23
Alliance	3	35.00	2.16	3.03	2.16

SUMMARY OF NURSERY YIELDS

The yields of the 21 varieties of winter wheat grown at the 12 stations are summarized in table 22 where the varieties are listed in order of their 12-nursery average yields. These averages are of interest only insofar as they show the general adaptation of the varieties. A more detailed study is possible as the varieties have also been averaged and ranked by states. Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12122), with an average yield of 32.7 bushels per acre, ranked first exceeding the second strain, Cheyenne x Early Blackhull (C. I. 12000), by 1.4 bushels per acre. The performance of the leading strain was quite consistent in that it ranked first in Texas and Oklahoma, fourth in Iowa and Nebraska, eighth in Colorado, and ninth in Kansas. This strain apparently was able to make this good yield record because of sustaining resistance to leaf rust. This strain appears in the nursery for the first time in 1929. In third place is Kharkof-Red Federation x Tenmarq (C. I. 12119), a sister strain of Turkey, and this year outyielded Turkey by .4 bushel. This selection would have ranked much higher had it not made a very poor record in Colorado, Iowa, and Nebraska. Turkey and Quivira x Tenmarq (C. I. 12116) were tied for fourth place. Early Blackhull had an average yield of 1.5 bushels per acre higher than Wichita and

Table 22.--Summary of the average yields of the 31 varieties grown as uniform yield nurseries at 12 stations in the hard red winter wheat region, 1945.

Variety	C. I. No.	Bushels per acre											
		Texas				Oklahoma				Kansas			
		Denton	Chillicothe	Av.	Rank	Stillwater	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank
Kaw.-Marquillo x Kaw.-Ten.	12128	15.9	32.9	24.4	1	29.3	36.5	32.9	1	27.6	16.8	22.2	9
Cheyenne x Early Blackhull	12000	15.0	30.4	22.7	4	28.4	29.0	28.7	3	21.1	20.2	20.7	15
Kanred-Hd.Fed. x Tenmarq	12115	15.9	30.9	23.4	2	30.5	32.6	31.6	2	29.0	30.2	29.6	1
Pawnee	11669	13.6	21.8	17.7	18	25.8	27.3	26.6	7	36.9	14.7	25.8	2
Quivira x Tenmarq	12116	11.1	25.6	18.4	16	23.3	24.2	23.8	18	28.7	21.2	25.0	4
Cheyenne x Early Blackhull	12122	13.3	32.2	22.8	3	29.0	28.0	28.5	4	20.5	20.1	20.3	17
Cheyenne x Tenmarq	11972	14.8	22.9	18.9	13	20.3	27.5	23.9	17	25.7	14.5	20.1	18
Early Blackhull	8856	12.4	26.6	19.5	9	25.1	26.7	25.9	10	22.7	21.6	22.2	10
Cheyenne x Early Blackhull	12114	12.9	19.3	16.1	22	21.5	32.0	26.8	6	22.7	14.0	18.4	21
Westar	12110	11.0	24.0	17.5	19	26.7	28.6	27.7	5	28.8	22.5	25.7	3
Chiefkan x Oro-Tenmarq	12134	13.8	26.1	20.0	7	22.9	25.7	24.3	14	28.2	17.0	22.6	7
Cheyenne x Tenmarq	12123	13.4	27.4	20.4	6	24.8	27.5	26.2	8	24.5	19.7	22.1	11
Chiefkan x Martin-Tenmarq	12130	11.9	26.5	19.2	11	23.0	23.7	23.4	22	28.0	15.6	21.8	13
Early Blackhull x Tenmarq	12124	7.8	20.7	14.3	26	20.6	29.8	25.2	13	28.4	16.7	22.6	8
Cheyenne x Chiefkan	12129	14.5	23.6	19.1	12	20.9	23.0	22.0	26	11.8	16.0	13.9	28
Wichita	11952	8.0	21.6	14.8	25	20.4	30.3	25.4	12	30.6	13.5	22.1	12
Chiefkan x Oro-Tenmarq	12133	13.9	28.8	21.4	5	20.7	20.0	20.4	29	25.1	22.8	24.0	6
Blackhull x Hard Federation	12120	11.6	26.1	18.9	14	17.4	29.5	23.5	20	20.0	20.9	20.5	16
Triumph	12132	10.1	28.8	19.5	10	24.8	23.8	24.3	15	30.8	18.2	24.5	5
Comanche	11673	13.5	26.5	20.0	8	21.8	26.4	24.1	16	22.9	19.8	21.4	14
Marquillo-Ten. x Kaw.-Ten.	12127	15.8	21.8	18.8	15	25.1	26.6	25.9	9	29.3	8.6	19.0	20
Blackhull x Cheyenne	12101	12.6	20.9	16.8	20	18.3	26.9	22.6	25	15.3	15.0	15.2	26
Tenmarq selection	12125	12.3	18.9	15.6	24	20.6	26.2	23.4	21	21.3	12.0	16.7	24
Blackhull x Tenmarq	12102	12.0	20.9	16.5	21	20.1	26.5	23.3	23	24.0	14.9	19.5	19
Chiefkan x Martin-Tenmarq	12131	9.9	16.1	13.0	30	13.8	23.9	18.9	31	13.7	14.7	14.2	27
Tenmarq x Blackhull	12126	10.6	17.5	14.1	27	23.0	28.6	25.8	11	18.3	16.4	17.4	23
Kanred x Hope-Hard Fed.	12136	9.7	21.8	15.8	23	20.2	27.1	23.7	19	20.3	11.3	15.8	25
Ceres-[illegible] x Kawvale	12121	9.8	26.8	18.3	17	20.2	25.3	22.8	24	23.0	13.5	18.3	22
Blackhull	6251	11.2	13.9	12.6	31	18.5	24.2	21.4	27	13.4	10.2	11.8	30
Kanred x Hope-Hard Fed.	12135	9.3	18.8	14.1	28	18.2	23.8	21.0	28	14.5	8.2	11.4	31
Kharkof	1442	9.0	17.3	13.2	29	14.3	25.0	19.7	30	15.9	8.7	12.3	29

Table 22.--(Concluded.)

	C. I. No.	Colorado Akron	Colorado Fort Collins	Colorado Av.	Colorado Rank	Iowa Ames	Iowa Rank	Nebraska Lincoln	Nebraska North Platte	Nebraska Mean	Nebraska Av.	Nebraska Rank	Average 12 stations
		Bushels per acre											
Kaw.-Marquillo x Kaw.-Ten.	12128	39.4	43.0	41.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	37.3	37.5	[illegible]	[illegible]
Cheyenne x Early Blackhull	12000	50.9	[illegible]	43.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35.8	34.9	16	[illegible]
Kanred-Hard Fed. x Tenmarq	121[illegible]	49.2	48.9	34.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	32.6	34.6	[illegible]	[illegible]
Pawnee	1166[illegible]	48.6	35.[illegible]	41.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	32.6	35.3	[illegible]	[illegible]
Quivira x Tenmarq	121[illegible]	49.9	39.[illegible]	40.2	[illegible]	34.2	17	[illegible]	[illegible]	37.0	36.3	[illegible]	[illegible]
Cheyenne x Early Blackhull	121[illegible]	47.9	35.[illegible]	41.6	[illegible]	34.0	18	[illegible]	[illegible]	[illegible]	35.6	[illegible]	[illegible]
Cheyenne x Tenmarq	119[illegible]	51.0	[illegible]	43.7	[illegible]	36.5	[illegible]	[illegible]	[illegible]	39.8	38.7	[illegible]	[illegible]
Early Blackhull x [illegible]	[illegible]	42.9	34.[illegible]	40.9	[illegible]	36.5	[illegible]	[illegible]	[illegible]	31.0	35.7	[illegible]	[illegible]
Cheyenne x Early Blackhull	121[illegible]	48.5	34.[illegible]	41.6	[illegible]	35.7	10	[illegible]	[illegible]	32.9	36.6	[illegible]	[illegible]
Wes[illegible]	121[illegible]	44.0	24.[illegible]	34.5	[illegible]	35.5	[illegible]	[illegible]	[illegible]	40.2	36.3	[illegible]	[illegible]
Chi[illegible]an x Oro-Tenmarq	121[illegible]	44.[illegible]	35.[illegible]	40.0	[illegible]	34.3	15	[illegible]	[illegible]	35.0	34.8	[illegible]	[illegible]
Che[illegible] x Tenmarq x [illegible]	121[illegible]	45.7	29.[illegible]	37.6	[illegible]	31.1	22	[illegible]	[illegible]	32.3	35.8	[illegible]	[illegible]
Chi[illegible] x Marquillo-Tenmarq	121[illegible]	45.[illegible]	36.[illegible]	40.6	[illegible]	34.2	16	[illegible]	[illegible]	36.3	35.0	15	[illegible]
Early Blackhull x Tenmarq	12[illegible]	[illegible]	[illegible]	41.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	36.0	[illegible]	[illegible]
Che[illegible] x Chi[illegible]	121[illegible]	44.[illegible]	45.[illegible]	45.0	[illegible]	35.[illegible]	[illegible]	[illegible]	[illegible]	35.5	35.5	11	28.5
Wi[illegible]	119[illegible]	[illegible]	[illegible]	38.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	34.1	20	[illegible]
Chi[illegible]an x O[illegible]	12[illegible]	42.[illegible]	[illegible]	38.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	34.3	[illegible]	[illegible]
Black[illegible] x [illegible] Federation	121[illegible]	45.[illegible]	[illegible]	41.[illegible]	[illegible]	36.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35.3	14	[illegible]
Tr[illegible] x [illegible]	121[illegible]	36.[illegible]	37.[illegible]	37.2	[illegible]	30.2	[illegible]	[illegible]	[illegible]	33.[illegible]	30.9	[illegible]	[illegible]
Con[illegible] x [illegible]	1[illegible]	[illegible]	[illegible]	38.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30.9	[illegible]	[illegible]
Ma[illegible]-Tenmarq x [illegible]w.-Ten.	121[illegible]	[illegible]	[illegible]	33.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	32.8	23	[illegible]
Bl[illegible] x Cheyenne	12[illegible]	[illegible]	[illegible]	36.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35.5	[illegible]	[illegible]
Te[illegible] x [illegible]	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bl[illegible] x Tenmarq	12[illegible]	43.[illegible]	[illegible]	36.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Che[illegible] x Marquillo-Tenmarq	12[illegible]	43.[illegible]	36.[illegible]	39.[illegible]	[illegible]	32.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	37.[illegible]	[illegible]	[illegible]
Tenmarq x Blackhull	12126	42.5	32.3	37.4	22	35.7	9	19.1	29.0	39.2	29.[illegible]	[illegible]	[illegible]
Kanred x Hope-Hard Fed.	12136	42.6	26.[illegible]	34.4	28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	32.5	24	25.6
Ceres-Mh x Kawgola	121[illegible]	37.5	[illegible]	30.[illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21	25.6
Blackhull	6[illegible]51	43.0	45.1	[illegible].1	2	37.7	[illegible]	[illegible]	39.0	[illegible]	28.9	30	25.3
Kanred x Hope-Hard Fed.	12135	43.1	32.8	38.0	19	27.8	[illegible]	[illegible]	46.0	32.6	30.8	[illegible]	24.1
Kharkof	1442	36.3	36.1	36.2	26	32.3	19	17.2	35.2	29.2	27.2	31	23.0

Table 23.--Summary of average yields of 21 winter wheat varieties grown in uniform yield nurseries at 10 stations in the hard red winter wheat region, 1944 and 1945.

Variety	C. I. No.	Bushels per acre: Texas: Denton	Texas: Chillicothe	Texas: Av.	Texas: Rank	Oklahoma: Woodward	Oklahoma: Rank	Oklahoma: Manhattan	Kansas: Hays	Kansas: Av.	Kansas: Rank
Cheyenne x Early Blackhull	12122	22.1	28.3	25.2	2	31.3	19	27.6	29.9	28.8	3
Cheyenne x Early Blackhull	12000	20.1	28.2	24.2	3	34.4	10	25.7	26.4	26.1	10
Pawnee	11669	21.2	18.3	19.8	15	36.0	5	32.5	22.7	27.6	6
Cheyenne x Tenmarq	11972	19.3	24.6	22.0	7	38.4	2	30.2	19.1	24.7	13
Early Blackhull	8856	19.7	21.3	20.5	12	31.6	18	25.8	26.4	26.1	11
Wichita	11952	17.8	23.7	20.8	11	36.3	4	31.6	22.8	27.2	8
Early Blackhull x Tenmarq	12124	16.0	23.1	19.6	17	36.0	6	30.9	25.0	28.0	5
Blackhull x Hard Federation	12120	19.4	25.7	22.6	6	33.9	11	26.6	28.5	27.6	7
Kanred-Hd. Fed. x Tenmarq	12115	23.1	27.6	25.4	1	35.7	8	25.8	32.0	28.9	2
Cheyenne x Early Blackhull	12114	18.5	21.1	19.8	16	35.8	7	26.2	23.5	24.9	12
Blackhull x Cheyenne	12101	18.5	24.0	21.3	10	40.0	1	20.2	27.1	23.7	16
Quivira x Tenmarq	12116	18.0	22.9	20.5	13	32.0	17	29.8	28.6	29.2	1
Cheyenne x Tenmarq	12123	21.0	25.4	23.2	5	32.4	15	26.0	26.8	26.4	9
Comanche	11673	22.4	23.9	23.2	4	34.5	9	23.7	25.4	24.6	14
Blackhull x Tenmarq	12102	17.2	20.9	19.1	18	36.4	3	26.4	22.7	24.6	15
Westar	12110	19.0	25.0	22.0	8	33.5	12	29.4	28.1	28.8	4
Tenmarq x Blackhull	12126	17.2	20.2	18.7	19	33.5	13	20.6	24.0	22.3	19
Blackhull	6251	16.2	19.1	17.7	20	32.4	16	19.5	20.1	19.8	20
Tenmarq selection	12125	18.7	21.2	20.0	14	30.1	21	22.8	24.0	23.4	18
Ceres 38h x Kawvale	12121	18.0	25.2	21.6	9	30.3	20	24.6	22.5	23.6	17
Kharkof	1442	11.6	19.0	15.3	21	32.7	14	20.9	16.3	18.6	21

Table 23.--(Concluded.)

[illegible]	C. I. No.	Colorado Akron	Fort Collins	Iowa Ames	Kansas Manhattan	Nebraska Mean	North Dakota Av.	Pacific Northwest Rank	Average of 10 stations
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cheyenne x Early Blackhull	1212[illegible]	35.0	30.0	32.5	[illegible]	28.3	[illegible]	[illegible]	30.1
Cheyenne x Early Blackhull	12006	35.9	28.4	32.2	[illegible]	26.7	[illegible]	[illegible]	28.9
[illegible]	116[illegible]	34.5	[illegible]	31.0	[illegible]	30.6	[illegible]	[illegible]	28.6
Cheyenne x Leonard	1197[illegible]	36.6	[illegible]	31.8	[illegible]	[illegible]	[illegible]	[illegible]	28.1
Early Blackhull	885[illegible]	33.1	[illegible]	32.6	[illegible]	29.5	[illegible]	[illegible]	28.0
[illegible]	1195[illegible]	[illegible]	[illegible]	30.3	[illegible]	[illegible]	[illegible]	[illegible]	28.0
Early Blackhull x Leonard	1212[illegible]	32.4	[illegible]	29.1	[illegible]	25.6	[illegible]	[illegible]	27.8
Blackhull x Ho. Federation	1212[illegible]	32.9	[illegible]	31.9	[illegible]	18.5	[illegible]	[illegible]	27.6
[illegible] x Leonard	121[illegible]	36.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26.9
Cheyenne x Early Blackhull	121[illegible]	35.9	26.1	31.0	[illegible]	[illegible]	[illegible]	[illegible]	26.8
Blackhull x Cheyenne	121[illegible]	31.0	[illegible]	35.2	[illegible]	27.0	[illegible]	[illegible]	26.8
[illegible] x Leonard	121[illegible]	[illegible]	[illegible]	34.4	[illegible]	[illegible]	[illegible]	[illegible]	26.8
Cheyenne x Leonard	121[illegible]	[illegible]	[illegible]	36.1	[illegible]	[illegible]	[illegible]	[illegible]	26.5
Comanche	116[illegible]	32.7	26.6	29.7	[illegible]	[illegible]	[illegible]	[illegible]	26.0
Blackhull x Leonard	121[illegible]	32.1	25.0	28.6	[illegible]	[illegible]	[illegible]	[illegible]	25.9
Webar	121[illegible]	30.7	27.2	24.0	[illegible]	[illegible]	[illegible]	[illegible]	25.6
Leonard x Blackhull	12126	31.3	27.9	29.6	11	28.1	5	24.4	26.9	25.7	16	25.4
Blackhull	6251	32.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tomsberg selection	121[illegible]	31.9	19.[illegible]	[illegible]	18	[illegible]	[illegible]	28.0	25.7	[illegible]	[illegible]
Ceres 38h x Kawvale	1212[illegible]	28.4	18.0	[illegible]	21	17/100	[illegible]	29.[illegible]	[illegible]	17	23.3
Kharkof	1442	27.7	21.9	24.8	19	[illegible]	[illegible]	23.6	20.1	21	21.7

SUMMARY OF AGRONOMIC DATA

Data for characters other than yield are averaged and presented in table 24. Since all stations did not report the same data, the number of stations entering the averages is shown at the top of each column.

Due to a generally mild winter, winterkilling was reported from 2 stations only and no wide range in survival was observed. The highest survivals were shown by Blackhull x Tenmarq (C. I. 12102), Early Blackhull x Tenmarq (C. I. 12124), and Tenmarq x Blackhull (C. I. 12126). The lowest ratings were reported for Comanche, Chiefkan x Oro-Tenmarq (C. I. 12133), and Chiefkan x Oro-Tenmarq (C. I. 12134). Heading dates were reported from 9 stations, and at these Triumph headed the earliest with a one-day advantage over Early Blackhull. Wichita was 2 days later than Early Blackhull but 6 days earlier than Pawnee. Some of the other strains showing considerable earliness were Cheyenne x Early Blackhull (C. I. 12000), Ceres-38h x Kawvale (C. I. 12121), Cheyenne x Early Blackhull (C. I. 12122), and Early Blackhull x Tenmarq (C. I. 12124). All strains in the nursery headed earlier than Kharkof. Ripening dates were reported from 11 stations and ranged from July 1 to July 7. The varieties matured in about the same order as indicated by the heading data. Plant heights were reported from 10 stations, but when averaged showed no great differences. The shortest ones in the nursery were Ceres-38h x Kawvale (C. I. 12121), Triumph, Marquillo-Tenmarq x Kawvale-Tenmarq (C. I. 12127), and Blackhull x Hard Federation (C. I. 12120). Westar and several Chiefkan crosses were the tallest.

Lodging was reported at 4 stations with readings that were rather high. Some of the varieties standing up the best were Blackhull x Tenmarq (C. I. 12102), Marquillo-Tenmarq x Kawvale-Tenmarq (C. I. 12127), Pawnee, and Quivira x Tenmarq (C. I. 12116). The most lodging was shown by Ceres-38h x Kawvale (C. I. 12121), Wichita, Early Blackhull, and Triumph. In this case Cheyenne x Early Blackhull (C. I. 12122) was not as weak as some strains, but weaker than the better wheats.

Leaf rust readings were reported from 9 stations with outstanding resistance being shown by Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12128). Wester was fairly low as was Pawnee but most other wheats had readings that were considerably higher, with some susceptible strains having averages above 70 per cent. Loose smut data from 3 stations showed no infection for Pawnee and Chiefkan x Martin-Tenmarq (C. I. 12131), while other strains had readings that were rather high.

Average test weights per bushel from 12 stations ranged from 54.7 to 60.5 pounds per bushel. The highest averages were shown by Early Blackhull, Blackhull x Hard Federation (C. I. 12120), Early Blackhull x Tenmarq (C. I. 12124), and Cheyenne x Early Blackhull (C. I. 12000). With a few exceptions there were no great differences in these weights. Pawnee had an average of .9 pound heavier than Comanche but 1.2 pounds less than Wichita.

DATA FROM THE DISEASE NURSERIES

For convenience, the data from the uniform winter wheat rust and bunt nurseries are included in this summary. These data are secured in cooperation with agronomists and plant pathologists working in the district. The report from the bunt nursery is included with no change in table numbers.

Table 24.--Summary of agronomic data on the hard red winter varieties of winter wheat grown as uniform selections at 12 stations in the hard red winter wheat region, 1945.

Variety	C. I. No.	Winter survival	Date of heading	Date of ripe	Leaf rust	Loose smut	Weight per bushel
		%	May	July	In.	%	Lbs.
Number of stations		2	9	9	3	3	12
Kharkof	1142	84	29	7	41	14	56.8
Blackhull	6251	92	26	5	42	8	58.5
Early Blackhull	8356	89	25	4	40	2	60.0
Pawnee	11669	87	23	3	39	0	58.1
Comanche	11673	75	23	5	40	4	57.2
Wichita	11952	86	17	2	40	5	59.3
Cheyenne x Tenmarq	11972	85	26	5	40	15	57.5
Chey. x Early Blackhull	12000	85	19	3	39	20	59.6
Blackhull x Cheyenne	12101	82	26	6	40	47	65	7	58.6
Blackhull x Tenmarq	12102	92	24	6	41	24	65	1	59.4
Westar	12110	79	23	5	42	46	21	3	57.2
Cheyenne x Early Blackhull	12114	87	25	6	40	45	9	5	58.4
Kanred-Hd. Fed. x Tenmarq	12115	78	20	4	41	46	25	1	59.5
Quivira x Tenmarq	12116	81	21	4	41	45	11	1	59.1
Blackhull x Hd. Federation	12120	82	21	5	38	39	9	3	60.5
Ceres-38h x Kawvale	12121	86	18	4	35	39	55	4	56.9
Cheyenne x Early Blackhull	12122	83	19	3	39	53	61	20	59.2
Cheyenne x Tenmarq	12123	82	23	5	40	44	48	1	59.3
Early Blackhull x Tenmarq	12124	79	21	3	39	40	4	52	59.6
Tenmarq selection	12125	84	23	4	41	44	49	15	57.3
Tenmarq x Blackhull	12126	93	22	5	41	49	69	1	57.6
Marquillo-Ten. x Kaw.-Tenq.	12127	90	18	3	38	39	35	1	57.8
Kaw.-Marquillo x Kaw.-Tenq.	12128	87	23	4	39	46	3	1	58.3
Cheyenne x Chiefkan	12129	73	25	6	42	47	34	3	58.5
Chiefkan x Martin-Tenmarq	12130	82	23	5	42	45	54	1	58.2
Chiefkan x Martin-Tenmarq	12131	81	25	6	42	49	58	0	57.3
Triumph	12132	80	14	4	36	46	66	7	59.4
Chiefkan x Oro-Tenmarq	12133	75	22	5	41	44	61	7	59.3
Chiefkan x Oro-Tenmarq	12134	77	20	4	44	45	5	1	58.9
Kanred x Hope-Hd. Fed.	12135	79	23	5	40	45	59	1	54.7
Kanred x Hope-Hd. Fed.	12136	83	22	5	39	54	43	0	56.4

UNIFORM WINTER WHEAT RUST NURSERIES

In tables 25 and 26 are presented the data on severity of leaf rust and stem rust infection on the 30 varieties of winter wheat grown in uniform rust observation nurseries throughout the country in 1945. These nurseries are maintained as a part of a rust research program carried on in cooperation with agronomists and plant 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 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 and not the coefficient of infection.

Differential data for leaf rust infection were obtained for the varieties at 21 stations (table 25). At most of these stations there was a rather heavy infection on the susceptible varieties. Among the varieties classed as semi-hard, Hussar had the lowest average infection. Kawvale and Harvest Queen x Kawvale (C. I. 12284) were also considerably more resistant than Minturki. Among the varieties classed as hard red winter, the best record was made by Mediterranean-Hope x Pawnee (C. I. 12287). At no station did this strain have a reading higher than 10 percent and in most cases it was recorded as 0 or trace. This strain showed outstanding resistance since its average infection at all stations was 1.5 percent compared to averages as high as 74.5 percent for susceptible strains. Other varieties having low averages were Comanche x Mediterranean-Hope (C. I. 12329), Kawvale-Marquillo x Kawvale-Tenmarq (C. I. 12331), and Marquillo-Oro x Oro-Tenmarq (C. I. 12407). Westar had an average of 19.0 compared to the averages of less than 5.0 percent for the varieties listed above. The most susceptible hard wheats such as Kharkof had average infections as high as 55 percent.

Stem rust readings showing differential reaction were reported from 10 stations as shown in table 26. At Ames, Iowa, Madison, Wis., and Lexington, Ky., the infection was not very high. Among the semi-hard wheats Minturki and Kawvale had average infections slightly lower than Harvest Queen x Kawvale (C. I. 12284). Hussar had the highest reading in this group of wheats. Among the hard wheats 3 varieties had average infections of 0.5 percent. These were Mediterranean-Hope x Pawnee (C. I. 12287), Comanche x Mediterranean-Hope (C. I. 12329), and Nebred x Mediterranean-Hope (C. I. 12404). H44 x Minturki[2] (C. I. 12327) and Comanche-Hope x Hussar (C. I. 12405) had averages below 2 percent. Westar, with an average of 17.2 percent, was the most susceptible of the hard wheats, while Kharkof averaged 15.2 percent.

When both rusts are considered, Mediterranean-Hope x Pawnee (C. I. 12287) had the best performance in that it had an average of 1.5 for leaf rust and 0.5 percent for stem rust. Almost as good a record was made by Comanche x Mediterranean-Hope (C. I. 12329) with an average of 2.3 percent for leaf rust and 0.5 percent for stem rust. The performance of wheats such as these is very encouraging since they show that real progress is being made in the development of rust resistant varieties of hard wheats. It is hoped that wheats such as these will prove to have agronomic value but if they do not they can still be used as parents in additional crosses.

Table 25.--Severity of leaf rust infection on winter wheat varieties grown in Uniform Rust Nurseries, 1945.

Class, variety, or cross	C. I. No.	Percent severity of leaf rust infection at: Col. Sta. Tex.	Den. Ston Tex.	Fayette-ville Ark.	Stillwater Okla.	Man-hattan Kans.	Lexing-ton Ky.	Wooster Ohio	Lafay-ette Ind.	Bed-ford Ind.	Ur-bana Ill.	Ames Iowa
Soft Red												
(Hope-Hus.-Trum.)x(Fulcaster-Purdue)	12200	35	2	50	10	T	10	1	5			
Trumbull x Fulcaster	12211	15	2	20	40	25	65	10	10	15	30	
Wabash	11[illegible]	[illegible]	2	10	60	10	50	40	15	20	30	
Trumbull x (Wabash-Hope-Hussar)	12201	[illegible]	[illegible]	50 1/	[illegible]	10	50 1/	20	T	10	50 1/	
Trumbull x Hope-Purdue	12202	30	2	100	40	60	80	15	10	15	20	
Dento	[illegible]	65	40	50	80	90	95	40	55	20	40	
Mediterranean	[illegible]	50	40	100	80	90	100	50	80	30	40	
Fulcaster	[illegible]	90	65	100	80	90	90	20	80	40	60	
Trumbull	[illegible]	85	40	100	50	90	90	40	80	40	65	
Michigan Amber	[illegible]	[illegible]	50	100	80	80	80	40	80	60	60	
Minhardi	[illegible]	[illegible]	65	100	80	80	80	40	80	25	65	
Semi-hard Red												
Hussar	[illegible]	[illegible]	85	75	[illegible]	[illegible]	[illegible]	20	20	20	70	
Kawvale	[illegible]	[illegible]	[illegible]	85	[illegible]	[illegible]	[illegible]	30	20	25	30	
Harvest Queen x Kawvale	[illegible]	[illegible]	[illegible]	80	40	80	80	40	20	35	10	1/
Minturki	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]	[illegible]	20	10	20	25	
Hard Red												
Medit.-Hope x Pawnee	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	T	T	T	
Comanche x Medit.-Hope	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	T	T	T	
Kawvale x (Turkey x Kan.-Tenn.)	[illegible]	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	T	T	10	
Marquillo x Omo x Omo-Tenmarq	[illegible]	5	[illegible]	5	[illegible]	[illegible]	[illegible]	0	1	5	5	
Marquillo-Omo x Omo-Tenmarq	[illegible]	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	T	T	10	
Nebred x Medit.-Hope	[illegible]	[illegible]	[illegible]	90	[illegible]	[illegible]	[illegible]	0	T	T	10	
Comanche x Hope-Hussar	[illegible]	10	[illegible]	90	[illegible]	[illegible]	[illegible]	0	T	T	30	
H44 x Minturki	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	5	10	20	
Westar	[illegible]	60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	10	10	30	
H44 x Minturki	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	[illegible]	0	5	5	5	
Kanred	[illegible]	60	[illegible]	100	50	70	20	0	20	20	50	
Nebred x Seven-44	[illegible]	[illegible]	80	100	50	60	10	30	65	25	30	
Malakof	[illegible]	[illegible]	40	100	[illegible]	[illegible]	[illegible]	40	20	50	40	
Tenmarq	[illegible]	60	[illegible]	100	[illegible]	[illegible]	[illegible]	5	65	25	50	
Kharkof	1442	75	65	100	65	90	80	10	95	75	25	50

1/ Segregating for rust reaction.

Table 25.--(Concluded.)

Class, variety, or cross	C. I. No.	Percent severity of leaf rust infection at: Kanawha Iowa	Columbia Mo.	Lincoln Nebr.	Madison Wis.	East Lansing Mich.	Chatham Mich.	Beltsville Md.	Hartsville S. C.	Westminster S. C.	Experiment Ga.	Average all stations
Soft Red												
(Hope-Hus-Trum)x Fulhio-Purkof	12400	5	2	3	T	5	5	T	15	0	5	7.7
Trumbull x Fultz sel.	12217	30	5	20	2	40	40	3	10	2	T	18.8
Wabash	11384	30	8	10	3	40	30	3	85	5	T	21.2
Trumbull[2] x (Wabash-Hope-Hussar)	12401	50	1	15	5 1/	28	40	5	85	0	15 1/	22.4
Trumbull[3] x Hope-Hussar	12402	50 1/	15	15	5 1/	18	40	10	100	1	25 1/	29.5
Denton	8265	50	20	30	10	25	70	2	85	1	25	33.1
Mediterranean	3332	70	70	55	60	40	95	75	100	10	5	61.2
Fulcaster	6471	50	60	90	80	25	85	50	100	10	70	68.8
Trumbull	5657	50	70	35	60	80	70	70	100	65	75	69.5
Michigan Amber	5620	65	80	80	60	90	65	80	100	65	75	72.4
Minhardi	5149	60	80	95	85	50	60	75	100	40	80	74.5
Semi-hard Red												
Hussar	4843	45	10	20	10	25	20	5	10	1	5	29.8
Kawvale	8180	40	30	15	50	40	45	5	15	1	3	34.7
Harvest Queen x Kawvale	12284	45 1/	50	25	30	30	50	10	100	1	5	36.2
Minturki	6155	65	80	90	50	35	65	30	100	5	65	67.9
Hard Red												
Medit.-Hope x Pawnee	12287	T	T	5	T	5	2	T	10	0	T	1.5
Comanche x Medit.-Hope	12329	T	T	10	T	5	T	T	T	15	0	2.3
Kawvale-Marquillo x Kaw.-Ten.	12331	20	3	5	T	10	T	T	15	0	T	4.7
Marquillo-Oro x Oro-Tenmarq	12407	20	T	3	T	15	2	T	10	0	T	5.0
Marquillo-Oro x Oro-Tenmarq	12406	20	2	10	1	10	10	T	15	0	T	8.3
Nebred x Medit.-Hope	12404	20	2	3	T	5	T	T	15	0	T	12.3
Comanche x Hope-Hussar	12405	40	2	5	T	..	25	1	15	0	T	13.6
H44 x Minturki[2]	12327	45	1	25	2	20	8	T	15	0	T	17.2
Westar	12110	40	5	20	5	20	40	T	15	0	T	19.0
H44 x Minturki[2]	12326	45	25	15	5	10	20	1	75	0	25	22.4
Kanred	5146	25	12	20	10	20	60	5	75	1	5	32.8
Nebred x Ceres-H44	12403	30	40	85	5	25	55	2	75	0	T	42.0
Malakof	4898	65	30	55	30	20	40	3	85	1	25	45.4
Tenmarq	6936	70	40	75	10	20	40	5	85	1	5	46.2
Kharkof	1442	65	80	70	40	20	45	3	85	1	25	55.4

1/ Segregating for rust reaction.

Table 26.--Severity of stem rust infection on winter wheat varieties in Uniform Rust Nurseries, 1945.

Class, variety, or cross	C.I. No.	Man-hattan Kans.	Lafay-ette Ind.	Ames Iowa	Kana-wha Iowa	Lin-coln Nebr.	Madi-son Wis.	East Lan-sing Mich.	Cha-tham Mich.	Wolf Creek W. Va.	Lex-ing-ton Ky.	Average all stations
		Percent severity of stem rust infection at:										
Soft Red												
(Hope-Hus.-Tenn.) x Fulhio-Purkof	12400	0	T	T	0	0	T		T	10	T	1.2
Trumbull 2 x (Wabash-Hope-Hussar)	12401	0	15		T	0		5	10	20	T	5.1
Trumbull x Hope-Hussar	12402	0	15		T	20	T	5	T	10	T	5.1
[illegible] x [illegible]	[illegible]	15	75		T	T	10	25	5	90	5	23.0
[illegible] x [illegible]	[illegible]	20	80		T	T	20	25	T	90	T	24.1
[illegible] x [illegible]	[illegible]	60	75		5	0	20	10	5	90	1	26.6
Michigan Amber	[illegible]	60	75		T	T	15	25	1	90	T	26.7
Trumbull	5657	60	75		T	T	5	10	30	90	T	27.1
Trumbull x Fultz sel.	12417	5	80		3	20	5	25	50	90	T	27.8
[illegible] x [illegible]	[illegible]	20	80		10	40	10	10	20	90	T	28.0
[illegible]	[illegible]	10	90		2	30	15	25	1	80	20	28.9
Semi-Hard Red												
[illegible]	[illegible]	T	30		0	0	T	5	T	50	T	8.6
[illegible]	8160	T	30		T	0	10	5	T	60	T	10.6
[illegible] Queen x Kawvale	[illegible]	T	25		T	T	T	[illegible]	[illegible]	80	T	11.1
[illegible]	[illegible]	T	85		T	50	10	[illegible]	100	80	T	23.8
Hard Red												
Medit.-Hope x Pawnee	[illegible]	0	[illegible]		0	0	0	[illegible]	[illegible]	5	0	0.5
Comanche x Medit.-Hope	[illegible]	0	[illegible]		0	0	0	[illegible]	[illegible]	5	0	0.5
[illegible] x Medit.-Hope	[illegible]	T	[illegible]		0	0	0	[illegible]	0	5	0	0.5
[illegible]	[illegible]	0	[illegible]		0	0	0	[illegible]	[illegible]	5	T	1.0
[illegible]	[illegible]	T	[illegible]		0	0	5	[illegible]	0	10	0	1.7
Comanche x Hope-Hussar	[illegible]	0	[illegible]		0	0	T	[illegible]	[illegible]	15	0	2.0
[illegible]	[illegible]	0	20		0	0	T	5	0	10	T	3.5
Marquillo-Oro x Oro-Tenmarq	[illegible]	T	T		0	0	5	20	0	10	0	3.5
Marquillo-Oro x Oro-Tenmarq	12406	T	20		0	0	5	0	5	0	20	T	5.0
Tenmarq	[illegible]	T	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.0
Kawvale-[illegible] x Kaw.-Tenmarq	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5
Malakoff	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50	[illegible]	15.5
Kanred	5046	T	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	13.8
Kharkof	1442	T	80		0	20	5	T	5	1	40	T	15.2
Weaver	12110	2	75		0	20	0	T	5	10	60	T	17.2

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AGRICULTURAL RESEARCH ADMINISTRATION
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(NOT FOR PUBLICATION)

SUMMARY OF RESULTS OF THE GREAT PLAINS UNIFORM WINTER WHEAT BUNT NURSERIES, 1945

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The uniform hard red winter wheat bunt nursery for the Great Plains area was continued in 1945 in the same manner as outlined for 1943 and 1944. Data were obtained at 8 stations in 1945. This report presents a summary of those data, together with the averages for certain selections grown for periods of varying length during the period 1932 to 1945, inclusive.

In the fall of 1944, 51 varieties and selections of hard red winter wheat were sown in duplicate 8-foot rows at each of 8 stations. All of the stations except Bozeman, Mont., and Beltsville, Md., are in the hard red winter wheat area. Each station represents a state or a distinct region that might include parts of several states. The data obtained are presented and summarized in table 1.

The inoculum used at each station was made up of a mixture of physiologic races known to be present in the area represented by that station, except at Beltsville, Md., where a composite of the races used at all other stations was used. Inoculum of the races was furnished by Dr. C. S. Holton, Pullman, Washington. The composites were prepared at Manhattan, Kans., and sent to Lincoln, Nebr., where the seed for the various nurseries was inoculated, packeted, and forwarded to cooperators at the stations. The races used in preparing the composites were the same as those used in 1943 and 1944. Only races of *Tilletia foetida* were used for stations in Texas, Oklahoma, Kansas, Colorado, and Nebraska. A mixture of races of *T. foetida* and *T. caries* was used at Bozeman, Mont., and Beltsville, Md.

The average infection for the stations given at the bottom of table 1 shows that only light infections were obtained at Denton, Tex., and North Platte, Nebr., and moderate infections at Lincoln, Nebr., and Fort Collins, Colo. Heavy infections occurred at Bozeman, Mont., and Beltsville, Md., where many races were used and where both species of bunt were included in the inoculum. Bozeman was the only station at which no wheat selection had a reading of zero.

The data in table 1 show that Hussar with an average infection of only 1.3 percent was the most resistant of all of the selections grown in 1945, although six selections had average infections of less than 2.0 percent. It should be noted that the first eight selections listed had infections below 10 percent at all stations. These therefore should be considered as

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Manhattan, Kansas
36CC - December, 1945

valuable sources of resistance to all of the races of both species of bunt used in the 1945 tests. [illegible] table 1 and entries 24, 25, 26, 28, and 30 [illegible] Woodward, Manhattan, Lincoln, [illegible] inoculum. All of them except "Tire" (Wd. 38B-1-8), Chevenne x Turkey 1962 (C. I. 12142), Oro x Turkey (Wd. 3789-3), and [illegible] resistant at Fort Collins where L-8 was a constituent of the inoculum. Some of these such as "Tire" (Wd. 38B-1-8), Oro x [illegible] (C. I. 431339), Marquillo-Oro x Oro-Tenmarq [illegible] x Oro-Tenmarq (H.G. 43-111) had extremely high resistance at the first 3 stations shown in table 1 where several races of T. foetida were used in the inoculum.

The [illegible] (Sel. 44734) and Comanche x Hope-Hussar (C. I. 12405) were resistant at all stations except Bozeman, Montana. On the other hand, [illegible] rust-resistant selection Comanche [illegible] resistant [illegible] most [illegible] the second highest [illegible] of these data, [illegible] periods of varying length during the period 1932 to 1945, inclusive.

It will be noted that Ridit had unusually heavy infections at Woodward, Manhattan, and [illegible] the resistant varieties Hussar [illegible] at Woodward [illegible] since [illegible] was not included in the inoculum [illegible] that race. Aside from this case several selections shown in table [illegible] differences in reaction to different races by showing resistance at some stations and not at others. The inoculum used at each station was made up of a mixture of pustulate races known to be present in the area represented by that station, except at [illegible] different periods [illegible] varieties grown during the [illegible] Ridit [illegible] lowest [illegible] grown each year [illegible] lowest average [illegible] (Sel. 39[illegible]) [illegible] noted that 14 of the 22 selections [illegible] average infections below 10 percent and should be considered resistant to most races. It [illegible] hybrid lines.

[illegible] shows that only light infections were obtained at Denton, Tex., and Worth Platte, Nebr., and moderate infections at Lincoln, Nebr., and Fort Collins, Colo. Heavy infections occurred at Bozeman, Mont., and Beltsville, Md., where many races were used and where both species of bunt were included in the inoculum. Bozeman was the only station at which no wheat selection had a reading of zero.

The data in table 1 show that Hussar with an average infection of only 1.3 percent was the most resistant of all of the selections grown in 1945, although six selections had average infections of less than 5.0 percent. It should be noted that the first eight selections listed had infections below 10 percent at all stations. These therefore should be considered as

Table 1.--Summary of bunt infection of 51 varieties and strains of winter wheat grown in the Great Plains uniform winter wheat bunt nursery at 8 stations in 1945, and average bunt infections for 1932-1945.

Variety or cross	C. I. or selection No.	Average percentage of bunt at: Denton Tex.	Wd. Ward Okla.	Manhattan Kans.	Lincoln Nebr.	North Platte Nebr.	Fort Collins Colo.	Bozeman Mont.	Beltsville Md.	Weighted av. 1945 av.	1932 to 1945	1942 to 1945	1944 and 1945
Hussar	4843	3	T	T	1	0	0	4	2	1.3	3.0	2.1	2.7
Hope-Turk. x Turk. (C.I.11530)	Ks. sel. 44769	1	8	0	0	0	0	2	0	1.4	...	...	...
Sibley 81 x Yogo	Nebr. sel. 392678	0	T	1	3	0	0	8	0	1.5	...	...	1.1
Turkey x Turk.-Cheyenne	Nebr. sel. 383130	1	1	T	0	0	5	4	3	1.8	...	...	2.8
Turkey x Blackhull	Wd. 39h3283-30-3	0	T	T	0	1	4	8	1	1.8	...	...	3.7
Minturki	6155	0	1	3	1	0	4	4	2	1.9	6.1	7.3	6.7
Relief	10082	0	0	T	1	0	0	7	8	2.0	...	1.5	2.0
H44 x Minturki[2]	Minn. 2710	T	5	0	1	0	2	8	2	2.3	...	...	4.0
"Fine"	Wd. 38B-1-8	0	T	0	0	0	11	8	1	2.5	...	...	4.4
Oro x Marquillo-Tenmarq	Ks. sel. 431354	0	1	0	0	0	6	15	2	3.0	...	...	...
Marquillo-Oro x Oro-Tenmarq	Ks. sel. 43636	0	1	2	3	0	2	18	2	3.5	...	...	...
Oro x Marquillo-Tenmarq	Ks. sel. 431339	0	0	0	0	0	9	18	2	3.6	...	...	...
"Fine"	Wd. 38B1-7	0	3	2	0	0	8	8	9	3.8	...	...	5.7
Medit.-Hope x Pawnee	Ks. sel. 44734	0	3	T	5	0	4	18	2	4.0	...	...	...
Martin-Tenmarq x Kharkof	Denton 42-2491	1	8	6	2	0	0	10	12	4.9	...	...	...
Cheyenne x Turkey 1062	12142	0	5	0	1	0	20	13	2	5.1	...	...	6.6
Oro x Turkey (C. I. 10095)	Wd. 37B9-3	0	3	4	0	0	11	18	6	5.3	...	...	...
Nebred	10094	T	2	1	9	0	9	20	3	5.5	3.3	4.1	4.9
Turkey selection	11530	0	1	1	2	0	1	35	8	6.0	...	5.0	7.5
Comanche	11673	0	2	1	0	0	6	35	5	6.1	...	7.5	6.9
Oro	8220	T	3	1	0	0	12	30	4	6.5	7.9	9.9	7.7
Comanche x Hope-Hussar	12405	0	4	1	0	0	6	40	3	6.8	...	...	...
Hope-Turk. x Turk. (C.I.11530)	Ks. sel. 44761	0	12	2	2	0	14	20	7	7.1	...	...	...
Marquillo-Oro x Oro-Tenmarq	Ks. sel. 43634	0	1	1	1	1	10	28	16	7.3	...	...	...
Oro x Turkey (C. I. 10016)	Wd. 37B10-8	0	8	8	2	1	9	20	10	7.3	...	...	...
Chiefkan x Oro-Tenmarq	H.C. 43-111	0	1	T	1	0	17	38	13	8.8	...	...	...
Oro x Turk. (C. I. 10095)	Wd. 37B9-1	0	13	20	2	0	3	25	10	9.1	...	...	...
Oro x Medit.-Hope	Ks. sel. 425930	0	9	3	0	0	25	35	7	9.9	...	...	...
Oro x Turk. (C. I. 10016)	Wd. 37B10-9	0	21	28	1	5	4	20	5	10.5	...	...	...
Chiefkan x Oro-Tenmarq	12134	0	7	1	0	1	16	30	3	11.0	...	...	...

Table [illegible] (Concluded.)

		Average percentage of bunt at									Weighted av.		
		Den-ton Tex.	Wd-ward Okla.	Man-hattan Kans.	Lin-coln Nebr.	North Platte Nebr.	Fort Collins Colo.	Bozeman Mont.	Beltsville Md.	1945 av.	1932 to 1945	1942 to 1945	1944 and 1945
[illegible] x Martin-Tenmarq	Wd. 38[illegible]	0	13	6	0	0	28	[illegible]	23	10.8	...	...	13.1
[illegible] x Martin-Tenmarq	Denton [illegible]2862	0	18	30	0	0	16	[illegible]	28	10.0	[illegible]	[illegible]	[illegible]
[illegible]		0	19	4	14	0	5	[illegible]	14	10.8	...	14.2	16.3
[illegible] x Oro-Tenmarq		0	12	6	0	0	33	[illegible]	18	10.6	...	[illegible]	[illegible]
[illegible] x Martin-Tenmarq	Denton [illegible]2882	0	15	15	0	0	6	58	14	10.8	[illegible]	[illegible]	[illegible]
[illegible] x [illegible]-Tenmarq	Denton [illegible]2887	0	34	22	0	0	10	58	30	20.1	...	...	...
[illegible]	Denton [illegible]2887	0	42	48	0	0	50	58	33	22.1	...	...	[illegible]
[illegible] x [illegible]		0	20	28	14	0	18	85	65	30.8	...	...	34.9
Comanche x Medit.-Hope	[illegible]762	0	30	28	13	0	11	70	45	24.9	...	...	[illegible]
[illegible]	[illegible]	0	52	12	5	0	14	45	35	26.9	...	...	[illegible]
[illegible] x Oro-Tenmarq		0	35	12	0	0	11	70	35	20.5	...	...	32.9
[illegible]-Tenmarq		0	65	8	0	0	11	75	35	20.9	5.9	10.0	16.6
[illegible]anne x Early Blackhull		0	47	12	15	0	13	50	20	21.0	...	...	...
[illegible] x Early Blackhull		0	41	18	16	0	19	65	10	22.3	...	...	[illegible]
[illegible] Composite	Wd. 31[illegible]-8	0	48	12	11	0	14	65	25	22.5	...	...	[illegible]
[illegible]		0	61	25	22	0	16	75	50	27.0	43.4	[illegible]	[illegible]
[illegible]hull x [illegible]-Tenmarq		0	42	15	23	0	15	80	40	21.0	[illegible]	[illegible]	[illegible]
[illegible] x [illegible]-Tenmarq		0	55	18	31	14	5	95	65	30.9	...	...	[illegible]
[illegible] x [illegible]		0	67	18	31	0	54	68	68	37.3	41.5	39.9	[illegible]
[illegible] x [illegible] (Orig. I.B.)		0	44	12	2	0	60	90	83	35.9	...	...	[illegible]
Hopechief	[illegible]9	31	72	12	63	30	66	75	89	63.1	...	74.3	66.8
Average		3.5	18.7	17.5	9.2	2.0	22.2	95.1	21.5	15.0	[illegible]	[illegible]	[illegible]