UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF PLANT INDUSTRY

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1942

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by

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EXPERIMENTS IN 1942

The 1942 crop was the twelfth harvested since the cooperative winter wheat improvement program has been in operation. Plans have not been altered greatly since the beginning, but each year changes are made in the lists of varieties tested in both plot and nursery experiments. The cooperating stations have changed from time to time owing to reorganization of State and Federal work.

This report is a summary of the 1942 data from all cooperating stations as well as a summary of yield data for the 3-year period ending in 1942. Because of the labor involved complete summaries of average yields are not made each year. Such summaries will be made at 2-year or longer intervals, since varieties do not change their positions greatly in long-time averages from year to year. The cooperating agencies, stations, and personnel concerned in these experiments are as follows:

COOPERATING AGENCIES, STATIONS, AND PERSONNEL

(The asterisk (*) indicates Government field stations)

BUREAU OF PLANT INDUSTRY:		
Division of Cereal Crops and Diseases		M. A. McCall
Wheat Investigations		S. C. Salmon
Hard Red Winter Wheat		K. S. Quisenberry
Rust and Smut		C. O. Johnston
Milling and Baking		M. A. Barmore, K. F. Finney, W. F. Keller
TEXAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Corn and Small Grains)		C. H. McDowell
College Station	Agricultural Experiment Station	E. S. McFadden
Denton	Substation No. 6	I. M. Atkins
Chillicothe	Substation No. 12	J. R. Quinby, I. M. Atkins
Bushland	Amarillo Experiment Station	David A. Reid
OKLAHOMA AGRICULTURAL EXPERIMENT STATION:		
Field Crops and Soils		H. F. Murphy
*Lawton	U. S. Dry Land Field Station 2/	W. M. Osborn
Stillwater	A. & M. College	C. B. Cross
*Woodward	Southern Great Plains Field Sta. 2/	V. C. Hubbard, J. B. Sieglinger, Horace S. Smith
Goodwell	Panhandle Agr. Exp. Station	O. Clay Terry

KANSAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy		R. I. Throckmorton
Manhattan	Kansas State College	H. H. Laude, L. P. Reitz, E. G. Heyne
Hays	Ft. Hays Branch Exp. Sta.	A. F. Swanson
Colby	Colby Branch Station	E. H. Coles
COLORADO AGRICULTURAL EXPERIMENT STATION:		
Agronomy		Alvin Kezer
*Akron	U.S. Dry Land Field Sta.	D. W. Robertson, J. F. Brandon, S. F. Callahan
Fort Collins	State Agricultural College	D. W. Robertson
Hesperus	Fort Lewis Substation	D. W. Koonce
IOWA AGRICULTURAL EXPERIMENT STATION:		
Ames	Iowa State College	L. C. Burnett, H. C. Murphy
NEBRASKA AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Experimental)		T. A. Kiesselbach
Lincoln	Agricultural Exp. Sta.	K. S. Quisenberry
North Platte	North Platte Substation	O. J. Webster, L. L. Zook
Alliance	Box Butte Experiment Farm	Robert Pahl
Valentine	Valentine Substation	E. M. Brouse
WYOMING AGRICULTURAL EXPERIMENT STATION:		
Agronomy		A. F. Vass
Laramie	Agricultural Exp. Sta.	Dayton Klingman
*Sheridan	U.S. Dry Land Field Sta. 2/	R. S. Towle
SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		A. N. Hume
Brookings	Agricultural Exp. Sta.	J. E. Grafius
MINNESOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy and Plant Genetics		H. K. Hayes
St. Paul	University Farm	E. R. Ausemus
Waseca	Southeast Experiment Sta.	R. E. Hodgson
Grand Rapids		E. R. Ausemus
NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		T. E. Stoa
Dickinson	Dickinson Substation	R. W. Smith
MONTANA AGRICULTURAL EXPERIMENT STATION:		
Agronomy		A. H. Post
Bozeman	Montana Experiment Sta.	R. H. Bamberg
Moccasin	Judith Basin Branch Sta.	R. H. Bamberg, J. M. Green
Havre	Northern Montana Branch Sta.	J. J. Sturm

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

ACCESSION NUMBERS ASSIGNED

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

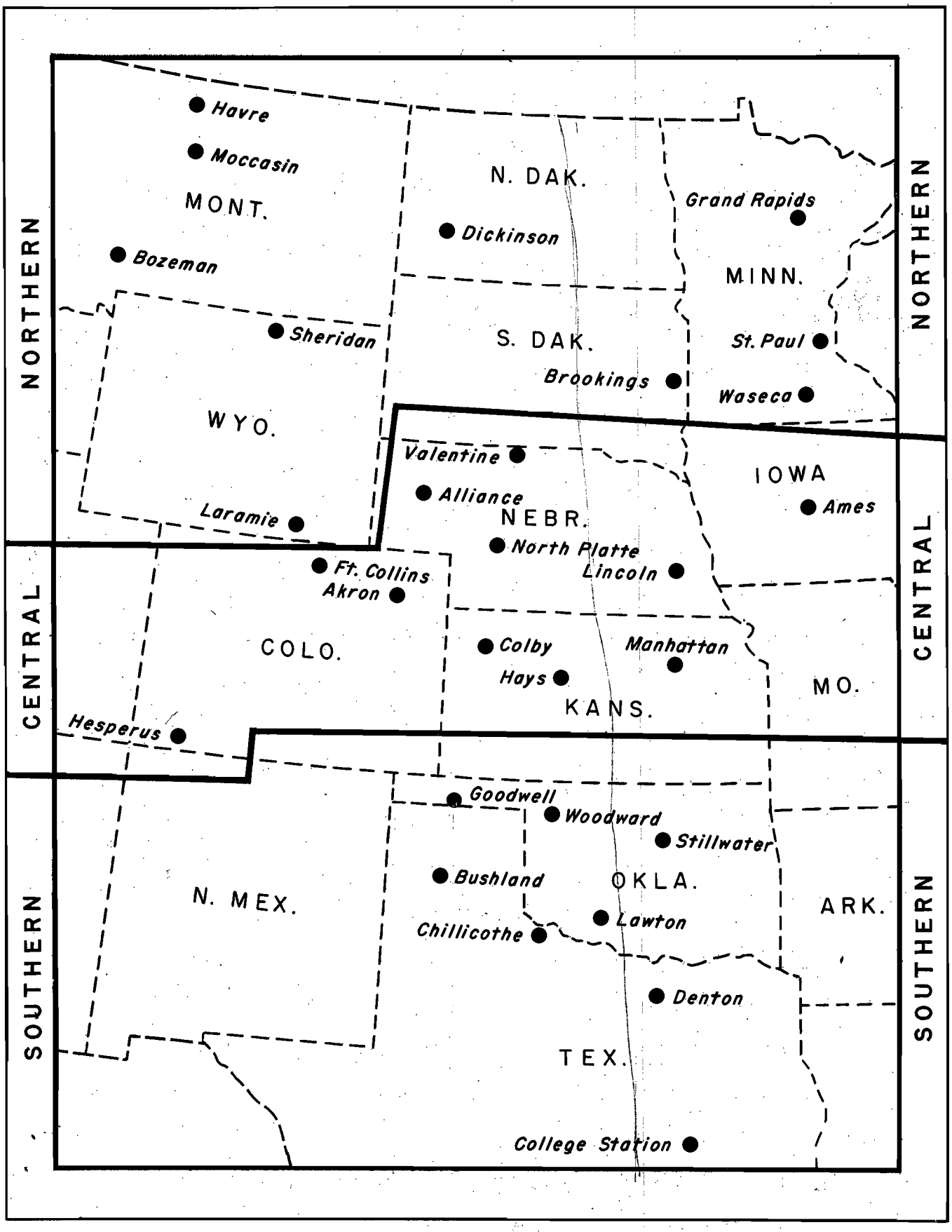
C. I. No.	Name	State No.
12115	Kanred-Hd. Federation x Tenmarq	Amarillo sel. No. 33-37-90
12116	Quivira x Tenmarq	Kans. No. 2762
12117	Kanred-Hd. Fed. x Minhardi-Minturki	Akron No. 186
12118	Kanred-Hd. Fed. x Minhardi-Minturki	Akron No. 192
12119	Kanred-Webster x Kanred x (Hard Federation x Marquis) x Marquis	Akron No. 864

UNIFORM VARIETIES IN PLOTS

Because of the wide variation in environment encountered in the region from Texas to Montana, it has not seemed advisable to seed the same varieties at all stations. The region has been divided into three districts, as shown by the map on the following page, and the varieties grown uniformly at the co-operating experiment stations are somewhat different in each of the three districts. The varieties grown uniformly in each district in 1942 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	
Early Blackhull x Tenmarq	11952	X	X	
Red Chief	12109	X	X	
Early Blackhull	8856	X		
Kawvale	8180	X		
Kawvale x Tenmarq	11956	X		
Nebred	10094		X	X
Cheyenne	8885		X	
Minturki	6155			X
Yogo	8033			X
Karmont	6700			X
Marmin	11502			X
Mont. 36-Beloglina x Karmont	12108			X

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


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

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

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

PLOT DATA

In the fall of 1941 conditions for seeding wheat were generally good and soil moisture was better than in previous years. At some stations seeding was delayed because of wet soil and at others washing damaged some of the plots. Plots were seeded at 22 cooperating stations. At Denton green bugs (aphids) completely ruined the crop, while at Bushland only dry land plots were grown. At Stillwater continued rains caused the varieties to be seeded on three different dates, therefore the yields are shown but are not included in the averages. Yield and other agronomic data for varieties grown at each of 21 stations are given in table 1. The generalized standard errors for most of the stations are given and summarized in table 2.

To save space, data are given only for those characters that showed a contrasting reaction and that may have had an influence on yield. For each station the varieties are listed in order of yield for 1942 and, where possible, average yields are given for the period 1940-42. For the most part the data need little explanation.

Winter weather was rather mild and in general there was little or no winterkilling. Spring moisture was very spotted over the area, for example, Kansas had a drought during April while parts of Oklahoma and Texas were having floods. In May it became dry in the south while farther north there was ample to abundant moisture. Rains continued during the growing season and as a

result growth was heavy at a number of stations and considerable lodging occurred. Heavy straw, soft ground, and continued rain made for a difficult harvest and bleached grain. Violent storms in the form of wind, rain, and hail were unusually frequent during the spring. Some leaf rust was present but not nearly as much as in previous years or as was expected. Aphids or green bugs wiped out nearly all wheat and other small grains in the Dallas-Ft. Worth,-Denton area of Texas, and as a result there was no build up of stem rust inoculum and the disease did not become serious farther north in spite of rank growth and late harvest. The green bug area extended into Oklahoma as far north and west as Lawton and as far west in Texas as Chillicothe. Septoria and wet weather diseases were present in varying amounts and these injured some varieties.

The 1942 season was characterized by a crop better than usual and better than expected. Some difficulty was encountered in harvest in some areas due to soft ground and badly lodged straw, but most of the crop was saved.

At Chillicothe the yields were very low and grain quality poor due for the most part to damage from green bugs; in fact the green bugs were so severe that an increase field of Comanche on the Station was a failure. Some leaf rust was recorded but in no case was the infection especially heavy. Early Blackhull x Tenmarq (C. I. 11952) and Red Chief gave the highest, while some of the later varieties such as Kanred, Kharkof, and Kawvale gave the lowest yields. At this station there were plots of Comanche from two seed sources, Manhattan and Chillicothe. The Manhattan source gave the most vigorous growth throughout the season and the highest yield. This may be a question of source of seed only or it may be due to local selection, but additional work will be needed to give the answer. In general the later varieties were most severely injured by green bugs, but of the earlier ones Pawnee was hard hit. For the

period 1940-42 Martin x Tenmarq3 (C. I. 11805), Tenmarq, and Early Blackhull had the highest average yields.

Only dry land plots were grown at Bushland since the irrigation system was not in operation. Heading occurred from the middle to the last of May and the crop was ripe from June 21 to July 4. Straw was of medium height and test weights fairly good. Yields ranged from 20.1 to 11.9 bushels per acre with Early Blackhull, Comanche, Blackhull, and Chiefkan having the highest yields, and Cheyenne, Red Chief, Kharkof, and certified Turkey the lower yields. For the last three years the varieties with the highest yields are Pawnee, Comanche, and Chiefkan. The agreement between the 1942 yields and the average is not too good.

Aphids were present at Lawton and may have been the cause of the low yields of some of the varieties. Leaf rust was rather heavy with only a few varieties having either Tenmarq or Kawvale as a parent showing resistance. Test weights ranged from 57 to 62 pounds per bushel and yield from 11.0 to 28.4 bushels per acre. Oro x Tenmarq (C. I. 11672), Early Blackhull x Tenmarq (C. I. 11952) and Kawvale x Tenmarq (C. I. 11956) had the highest average yields. Comanche, Blackhull, Tenmarq, Pawnee, Cheyenne, Chiefkan, and Turkey yielded in the order listed. For the period 1940-42 Oro x Tenmarq (C. I. 11672) had the highest average yield followed by Comanche, Kawvale x Tenmarq (C. I. 11750), and Kawvale. For this same period Early Blackhull, a very popular variety in the Lawton area, has ranked sixth for yield.

Yields and test weights per bushel are shown for the varieties grown at Stillwater. At this station seeding was done on three dates extending over nearly a month of time. An examination of the data shows that those varieties seeded on October 14 tended to outyield varieties seeded on November 8 and 10. Test weights averaged more than 2 pounds per bushel heavier for the early seeded

than for the late seeded varieties. For this reason these yields have not been used in the averages. Comanche, Pawnee, and Blackhull, all seeded early, gave the highest yields, followed by two Oklahoma Turkey selections and Cheyenne.

At Woodward another good crop was harvested with no diseases being reported. Straw was tall and most varieties had test weights above 59 pounds per bushel, except Chiefkan, Kharkof, Turkey and Kanred. For some reason Chiefkan had an unusually low test weight. Four varieties, Comanche, Early Blackhull x Tenmarq (C. I. 11952), Cheyenne x Early Blackhull (C. I. 12000), and Kawvale x Tenmarq (C. I. 11956), had yields above 40 bushels per acre, while Kanred, Blackhull, Kharkof, Chiefkan, and Turkey had yields below 30 bushels per acre. For the last three years Pawnee and Comanche had average yields nearly the same. Quivira and Tenmarq rank third and fourth, respectively, for yield.

Thirty-three varieties of winter wheat were tested at Manhattan and very complete data were reported. Heading ranged from May 11 to May 22 and ripening from June 20 to 29. Straw was very tall and lodging severe in all varieties. The type of lodging also is recorded in order to show the way the crop lodged; i.e. whether by bending over or by breaking of the straw or a combination of the two. Type 1 represents bending with practically no broken straw. Type 5 represents lodging mainly by breaking with little bending. Leaf rust readings ranged from a trace on Marquillo x Oro hybrids to 87 per cent on Nebred. Number of culms per acre indicated rather wide differences in stand with such varieties as Pawnee, Nebred, and Cheyenne x Tenmarq (Kans. 2759) having the highest counts. Test weights per bushel were all below 60 pounds per bushel, the heaviest being Red Chief with a test of 59.3 pounds. Much of this loss in weight probably was caused by weathering previous to harvest. Pawnee (Lincoln seed), Early Blackhull x Tenmarq (C. I. 11952),

Pawnee (Manhattan), and Cheyenne x Tenmarq (Kans. No. 2758) had the highest yields. Kawvale, Tenmarq, Red Chief, Chiefkan, Nebred, Blackhull, and Turkey yielded in the order named. In general, the earlier varieties gave the higher yields. Yields of Pawnee from two seed sources are shown, with Lincoln being slightly better than Manhattan seed. With Comanche Manhattan seed yielded higher than Chillicothe seed. It will be remembered that at Chillicothe the plots of Comanche grown from Manhattan seed gave the higher yields. Based on the three-year average Pawnee ranked first, Early Blackhull x Tenmarq (C.I. 11952) second, Cheyenne x Tenmarq (C. I. 11972) third, and Comanche sixth. Such varieties as Kharkof, Nebred, Blackhull, and Turkey have had relatively poor three-year average yields.

At Hays, the crop matured at about the normal time or possibly a little late. Straw was medium in height and no rust was recorded. Test weights ranged from 56 pounds per bushel for Comanche Pawnee, and Marquillo x Oro (C. I. 11979) to 62 pounds for Red Chief. Chiefkan, Cheyenne x Tenmarq (C. I. 11972), and Early Blackhull had the highest yields, with Pawnee, Nebred, Blackhull, Tenmarq, and Comanche ranking in the order listed. For the three-year average Pawnee ranked first, Comanche second, Chiefkan third, and Early Blackhull fourth. The Turkey type wheats have had the lowest averages.

Growth was unusually good at Colby, yields were high, and test weights per bushel were heavy. Wide differences between varieties were recorded for lodging, with Cheyenne x Tenmarq (C. I. 11972), Cheyenne, and Cheyenne x Tenmarq (C. I. 12103) showing the lowest figures and Early Blackhull and Early Blackhull x Tenmarq (C. I. 11952) the highest. For all varieties except Pawnee leaf rust readings were high. Cheyenne x Tenmarq (C. I. 11972) with 61.4 bushels per acre had the highest yield. Pawnee, Red Chief and Cheyenne x Tenmarq (C. I. 12104) all gave good yields, while Early Blackhull, Kanred, Turkey, and Kharkof gave the lowest yields. Based on a 2-year average Pawnee,

Chiefkan, and Early Blackhull x Tenmarq (C. I. 11952) have ranked highest for yield, all varieties that are less winter hardy than it is felt a variety should be for the Colby area.

Only a small amount of winterkilling was recorded at Akron. The varieties headed in late May and early June and ripened from the first to the middle of July. Leaf rust was rather heavy on all varieties except those carrying some resistance. Test weights were unusually good, with all but two varieties weighing 60 pounds or better. The early varieties such as Early Blackhull x Tenmarq (C. I. 11952), Kanred-Hard Federation x Minhardi-Minturki (C. I. 11970), Early Blackhull, and Chiefkan had the highest yields, while the later types had lower yields. The 1941-42 averages follow the same general order as do the 1942 yields. Here again early tender types have given surprisingly high yields.

Twenty-four varieties were grown in plot tests at Lincoln and the crop was somewhat later than in previous years. The varieties headed from May 22 to 29 and ripened from June 25 to July 1. Straw was tall ranging from 43 to 51 inches in height and lodging was rather serious especially in the case of Blackhull. Leaf rust readings ranged from 8 per cent on Pawnee to 40 per cent on Nebraska No. 60. The counts on number of culms per acre were very high with Pawnee, Kawvale x Tenmarq (Sel. 23867), and Kawvale x Tenmarq (C. I. 11992) showing the most tillering. Grain quality was rather good with test weights ranging from 58.9 to 62.7 bushels per acre. Four varieties, Pawnee (Nebraska), Pawnee (Kansas), and two Kanred x Tenmarq selections, had yields above 50 bushels per acre. All the other varieties, except Blackhull had yields ranging in the 40-bushel class, while Blackhull had the lowest yield of 28.0 bushels per acre. Pawnee was grown from two seed sources, Kansas and Nebraska, and although the Nebraska seed plot had the highest yield, the difference is not great enough to be considered significant. Based on the 3-year average Pawnee

ranked first and Kawvale x Tenmarq (C. I. 11992) second. The latter strain seems to have yielding ability but lacks desirable milling and baking characteristics and will be discarded. Cheyenne ranked fifth, Nebred ninth, and Blackhull fifteenth in the averages.

At North Platte growth was extremely heavy, straw tall, and lodging very bad for all varieties except Pawnee and Cheyenne. Test weights ranged from 52.5 pounds for Turkey selection (C. I. 11577) to 62.5 pounds for Red Chief. Pawnee, Red Chief, Chiefkan, and Comanche had the highest yields, Cheyenne and Nebred were intermediate, and Kharkof and Kanred low. This is the first year in which Pawnee has ranked so high in yield at this station. For the three-year average Chiefkan ranked first followed by Pawnee, Nebred, Local Turkey, Kanred x Blackhull (C. I. 11844), and Cheyenne.

Winterkilling was reported at Alliance and may have had some influence on yield although the relation is not clear cut. Straw was very tall for the station and yields unusually high. Comanche, Cheyenne, Pawnee, and Nebred were the four varieties having the highest yields—two hardy and two relatively tender varieties. Tenmarq, Red Chief, and Chiefkan were apparently killed severely enough to reduce the yield as these varieties appear at the bottom of the list. No long-time averages are shown since no plots were harvested in 1940 and 1941.

Yields and test weights per bushel were reported for Valentine, where the varieties were grown in duplicate plots, with rod rows being cut for yield determinations. Yields were low and the varieties ranked in an interesting order, with Kharkof, Tenmarq, and Chiefkan at the top of the list and Cheyenne, Comanche, and Nebred at the bottom. No long-time averages are available for this station.

No winterkilling was reported from Waseca, where an interesting set of new varieties was grown in plot tests. Straw was rather tall and all varieties

lodged very badly, but in spite of this good test weights were reported. Several H-44 x Minturki back crosses were tested and some of these proved to have considerable yielding ability. Two new strains ranked above Nebred for yield and five were above Kharkof and Yogo. Marmin and Minturki were rather low in yield. Based on the three-year average Yogo still ranks first for yield with Nebred and Marmin in second and third places, respectively.

At St. Paul, there was some winterkilling, also a very heavy growth of straw which lodged rather badly. Leaf rust was present but was heavy only on Minhardi and Marmin. In spite of 50 percent winterkilling Mont. 36-Beloglina x Kanred (C. I. 12108) gave the highest yield, although this yield apparently is open to question, since the square-yard samples for this variety were taken from the best parts of the plots. A number of H-44 x Minturki back crosses were included in the test and several gave good yields. Of the varieties grown for three years Minturki has had a slight advantage in yield.

At Grand Rapids, killing was very light, straw tall, and some black chaff was reported. Test weights were all above 58 pounds per bushel and yields ranged from 27.9 to 37.4 bushels per acre with Yogo, H-44 x Minturki^2 (Minn. 2711) and Minhardi x Marquis (Minn. 2699) having the highest average yields. Eight strains outyielded Minturki, and Minturki was higher than Marmin. Only three varieties have been grown for three years and of these Yogo has had a slight yield advantage.

Two replications of winter wheat were seeded at Dickinson, where no winter killing was observed, leaf rust was rather heavy on all varieties, and some stem rust developed. Test weights were unusually good, all being above 59 pounds per bushel. Yogo yielded the highest followed by Mont. 36-Beloglina x Kanred (C. I. 12108), and Minturki. At the bottom of the list were Beloglina and Kharkof. Two year average yields (1940 and 1942) are shown and for this period Nebred, Marmin, and Yogo have had the highest averages.

Uniform survivals were reported at Sheridan where the crop seemed to be normal except for low test weight per bushel. Cheyenne, Kanred, and Kharkof gave the highest yields while the later, more hardy varieties such as Nebraska No. 60, Marmin, Minturki, and Yogo had the lowest yields. Based on a three-year average Kanred, Kharkof, and Nebred have had the highest yields, and Minturki the lowest.

Differential lodging data were reported from Bozeman and Marmin and Ridit x Utah Kanred (C. I. 11599) standing up the best and Karmont going down the worst. Test weights were extremely high, and yields ranged from 67.7 to 85.4 bushels per acre. Nebred, Karmont, and Mont. 36-Beloglina x Kanred (C. I. 12108) had the highest yields. For the last two years Karmont, Nebred, and Kharkof have had the highest average yields at this station, while Minturki and Marmin have had the lowest averages.

No winterkilling was reported from Moccasin where a very good crop developed. Maturity was about normal as to time, straw was fairly tall, and grain quality good. From this station bunt data obtained from separate tests are reported, showing that Yogo and Yogo x Oro (Sel. 5) are fairly resistant. Eurska x Minhardi (C. I. 8036) had the highest yield, and for the three-year average is exceeded by Yogo. This strain is beardless, has good grain quality but was never released because of susceptibility to bunt. Minturki x Beloglina-Buffum (C. I. 11661), Newturk, and Mont. 36-Beloglina x Kanred (C. I. 12108) all yielded higher than Yogo. Yogo has had the highest 3-year average yield, while Marmin and Nebred have had the lowest ones.

The varieties at Havre all ripened on the same day, straw varied only slightly in height, test weights were for the most part just a little less than 60 pounds per bushel, and yields ranged from 44.2 down to 35.6 bushels per acre. Yogo had the highest yield, followed by Mont. 36-Beloglina x Kanred (C. I. 12108) and Minard x Minhardi (C. I. 8889). Marmin and Turkey x Minessa

(C. I. 8028) had the lowest average yields. For the period 1940-42 Yogo, Kharkof, and Minhardi x Minturki (C. I. 8034) ranked the highest.

Table 1. - Agronomic and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 21 experiment stations in the hard red winter wheat area in 1942, and average yields for 1940-42.

Chillicothe, Texas
(Four plots)

Variety or cross	C.I. number	Date Headed	Leaf rust	Weight per bushel	Average acre Yield	Yield average 1940-42	Yield Rank
		May	Pct.	(lbs.)	(Bu.)	(Bu.)	
Early Blackhull x Tenmarq	11952	1	15	59	12.9		
Red Chief	12109	4	10	59	11.1		
Comanche (from Manhattan)	11673	9	5	58	10.5		
Early Blackhull	8856	1	15	58	9.3	10.1	3
Denton	8265	12	T	55	7.9	9.4	6
Comanche	11673	9	5	56	7.8	9.5	5
Kan. H. Fed. x Tenmarq	12105	3	T	57	7.3		
Blackhull	6251	5	15	57	7.1	9.1	8
Chiefkan	11754	5	10	57	6.9	9.4	6
Martin x Tenmarq 3	11805	11	5	53	5.2	10.7	1
Kan. H. Fed. x Tenmarq	12106	4	10	56	4.6		
Tenmarq	6936	12	10	53	4.3	10.2	2
Kawvale x Tenmarq	11956	12	T	53	4.2		
Certified Turkey	1558	12	30	54	3.5	8.0	10
Cheyenne	8885	12	30	54	3.2	7.0	11
Pawnee	11669	12	T	53	2.9	8.6	9
Mediterranean	11587	5	T	55	2.7	10.0	4
Kanred	5146	12	15	54	2.5	6.3	12
Kharkof	1442	12	10	54	2.3	6.1	13
Kawvale	8180	12	5	49	1.7	5.8	14

Standard error of a difference between the mean yields of any two varieties = 0.62 bushels.

25706vh-2/43

Table 1 (Continued)

Bushland, Texas

(Four 1/40.4 - acre plots: seeded November 10, 1941)

Variety or cross	C.I. number	Date Headed	Date Ripe	Height	Weight per bushel	Average acre Yield	Yield Av. 1940-42	Yield Rank
		May		(In.)	(lbs.)	(Bu.)	(Bu.)	
Early Blackhull	8856	15	21	32	58.8	20.1	14.3	7
Comanche	11673	25	29	31	58.3	19.2	18.9	2
Blackhull	6251	26	29	32	59.9	18.9	14.0	9
Chiefkan	11754	26	30	33	61.1	18.4	18.6	3
Early Blackhull x Tenmarq	11952	20	24	31	60.6	17.4		
Kanred H. Fed. x Tenmarq	12106	24	28	31	58.6	17.2		
do.	12110	26	30	30	58.8	16.8		
Pawnee	11669	26	1	28	58.5	16.7	19.2	1
Tenmarq	6936	27	1	29	58.0	16.0	16.7	4
Kawvale x Tenmarq	11956	28	1	28	58.1	14.9		
Kanred H. Fed. x Tenmarq	12105	25	30	30	59.9	14.8		
Kanred	5146	29	2	27	59.0	14.2	15.0	6
Kawvale	8180	29	1	27	58.0	14.1	16.1	5
Cheyenne	8885	31	3	26	59.9	13.5	14.3	7
Red Chief	12109	27	30	32	61.9	12.7		
Kharkof	1442	31	4	27	58.1	12.6	13.9	10
Certified Turkey	1558	29	2	27	59.0	11.9	13.1	11

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

25706vh-2/43

Table 1 (Continued)

Lawton, Oklahoma:

(Three .01332-acre plots; seeded October 10; emerged October 21, 1941)

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Leaf rust	Wt. per bushel	Ave. acre Yield	Yield Av. 1940-42	Yield Rank
				(In.)	(Pct.)	(lbs.)	(Bu.)	(Bu.)	
Oro x Tenmarq	11672	4/28	6/6	36	5	59	28.4	28.0	1
Early Blackhull x Tenmarq	11952	4/20	5/31	36	90	62	27.5		
Kawvale x Tenmarq	11956	5/2	6/8	36	1	60	24.8		
Early Blackhull	8856	4/20	5/31	36	90	62	24.2	21.8	6
Comanche	11673	4/29	6/6	34	25	60	20.9	24.7	2
Kawvale	8180	5/2	6/8	33	5	59	20.5	22.4	4
Kawvale x Tenmarq	11750	5/1	6/6	35	2	58	20.5	22.6	3
Kanred	5146	5/6	6/9	33	90	59	19.5	21.1	8
Sibley - 62	11523	5/6	6/9	33	90	59	18.9	18.4	11
Blackhull	6251	5/2	6/8	36	90	61	18.0	18.2	12
Tenmarq	6936	5/2	6/9	36	90	57	16.9	21.9	5
Pawnee	11669	5/1	6/9	29	25	59	15.4	21.4	7
Clarkan	8858	5/6	6/9	36	90	61	15.1	17.1	15
Cheyenne	8885	5/6	6/9	31	90	60	14.9	20.5	9
Penquite	11745	5/2	6/9	33	90	58	13.8	16.8	16
Red Chief	12109	5/1	6/9	31	90	61	13.5		
Kharkof	1442	5/8	6/9	31	90	57	12.9	17.6	14
Turkey x Kawvale (La. 35-93)		5/6	6/9	29	20	57	12.3	19.3	10
Chiefkan	11754	5/2	6/10	28	90	59	11.6	18.1	13
Harvest Queen	6199	5/1	6/9	36	90	59	11.4	13.8	18
Turkey	1558	5/10	6/9	31	90	57	11.0	16.7	17

Standard error of a difference between the mean yields of any two varieties = 1.26 bushels.

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Table 1 (Continued)

Stillwater, Oklahoma
(Four plots; seeded October 14, Nov. 8 & 10, 1941)

Variety or cross	C.I. number	Seeding date	Wt. per bushel (Lbs.)	Average acre Yield (Bu.)
Comanche	11673	October 14	57.9	25.5
Pawnee	11669	do	57.8	24.5
Blackhull	6251	do	58.0	24.2
Turkey Sel (I-32-84)	—	do	57.4	23.8
Turkey Sel (I-32-85)	—	do	57.4	23.2
Cheyenne	8885	do	58.2	23.0
Early Blackhull	8856	do	62.1	21.0
Kharkof	1442	do	58.2	20.9
Red Chief	12109	do	59.8	20.8
Kawvale x Tenmarq	11956	November 10	57.7	19.8
Denton	8265	November 8	57.9	19.7
Tenmarq	6936	October 14	57.5	18.8
Chiefkan	11754	do	—	18.2
Early Blackhull x Tenmarq	11952	November 10	58.2	18.2
Fulcaster (No. 307)		November 8	55.0	17.7 1/
Clarkan	8858	do	58.2	17.3
Harvest Queen	6199	do	56.2	16.9
Kanred	5146	do	56.5	16.0
Turkey Sel. (I-32-94)	—	do	55.5	15.8
Turkey Sel (I-32-87)	—	do	57.2	15.6
Eagle Chief	8868	do	56.7	15.1
Fulcaster	6471	do	57.0	15.1
Turkey	1558	do	56.3	13.7
Kawvale	8180	do	55.7	12.2
Redhall	11534	do	56.7	11.9
Fulcaster (Mo. Sel)	—	do	55.5	10.7

Standard error of a difference between the mean yields of any two varieties = 2.42 bushels.

1/ Three replications reported.

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Table 1 (Continued)

Woodward, Oklahoma

(Four 1/47-acre plots - seeded October 6; emerged Oct. 11, 1941)

Variety or cross	C.I. number	Date Headed	Date Ripe	Height	Wt. per bushel	Av. acre yield	Yield Av. 1940-42	Yield Rank
			June	(In.)	(Lbs.)	(Bu.)	(Bu.)	
Comanche	11673	5/1	8	40	61	43.6	34.7	2
Early Blackhull x Tenmarq	11952	4/28	4	38	61	43.2		
Cheyenne x Early Blackhull	12000	4/28	7	38	61	42.8		
Kawvale x Tenmarq	11956	5/7	10	39	61	41.5		
Pawnee	11669	5/2	10	38	62	38.6	34.8	1
Quivira	8886	5/1	9	39	61	37.6	32.1	3
Cheyenne x Early Blackhull	11999	5/4	8	38	62	37.1		
Tenmarq	6936	5/5	12	41	59	36.6	30.5	4
Early Blackhull	8856	4/26	5	38	60	35.0	27.6	6
Cheyenne	8885	5/10	13	39	59	34.6	27.6	6
Kawvale	8180	5/7	11	40	59	33.3	29.5	5
Red Chief	12109	5/4	10	43	61	30.3		
Kanred	5146	5/10	12	40	57	29.8	24.0	10
Blackhull	6251	5/7	12	39	60	28.6	26.0	9
Kharkof	1442	5/11	14	40	54	27.7	23.2	12
Chiefkan	11754	5/7	13	41	58	27.1	26.7	8
Turkey	1558	5/11	12	40	57	25.3	24.0	10

Standard error of a difference between the mean yields of any two varieties = 1.68 bushels.

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Table 1 (Continued)

Hays, Kansas

(Four 1/50-acre plots; 2 on fallow, 2 on cropped land; seeded September 26; emerged October 3, 1941)

Variety or cross	C.I. number	Date Headed	Date Ripe	Height	Wt. per bu.	Av. acre Yield	Yield Av. 1940-42	Yield Rank
		May	June	(In.)	(Lbs.)	(Bu.)	(Bu.)	
Chiefkan	11754	25	22	40	61	27.6	26.7	3
Cheyenne x Tenmarq	11972	25	20	36	59	27.5		
Early Blackhull	8856	16	15	39	58	27.3	26.1	4
Red Chief	12109	26	25	42	62	26.2		
Pawnee	11669	22	19	37	56	25.1	28.0	1
Nebred	10094	28	23	36	58	24.2	21.4	7
Marquillo x Oro	11979	27	23	36	56	24.2		
Blackhull	6251	25	21	38	59	23.9	20.7	8
Tenmarq	6936	24	20	39	57	23.7	24.6	6
Comanche	11673	22	18	38	56	22.8	27.1	2
Cheyenne	8885	30	24	35	60	22.7	20.1	9
Early Blackhull x Tenmarq	11952	18	16	37	58	22.6		
Turkey	1558	28	24	37	59	21.8	18.7	13
Early Blackhull Hybrid	11846	25	19	38	57	21.4	24.9	5
Kharkof	1442	31	24	36	58	19.5	18.8	12
Oro	8220	31	23	37	59	19.3	19.6	10
Kanred	5146	31	24	36	58	19.3	19.2	11

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

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Table 1 (Continued)

Akron, Colorado

(Four 1/41 - acre plots; 2 on fallow, 2 on cornland; seeded September 12; emerged September 18, 1941)

Variety or cross	C.I. number	Winter survival	Date Headed	Date Ripe	Height	Leaf rust	Weight per bushel.	Average acre Yield	Yield Average 1941-42	Rank
		(Pct.)		July	(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Early Blackhull x Tenmarq	11952	98	5/26	5	35	41	62.0	36.5	26.9	1
Kan. Hd. Fed. x Mink-Mint	11970	98	5/28	12	35	22	61.0	36.4	26.2	2
Early Blackhull	8856	98	5/25	4	37	41	61.0	35.6	25.9	3
Chiefkan	11754	98	5/29	12	34	20	63.0	33.7	25.1	4
Pawnee	11669	98	5/28	10	31	1	60.5	32.5	23.9	6
Red Chief	12109	98	5/29	12	32	44	64.0	32.5		
Tenmarq	6936	98	5/30	12	32	14	60.8	31.5	23.7	7
Comanche	11673	98	5/28	10	34	21	60.0	31.1	24.8	5
Blackhull	6251	98	5/29	12	33	33	61.5	30.4	23.4	8
Nebred	10094	98	6/3	13	27	33	60.0	28.0	19.9	9
Kanred x Marquis (Akron No. 44)		98	6/1	13	31	8	60.0	27.4	19.0	10
Minturki	6155	98	6/3	13	31	29	60.0	25.2	18.0	13
Kharkof	1583	94	6/5	13	29	28	60.5	24.7	18.7	11
Kanred	5146	98	6/6	13	30	30	60.5	23.8	18.6	12
Kharkof	1442	96	6/5	13	29	25	59.5	20.8	16.4	15
Cheyenne	8885	98	6/5	13	28	38	59.5	20.4	16.7	14
Alton	1438	91	6/6	13	29	44	61.0	18.7	13.2	16

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

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Table 1 (Continued)

Manhattan, Kansas
(Three 1/45 - Acre plots)

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Lodging Pct.	Lodging Type	Leaf rust[1]	No. of culms per acre	Wt. per bu.	Av. acre yield	Yield Av. 1940-42	Yield Rank
		May	June	(In.)			(Pct.)	(1000)	(Lbs.)	(Bu.)	(Bu.)	
Pawnee (Lincoln)	11669	13	25	42	73	1	22	2830	56.4	39.8		
Early Blackhull x Tenmarq	11952	12	22	41	83	4	72	2080	56.6	36.2	31.7	22
Pawnee (Manhattan)	11669	14	25	42	80	1	22	2600	55.7	34.4	32.7	1
Cheyenne x Tenmarq (Ks 2758)		14	24	42	87	2	15	2330	57.1	34.1		
Cheyenne x Tenmarq	12104	14	24	42	87	2	13	2210	56.6	33.8	30.9	4
Early Blackhull x Tenmarq (Ks 2757)		11	21	42	83	4	73	2170	56.1	33.5		
Cheyenne x Tenmarq (Ks 2759)		19	25	44	82	2	10	2640	56.8	33.5		
Early Blackhull x Tenmarq (Ks 2756)		12	20	43	93	4	78	2370	55.8	32.9		
Kawvale	8180	19	26	45	60	2	22	2140	53.8	32.8	29.3	7
Cheyenne x Tenmarq	12103	18	26	44	87	3	10	2430	56.2	32.3	30.7	5
Cheyenne x Tenmarq	11972	18	25	44	87	2	8	2460	55.9	31.4	31.4	3
Iobred selection	11997	20	29	49	63	1	57	2260	57.5	31.2		
Clarkan	8858	21	27	51	75	3	57	2160	58.4	31.0	25.1	12
Marquillo x Tenmarq (Ks 2755)		13	25	44	70	2	10	2530	53.3	31.0		
Comanche (Manhattan)	11673	13	25	43	83	4	10	2390	54.5	30.9	29.7	6
Quivira	8886	13	24	46	97	1	33	2360	54.6	29.4	28.5	8
Fulcaster	6471	20	25	49	83	3	77	2290	54.7	28.7	24.0	13
Tenmarq	6936	15	26	45	90	5	40	2290	54.3	27.6	27.1	9
Marquillo x Oro	11979	19	29	41	80	2	T	3000	54.7	27.2		
Comanche (Chillicothe)	11673	14	25	44	87	4	10	1910	53.5	27.1	29.7	6
Cheyenne	8885	21	27	44	73	2	82	2560	54.8	26.2	26.8	10
Red Chief	12109	14	29	48	58	1	52	2370	59.3	25.7		
Marquillo x Oro	11851	21	29	44	78	2	T	2990	55.6	25.6		
Early Blackhull Hybrid	11846	16	25	45	93	5	45	2180	54.2	25.5		
Chiefkan	11754	16	27	47	83	4	37	1850	56.9	23.4	26.5	11
Harvest Queen	6199	21	27	52	77	4	82	2030	55.7	22.7	19.9	21
Early Blackhull	8856	11	20	42	97	5	70	1730	54.6	21.9	24.0	13
Oro	8220	22	29	46	85	4	73	2320	55.3	21.8	22.5	17
Kanred	5146	21	26	45	92	1	62	2470	52.5	21.0	22.2	18
Kharkof	1442	22	28	47	87	2	77	2200	53.8	20.7	21.3	19
Nebred	10094	21	26	42	93	4	87	2740	55.3	20.1	23.5	16
Blackhull	6251	22	25	46	93	5	77	2220	54.9	19.3	23.8	15
Turkey	1558	22	27	45	100	2	70	2520	53.6	18.8	21.2	20

Standard error of a difference between the mean yields of any two varieties = 1.77 bushels.

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

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Table 1 (Continued)

Colby, Kansas
(Three 1/50th acre Plots)

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Lodging	Leaf rust	Wt. per bushel	Av. acre yield	Yield Av. 1941-42	Yield Rank
				(In.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Cheyenne x Tenmarq	11972	5/30	7/3	38	0	50	61.0	61.4		
Pawnee	11669	5/27	7/1	43	22	2	62.0	58.3	49.7	1
Red Chief	12109	5/27	7/1	40	37	75	65.0	55.3		
Cheyenne x Tenmarq	12104	5/26	7/1	39	10	67	63.0	55.0		
Cheyenne x Tenmarq	12103	5/28	7/2	40	2	60	61.0	53.9		
Chiefkan	11754	5/28	7/1	41	3	80	63.5	52.7	44.7	2
Early Blackhull x Tenmarq	11952	5/25	6/30	42	50	60	63.0	52.0	44.6	3
Comanche	11673	5/27	7/1	42	25	45	60.0	49.4	43.5	4
Tenmarq	6936	5/28	7/1	40	40	70	58.0	47.1	42.9	5
Nebred	10094	6/1	7/4	42	22	85	60.0	44.7	39.7	6
Blackhull	6251	5/28	7/3	40	35	65	61.0	44.3	38.4	7
Cheyenne	8885	6/1	7/4	36	1	70	61.0	40.9	37.6	8
Early Blackhull	8856	5/25	6/30	41	55	60	63.0	40.3	34.8	11
Kanred	5146	6/1	7/2	37	30	50	56.5	39.9	37.6	8
Turkey	1558	6/2	7/2	36	44	65	59.0	39.2	36.2	10
Kharkof	1442	6/2	7/2	37	40	55	57.5	36.4	34.8	11

Standard error of a difference between the mean yields of any two varieties = 3.56 bushels.

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Table 1 (Continued)

Lincoln, Nebraska

(Five 1/40 - acre plots; seeded September 26; emerged October 4, 1941)

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Lodging	Leaf rust	No. of culms per acre	Wt. per bu.	Av. acre yield	Yield Av. 1940-42	Yield Rank
		May		(In.)	(Pct.)	(Pct.)	(1000)	(Lbs.)	(Bu.)	(Bu.)	
Pawnee (Nebraska)	11669	23	6/25	46	2	8	3721	61.5	55.9	36.1	1
Pawnee (Kansas)	11669	23	6/25	46	15	8	3572	61.3	54.0		
Kawvale x Tenmarq (Sel. 23867)		22	6/25	48	5	13	3385	61.2	53.9		
Kawvale x Tenmarq	11992	23	6/25	49	8	13	3080	60.5	53.0	34.9	2
Comanche	11673	23	6/26	47	25	18	2530	60.8	48.8	27.8	6
Kharkof	1442	29	7/1	47	24	33	2922	59.6	47.4	24.2	14
Hope x Turkey	11964	24	6/27	43	17	10	2754	61.7	46.7		
Clarkan	8858	28	7/1	51	18	13	2499	62.4	46.5	27.7	7
Early Blackhull x Tenmarq	11952	20	6/24	49	31	23	2122	62.3	46.2		
Cheyenne x Blackhull	12112	26	6/30	46	15	38	2760	61.6	46.0		
Cheyenne	8885	27	6/29	46	10	35	2990	60.4	45.9	27.9	5
Cheyenne x Tenmarq	12103	26	6/29	47	26	20	2782	60.3	45.2		
Cheyenne x Tenmarq	12104	22	6/27	47	26	15	2670	61.2	45.0		
Red Chief	12109	25	6/30	47	6	18	2589	62.7	44.8		
Tenmarq	6936	26	6/29	47	30	20	2558	58.9	44.7	25.7	9
Iobred sel.	11997	27	7/1	51	9	20	2458	62.0	43.9	28.1	4
Cheyenne x Tenmarq	11972	27	6/29	46	29	15	2340	59.5	43.2		
Kanred x Blackhull	11844	25	6/29	47	33	33	3059	59.6	43.1	28.5	3
Nebraska No. 60	6250	29	7/1	47	34	40	2866	60.7	43.0	24.5	13
Nebred	10094	27	6/29	45	28	38	2970	60.6	41.2	25.7	9
Turkey (Nebraska No. 1)	——	28	7/1	47	31	38	3074	60.3	40.9	24.7	11
Iobred	6934	28	7/1	48	7	15	3037	61.6	40.8	24.7	11
Chiefkan	11754	25	6/30	46	26	13	2564	62.0	40.5	26.2	8
Blackhull	6251	26	6/26	47	66	30	2813	60.3	28.0	21.3	15

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

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Table 1 (Continued)

North Platte, Nebraska

(Four 1/40 - acre plots; 2 on fallow, 2 on cornland; seeded September 26; emerged October 3, 1941).

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Lodging	Wt. per bushel	Av. acre yield	Yield Av. 1940-42	Yield Rank
		June	July	(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Pawnee	11669	1	7	41	2	59.8	50.8	22.5	2
Red Chief	12109	3	11	48	35	62.5	49.0		
Chiefkan	11754	4	11	47	83	60.8	45.1	23.8	1
Comanche	11763	2	8	43	58	58.3	43.8	21.0	7
Turkey (Local)	----	4	10	44	63	56.0	43.4	22.0	4
Early Blackhull x Tenmarq	11952	5/30	4	41	29	59.0	36.8		
Kanred x Blackhull	11844	3	8	44	75	54.8	35.6	21.7	5
Cheyenne	8885	6	10	46	25	56.0	35.5	21.3	6
Nebred	10094	4	9	44	78	55.5	34.6	22.2	3
Oro	8220	6	12	47	53	55.5	33.0	19.7	9
Nebraska No. 60	6250	6	12	46	60	55.8	31.1	19.0	10
Blackhull	6251	5	9	46	75	55.0	30.8	18.6	12
Tenmarq	6936	5	10	45	83	54.8	30.7	17.6	14
Kharkof	1442	6	12	46	88	53.8	30.3	18.9	11
Turkey selection	11577	5	9	43	60	52.5	28.5	19.8	8
Kinan "Alton"	----	13	13	48	95	56.3	28.2	16.0	15
Kanred	5146	6	10	45	95	52.8	28.1	18.6	12

Standard error of a difference between the mean yields of any two varieties = 2.40 bushels.

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Table 1 (Continued)

Alliance, Nebraska
(Three plots)

Variety or cross	C. I. number	Winter Survival	Date ripe	Height	Weight per bushel	Average acre yield
		(pct.)	July	(In.)	(Lbs.)	(Bu.)
Comanche	11673	78	22	44	58.7	48.5
Cheyenne	8885	87	22	46	58.0	48.2
Pawnee	11669	80	21	42	58.0	44.3
Nebred	10094	87	21	42	59.0	43.6
Kharkof	1442	78	22	47	58.0	43.6
Early Blackhull x Tenmarq	11952	65	21	43	60.0	42.2
Nebraska No. 60	6250	87	23	46	58.0	41.8
Blackhull	6251	73	21	44	58.0	40.9
Kanred x Blackhull	11844	78	22	46	57.5	38.3
Tenmarq	6936	60	23	41	59.0	38.1
Red Chief	12109	55	23	40	61.0	34.0
Chiefkan	11754	60	23	38	59.5	30.1

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

Table 1 (Continued)

Valentine, Nebraska
(Two plots)

Variety or cross	C. I. number	Weight per bushel	Average acre yield
		(Lbs.)	(Bu.)
Kharkof	1442	57.5	9.5
Tenmarq	6936	58.0	9.3
Chiefkan	11754	62.0	8.7
Pawnee	11669	59.5	8.4
Early Blackhull x Tenmarq	11952	60.2	8.1
Red Chief	12109	63.5	8.0
Blackhull	6251	60.5	8.0
Cheyenne	8885	59.0	7.8
Comanche	11673	59.0	7.2
Nebred	10094	58.7	6.5

Standard error of a difference between the mean yields of any two varieties = 1.34 bushels.

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Table 1 (Continued)

Waseca, Minnesota
(Three 1/40 acre plots)

Variety or cross	Minn. No.	C. I. number	Date Headed	Date Ripe	Ht.	lodging	Degree lodged	Grain texture	Wt. per bu.	Av. acre yield	Yield Av. 1940-42	Yield Rank
			June	July	(In.)	(Pct.)		(Pct.)	(Lbs.)	(Bu.)		
H-44 x Minturki 2	2710	---	8	17	43	97	32	78	60.2	43.6		
H-44 x Minturki 3	2714	---	9	18	45	80	28	72	58.8	42.2		
Nebred	2654	10094	8	16	37	90	23	78	59.5	41.6	34.9	2
H-44 x Minturki 2	2711	---	9	18	43	63	26	75	59.0	41.1		
do.	2713	---	9	16	42	97	40	80	60.8	40.9		
do.	2702	---	10	19	44	97	20	78	59.2	40.5		
Kharkof	2318	1442	8	17	43	83	37	78	59.2	39.5	31.2	5
Yogo	2321	8033	9	18	44	100	38	80	59.2	39.5	36.2	1
Minhardi x Marquis	2699	---	9	19	42	27	25	73	57.5	39.4		
Mont. 36 - Bel. x Kanred	2715	12108	9	18	42	97	42	78	58.5	37.6		
Marmin	2614	11502	8	16	43	97	35	73	60.2	37.5	34.4	3
H-44 x Minturki 2	2709	---	9	17	43	100	30	80	60.5	37.4		
Karmount	2322	6700	9	18	41	93	34	78	57.2	37.0		
Minturki	1507	6155	9	18	43	90	23	73	60.0	36.6	32.1	4
H-44 x Minturki 2	2701	---	11	17	47	63	28	72	58.8	36.2		
Hope x Minturki 2	2712	---	7	15	41	100	28	77	59.8	35.9		
H-44 x Minturki 2	2700	---	9	17	40	93	39	68	57.8	30.0		

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

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Table 1 (Continued)

St. Paul, Minnesota
(Three 1/40 - acre plots)

Variety or cross	Minn. No.	C. I. number	Winter Survival	Date Hd.	Date Ripe	Ht.	Lodging	Degree lodged	Grain texture	Wt. per bu.	Av. acre yield	Yield Av. 1940-42	Yield Rank	Leaf rust
			(Pct.)	June	July	(In.)	(Pct.)		(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Pct.)
Mont. 36 - Bel. x Kan.	2745	12108	50	11	21	43	73	21	75	60.2	53.9 1/			10
Minhardi x Marquis	2699		98	9	21	42	33	5	75	59.7	49.2			T
H-44 x Minturki 3	2714		97	10	20	44	70	39	73	58.5	48.9			T
H-44 x Minturki 2	2713		99	9	18	45	67	20	82	61.7	48.7			T
Minhardi	1505	5149	100	11	22	46	23	44	65	60.8	48.5	38.7	2	50
Marmin	2614	11502	98	9	18	45	73	53	73	60.2	48.1	38.7	2	40
Yogo	2321	8033	89	10	21	44	60	23	78	60.8	47.9			10
H-44 x Minturki 2	2710		95	9	19	44	67	25	75	60.7	46.7			T
Minturki	1507	6155	92	10	19	46	40	47	73	60.7	45.4	39.5	1	20
H-44 x Minturki 2	2711		97	9	19	43	40	16	75	59.3	44.8			T
do.	2701		88	12	22	45	35	10	73	59.2	43.1			T
Hope x Minturki 2	2712		97	7	16	44	67	35	78	60.7	42.0			T
H-44 x Minturki 2	2702		91	11	21	45	45	28	73	59.8	41.9			T
do.	2709		97	9	18	44	67	40	80	60.8	39.5			T
do.	2700		93	11	18	43	53	33	72	59.2	38.2			T

Standard error of a difference between the mean yields of any two varieties = 1.50 bushels.

1/ Yield samples were taken from highest yielding portion of plots

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Table 1 (Continued)

Grand Rapid, Minnesota
(Three 1/40 acre plots)

Variety or cross	Minn. No.	C. I. number	Winter survival	Date		Ht.	Black Chaff	Grain Texture	Wt. per bu.	Av. acre yield	Yield	
				Headed	Ripe						Av. 1940-42	Rank
			(Pct.)	June		(In.)		(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Yogo	2321	8033	99	22	8/1	43	L-	68	61.8	37.4	29.4	1
H-44 x Minturki 2	2711	—	100	22	8/1	43	L-	68	59.8	37.4		
Minhard x Marquis	2699	—	100	22	8/1	42	L	65	59.3	36.8		
Mont. 36 - Bel. x Kan.	2715	12108	92	23	7/23	41	L-	65	58.8	36.2		
H-44 x Minturki 3	2714	—	99	22	7/30	41	M	68	58.5	35.9		
H-44 x Minturki 2	2700	—	100	23	7/30	40	L	73	60.3	35.1		
(do)	2709	—	100	19	7/31	44	M	77	61.5	34.6		
do	2713	—	100	22	7/30	40	M	77	61.2	33.9		
Minturki	1507	6155	100	24	8/1	41	L	68	62.0	31.9	27.2	3
H-44 x Minturki 2	2710	—	95	21	8/1	40	L	72	61.2	31.2		
Marmin	2614	11502	100	19	7/30	42	L	67	61.7	30.9	27.7	2
H-44 x Minturki 2	2702	—	99	24	8/2	43	M	65	58.2	29.8		
do	2701	—	99	24	8/1	43	M	65	59.5	28.4		
Hope x Minturki 2	2712	—	98	19	7/31	41	M	77	61.8	27.9		

Standard error of a difference between the mean yields of any two varieties = 3.92 bushels

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Table 1 (Continued)

Dickinson, North Dakota
(Two 1/57.6 - acre plots; seeded September 19; emerged October 3, 1941)

Variety or cross	C. I. number	Date Headed	Date Ripe	Ht.	Rust Leaf	Rust Stem	Wt. per bu.	Av. acre yield	Yield Average 1940-42	Yield Rank
		June	Aug.	(In.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)		
Yogo	8033	26	4	39	48	5	60.5	31.8	16.8	3
Mont. 36-Bel. x Kanred	12108	25	3	36	43	20	61.5	30.9		
Minturki	6155	25	3	37	45	25	61.0	29.3	16.2	4
Nebred	10094	24	2	31	50	t	62.8	28.6	17.8	1
Nebraska No. 60	6250	25	3	37	50	10	60.0	27.4	15.9	5
Marmin	11502	23	2	36	45	5	62.0	25.9	17.0	2
Karmount	6700	25	4	36	48	25	59.6	23.0	13.6	6
Turkey	1571	25	3	36	48	25	60.5	21.5	12.9	7
Beloglina	1543	25	4	36	48	5	60.0	21.1	11.6	9
Kharkof	1442	25	3	36	48	20	61.0	19.9	12.0	8

Standard error of a difference between the mean yields of any two varieties = 3.11 bushels.

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Table 1 (Continued)

Sheridan, Wyoming
(Three 1/55 - acre plots; seeded September 11; emerged September 19, 1941).

Variety or cross	C. I. number	Winter survival	Date		Ht.	Wt. per bu.	Av. acre yield	Yield	
			Headed	Ripe				Av. 1940-42	Rank
		(Pct.)	June	July	(In.)	(Lbs.)	(Bu.)	(Bu.)	
Cheyenne	8885	92	14	15	52	58	44.8	38.4	4
Kanred	5146	93	14	15	50	56	43.7	38.7	1
Kharkof	1442	93	13	15	51	55	42.2	38.5	2
Nebred	10094	93	12	13	45	55	41.6	38.5	2
Karmont	6700	93	13	15	49	56	41.6	37.6	6
Mont. 36 - Bel. x Kanred	12108	93	14	17	52	59	41.3		
Montana No. 36	5549	93	14	16	50	56	41.0	38.3	5
Nebraska No. 60	6250	93	15	15	51	55	38.5	36.6	7
Marmin	11502	93	13	16	52	56	36.7	35.5	9
Minturki	6155	95	14	15	53	57	35.8	33.5	10
Yogo	8033	95	14	16	52	57	35.4	35.6	8

Standard error of a difference between the mean yields of any two varieties = 2.90 bushels.

25706vb-3/43

Bozeman, Montana
(Three 1/56 - acre plots)

Variety or cross	C. I. number	Date		lodging	Wt. per bu.	Av. acre yield	Yield	
		Headed	Ripe				Average 1941-42	Rank
		July	Aug.	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Nebred	10094	5	18	13	63.7	85.4	60.6	2
Karmount	6700	8	21	65	62.8	84.3	61.5	1
Mont. 36--Beloglina x Kanred	12108	8	20	35	63.5	83.4		
Tenmarq	6936	3	18	8	61.7	82.6		
Montana 36	5549	8	21	40	63.3	82.4	60.2	4
Kharkof	1442	8	22	38	63.2	81.4	60.6	2
Newturk	6935	7	22	35	63.7	79.5	56.9	6
Relief	10082	6	19	55	63.1	76.8	57.7	5
Yogo	8033	8	20	40	63.6	76.2	53.5	7
Minturki	6155	8	21	20	63.0	72.6	52.1	9
Ridit x Utah Kanred	11599	8	20	5	62.3	69.2	53.2	8
Marmin	11502	4	18	5	63.4	67.7	49.0	10

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

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Table 1 (Continued)

Moccasin, Montana
(Four 1/50 - acre plots; seed September 16; emerged October 1, 1941)

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Bunt[1/]	Weight per bushel	Average acre yield	Yield Average 1940-42	Yield Rank
			Aug.	(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
Eureka x Minhardi	8036	7/2	5	41	73	62.4	42.2	32.2	2
Minturki x Bel. - Buf.	11661	7/2	6	45	10	61.5	40.8	31.7	4
Newturk	6935	6/30	5	42	75	62.0	40.4	32.2	2
Mont. 36 - Bel. x Kanred	12108	7/2	5	42	15	61.4	40.1	31.7	4
Yogo	8033	7/2	3	42	8	61.9	39.9	32.4	1
Turkey x Kanred	11725	7/3	6	41	53	61.2	38.8	31.3	6
Karmount	6700	6/30	4	41	80	62.3	38.6	29.9	9
Kharkof	1442	6/30	2	41	55	62.1	38.3	29.2	13
Yogo x Oro,	—	7/2	5	38	7	62.4	37.5	30.3	8
Minturki	6155	7/1	4	41	23	61.4	37.4	29.4	11
Turkey	1558	6/29	3	41	65	62.2	37.3	29.4	11
Kanred x Minhardi	11726	7/3	5	40	23	62.4	36.9	30.5	7
Nebred	10094	6/27	1	36	10	62.5	36.8	27.9	15
Marmin	11502	6/29	3	41	14	62.1	34.6	26.4	16
Minard x Minhardi	8888	7/2	6	39	40	63.1	34.4	29.6	10
Bulk Hybrid sel.	11744	6/30	6	40	20	61.8	33.4	28.5	14

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

1/ = Obtained from a separate test.

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Harve, Montana

(Three 1/50 - acre plots; seed September 22; emerged October 2, 1941)

Variety or cross	C. I. number	Date Headed 1/	Ht.	Weight per bushel	Average acre yield	Yield	
						Average 1940-42	Rank
		June	(In.)	(Lbs.)	(Bu.)	(Bu.)	
Yogo	8033	5	33	57.5	44.2	25.7	1
Mont. 36 - Bel. x Kanred	12108	8	32	58.1	42.5		
Minard x Minhardi	8889	7	30	58.1	41.7	23.3	8
Kharkof	1442	6	33	58.3	41.4	24.8	2
Minhardi x Minturki	8034	6	33	57.5	41.1	24.8	2
Nebred	10094	5	29	60.0	40.8	22.2	12
Minturki	6155	7	32	56.8	40.8	23.9	6
Minard x Minhardi	8888	7	32	58.3	40.6	23.1	9
Newturk	6935	4	32	58.4	40.3	24.3	4
Kanred	5146	6	30	58.3	39.7	23.8	7
Larmont	6700	7	32	56.3	39.2	24.0	5
Montana No. 36	5549	6	31	56.1	37.8	22.7	10
Minhardi x Minturki	8215	7	31	56.8	36.9	22.7	10
Marmin	11502	7	34	58.1	36.7	20.1	14
Turkey x Minessa	8028	9	31	56.6	35.6	21.9	13

Standard error of a difference between the mean yields of any two varieties = 2.66 bushels.

1/ All ripe July 19

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STANDARD ERRORS

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

The analysis of variance was used for the 1942 yield data at each station. Total variance was obtained and from this was subtracted the variance due to varieties and due to replications, the remainder considered as due to error. 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 of an average of averages was determined by the formula:

$$S.E. = \pm \frac{1}{N} \sqrt{a^2 + b^2 + c^2 + \text{---} n^2}$$

where a, b, and c, ---h are the separate standard errors and N = the number of separate averages. The standard error in bushels may be expressed in percent by dividing the standard error by the mean yield and multiplying by 100. The summary of these standard errors is shown in table 2, together with the number of plots and average yields at each station.

Table 2. Number of plots, average yield, and standard errors for the plot test at each cooperating station, 1942.

Station	Number of Plots	Aver. yield of varieties	Single plot	Standard error of a Difference between means	Mean in Bushels	Mean in Percent
		(Bu.)	(Bu.)	(Bu.)		
Texas:						
Chillicothe	4	5.88	0.88	0.62	0.44	7.48
Bushland	4	15.85	1.54	1.09	0.77	4.86
Oklahoma:						
Lawton	3	17.70	1.55	1.26	0.89	5.03
Stillwater	4	18.43	3.42	2.42	1.71	9.28
Woodward	4	34.85	2.39	1.68	1.19	3.41
Kansas:						
Manhattan	3	27.65	2.17	1.77	1.25	4.52
Hays	4	23.47	3.02	2.14	1.51	6.43
Colby	3	48.18	4.37	3.56	2.52	5.23
Colorado:						
Akron	4	28.78	2.98	2.11	1.49	5.18
Nebraska:						
Lincoln	5	45.38	3.53	2.23	1.58	3.48
North Platte	4	36.18	3.40	2.40	1.70	4.70
Alliance	3	41.12	4.23	3.45	2.44	5.93
Valentine	2	8.15	1.34	1.34	.95	11.66
Minnesota:						
Waseca	3	38.62	1.97	1.61	1.14	2.95
St. Paul	3	45.79	1.84	1.50	1.06	2.31
Grant Rapids	3	33.39	4.79	3.92	2.77	8.30
North Dakota:						
Dickinson	2	25.94	3.10	3.11	2.20	8.48
Wyoming:						
Sheridan	3	40.24	3.55	2.90	2.05	5.09
Montana:						
Bozeman	3	78.46	3.79	3.08	2.18	2.78
Moccasin	4	37.97	2.69	1.91	1.35	3.56
Harve	3	39.95	3.26	2.66	1.88	4.71

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 three years (1940-42) are also given.

Table 3 - Summary of average yields of the uniform winter wheat varieties grown in plot tests at 4 stations in the southern district, 1942.

Variety or cross	C. I. number	Average yield in bushels per acre at: Chillicothe	Bushland	Lawton	Woodward	Average
Early Blackhull x Tenmarq	11952	12.9	17.4	27.5	43.2	25.3
Comanche	11673	7.8	19.2	20.9	43.6	22.9
Early Blackhull	8856	9.3	20.1	24.2	35.0	22.2
Kawvale x Tenmarq	11956	4.2	14.9	24.8	41.5	21.4
Tenmarq	6936	4.3	16.0	16.9	36.6	18.5
Pawnee	11669	2.9	16.7	15.4	38.6	18.4
Blackhull	6251	7.1	18.9	18.0	28.6	18.2
Kawvale	8180	1.7	14.1	20.5	33.3	17.4
Red Chief	12109	11.1	12.7	13.5	30.3	16.9
Cheyenne	8885	3.2	13.5	14.9	34.6	16.6
Kanred	5146	2.5	14.2	19.5	29.8	16.5
Chiefkan	11754	6.9	18.4	11.6	27.1	16.0
Kharkof	1442	2.3	12.6	12.9	27.7	13.9
Turkey	1558	3.5	11.9	11.0	25.3	12.9
Standard error of a mean (bushels)		.44	.77	.89	1.19	.43
Standard error of a mean (percent)		7.48	4.86	5.03	3.41	2.70

Districts

Summaries of the yield data for the uniform varieties grown in 1942 and the 1940-42 averages where available are presented in tables 3 to 8.

In the southern district in 1942 yields were reported from only four stations, but at these 14 varieties were grown uniformly. The data are presented in table 3. The variety having the highest average was Early Blackhull x Tenmarq (C. I. 11952), an early strain in the uniform list for the first time. Comanche ranked second and Early Blackhull third. Red Chief, a new variety of the Blackhull group, had an average yield slightly above that of Chiefkan, while the later Turkey types had the lowest average yields. The average yield of Pawnee was about 7 bushels less than for the highest ranking variety, a placing that is relatively lower than usual for the variety. This was caused by relatively poor yields at Chillicothe and Lawton, due probably to greater damage from aphids.

Table 4. - Summary of average yields of winter wheat varieties grown in plot tests at stations in the southern district for all of a part of the period 1940-42.

Variety or cross	C. I. number	Average yield in bushels per acre at: Denton	Chilli-cothe	Bush-land	Lawton	Still-water	Wood-ward	Good-well	Weighted average
Number of years grown		2	3	3	3	1	3	1	
Comanche	11673	19.2	9.5	18.9	24.7	34.5	34.7	20.3	22.3
Pawnee	11669	17.3	8.6	19.2	21.4	35.0	34.8	20.5	21.4
Tenmarq	6936	15.8	10.2	16.7	21.9	33.5	30.5	18.8	20.1
Chiefkan	11754	17.5	9.4	18.6	18.1	33.6	26.7	20.6	19.2
Early Blackhull	8856	17.7	10.1	14.3	21.8	25.3	27.6	23.0	19.1
Blackhull	6251	16.1	9.1	14.0	18.2	39.0	26.0	19.5	18.3
Kawvale	8180	14.8	5.8	16.1	22.4	25.4	29.5	15.3	18.2
Kharkof	1442	10.8	6.1	13.9	17.6	36.0	23.2	16.4	16.0

Table 5. - Summary of average yields of the uniform winter wheat varieties grown in plot tests at 8 stations in the central district, 1942.

Variety or cross	C. I. number	Average Yield in Bushels Per Acre at: Man-hattan	Hays	Colby	Akron	Lincoln	North Platte	Alliance	Valen-tine	Average
Pawnee	11669	34.4	25.1	58.3	32.5	55.9	50.8	44.3	8.4	38.7
Comanche	11673	30.9	22.8	49.4	31.1	48.8	43.8	48.5	7.2	35.3
Early Blackhull x Tenmarq	11952	36.2	22.6	52.0	36.5	46.2	36.8	42.2	8.1	35.1
Red Chief	12109	25.7	26.2	55.3	32.5	44.8	49.0	34.0	8.0	34.4
Chiefkan	11754	23.4	27.6	52.7	33.7	40.5	45.1	30.1	8.7	32.7
Tenmarq	6936	27.6	23.7	47.1	31.5	44.7	30.7	38.1	9.3	31.6
Cheyenne	8885	26.2	22.7	40.9	20.4	45.9	35.5	48.2	7.8	31.0
Nebred	10094	20.1	24.2	44.7	28.0	41.2	34.6	43.6	6.5	30.4
Kharkof	1442	20.7	19.5	36.4	20.8	47.4	30.3	43.6	9.5	28.5
Blackhull	6251	19.3	23.9	44.3	30.4	28.0	30.8	40.9	8.0	28.2
Standard error of a mean (bushels)		1.25	1.51	2.52	1.49	1.58	1.70	2.44	.95	.62
Standard error of a mean (percent)		4.52	6.43	5.23	5.18	3.48	4.70	5.93	11.66	2.24

The average yields of the varieties grown for the period 1940-42 are presented in table 4. A total of 16 station-years' results are summarized and for these years Comanche ranked first followed by Pawnee and Tenmarq. Chiefkan, Early Blackhull, and Blackhull had yields somewhat lower than those for the leading varieties.

Yields were reported from eight stations in the central district in 1942 and these are assembled in table 5. For this district Pawnee had an average yield 3.4 bushels higher than Comanche which ranked second. In third place is Early Blackhull x Tenmarq (C. I. 11952), and the high yield of this variety is surprising for it is hardly thought to be adapted to the central district. Red Chief had a slight advantage over Chiefkan and both ranked above Tenmarq, Cheyenne, and Nebred. Kharkof and Blackhull had the lowest average yields as was the case last year.

The average yields for the 1940-42 period are assembled in table 6. Pawnee and Comanche have been the two leading varieties, followed by Chiefkan, Tenmarq, Cheyenne, and Nebred. Blackhull and Kharkof with the lowest average yields complete the list.

The yields of the varieties grown in the northern district are shown in table 7. Four varieties were grown at eight stations with Mont. 36-Beloglina x Kanred (C. I. 12108) having an average yield slightly above the one for Yogo. Minturki and Marmin had averages that were somewhat lower. Mont. 36-Beloglina x Kanred (C. I. 12108) had the highest average yield at six stations with Nebred ranking second.

Over a 3-year period at 6 stations (table 8) Yogo and Nebred had the highest yields, closely followed by Kharkof, Minturki, and Marmin. For the average of five stations four varieties, Karmont, Kharkof, Nebred, and Yogo, had yields that were nearly the same, while Minturki and Marmin were somewhat lower.

Table 6. - Summary of average yields of winter wheat varieties grown in plot tests at stations in the central district for all or a part of the period 1940-42.

Variety or cross	C. I. number	Average yield in bushels per acre at: Manhattan	Hays	Colby	Akron	Lincoln	North Platte	Alliance	Valentine	Weighted average
Number of years grown		3	3	2	2	3	3	1	1	
Pawnee	11669	32.7	28.0	49.7	23.9	36.1	22.5	44.3	8.4	31.0
Comanche	11673	29.7	27.1	43.5	24.8	27.8	21.0	48.5	7.2	28.3
Chiefkan	11754	26.5	26.7	44.7	25.1	26.2	23.8	30.1	8.7	27.1
Tenmarq	6936	27.1	24.6	42.9	23.7	25.7	17.6	38.1	9.3	25.9
Cheyenne	8885	26.8	20.1	37.6	16.7	27.9	21.3	48.2	7.8	25.2
Nebred	10094	23.5	21.4	39.7	19.9	25.7	22.2	43.6	6.5	24.9
Blackhull	6251	23.8	20.7	38.4	23.4	21.3	18.6	40.9	8.0	23.7
Kharkof	1442	21.3	18.8	34.8	16.4	24.2	18.9	43.6	9.5	22.5

Table 7. - Summary of average yields of 7 varieties of winter wheat grown in plot tests at 8 stations in the northern district, 1942.

Variety or cross	C. I. number	Average yield in bushels per acre at: Waseca	St. Paul	Grand Rapids	Dickinson	Sheridan	Bozeman	Moccasin	Harve	Average yields 8 stations	Average yields 6 stations 1/
Mont. 36-Bel. x Kanred	12108	37.6	53.9	36.2	30.9	41.3	83.4	40.1	42.5	45.7	46.0
Nebred	10094	41.6	—	—	28.6	41.6	85.4	36.8	40.8	—	45.8
Yogo	8033	39.5	47.9	37.4	31.8	35.4	76.2	39.9	44.2	44.0	44.5
Karmont	6700	37.0	—	—	23.0	41.6	84.3	38.6	39.2	—	44.0
Kharkof	1442	39.5	—	—	19.9	42.2	81.4	38.3	41.4	—	43.8
Minturki	6155	36.6	45.4	31.9	29.3	35.8	72.6	37.4	40.8	41.2	42.1
Marmin	11502	37.5	48.1	30.9	25.9	36.7	67.7	34.6	36.7	39.8	39.9
Standard error of a mean (bushels)		1.14	1.06	2.77	2.20	2.05	2.18	1.35	1.88	.68	.75
Standard error of a mean (percent)		2.95	2.31	8.30	8.48	5.09	2.78	3.56	4.71	1.87	2.04

1/ Excluding St. Paul, and Grand Rapids.

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States

In several of the States there were two or more cooperating stations from which data were received in 1942. At some of these stations only the uniform varieties were grown, while at others additional varieties were included. It has been the practice to summarize the data by States by averaging yields from all stations within a State. In 1942, data were reported from more than one station in Texas, Oklahoma, Kansas, Nebraska, Minnesota, and Montana, and summaries have been made up for these.

In Texas, 16 varieties were grown at the two stations and the average yields are shown in table 9. Early Blackhull x Tenmarq (C. I. 11952), Early Blackhull, and Comanche had the highest and the later, Turkey types the lowest yields. For the three years 1940-42, including six station-years Comanche, Chiefkan, and Pawnee ranked the highest.

Yields of 14 varieties from two Oklahoma stations (Stillwater omitted) are shown in table 10. In this case Early Blackhull x Tenmarq (C. I. 11952), Kawvale x Tenmarq (C. I. 11956), and Comanche rank the highest, while Red Chief and Chiefkan are rather far down in the list. For the three-year period Comanche ranked first followed by Pawnee, Tenmarq, and Kawvale.

Data for 14 varieties grown at three Kansas stations are shown in table 11. Cheyenne x Tenmarq (C. I. 11972), Pawnee, and Early Blackhull x Tenmarq (C. I. 11952) ranked in the order named. Red Chief had a slight advantage over Chiefkan, and Comanche was a little higher than Tenmarq. Blackhull and the later varieties had the lowest yields. For the last three years in Kansas the varieties have ranked in the following order for yield: Pawnee, Comanche, Chiefkan, and Tenmarq.

Table 8. - Summary of average yields of 6 winter wheat varieties grown in plot tests in 6 stations in the Northern district for all or a part of the period, 1940-42.

Variety	C. I. number	Average yield in bushels per acre at:								Weighted Average		
		Waseca	St. Paul	Grand Rapids	Dickinson	Sheridan	Bozeman	Moccasin	Harve	6 Stations[1]	Rank	5 stations[2]
Number of years grown		3	3	3	2	3	2	3	3			
Karmont	6700	—	—	—	13.6	37.6	61.5	29.9	24.0	—	—	32.7
Kharkof	1442	31.2	—	—	12.0	38.5	60.6	29.2	24.8	32.3	3	32.5
Nebred	10094	34.9	—	—	17.8	38.5	60.6	27.9	22.2	33.0	2	32.5
Yogo	8033	36.2	—	29.4	16.8	35.6	53.5	32.4	25.7	33.1	1	32.4
Minturki	6155	32.1	39.5	27.2	16.2	33.5	52.1	29.4	23.9	30.8	4	30.5
Marmin	11502	34.4	38.7	27.7	17.0	35.5	49.0	26.4	20.1	30.1	5	29.1

1/ Excluding St. Paul and Grand Rapids.

2/ Excluding Waseca, St. Paul and Grand Rapids.

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Table 9. — Average yield in bushels per acre of winter wheat varieties grown in plot tests in Texas in 1942, and weighted average for 1940-42.

Variety or Cross	C. I. number	Average yield in bushels		
		1942 (2 stations)	1940-42 (6 stations)	Rank
Early Blackhull x Tenmarq	11952	15.2		
Early Blackhull	8856	14.7	12.2	5
Comanche	11673	13.5	14.2	1
Blackhull	6251	13.0	11.6	6
Chiefkan	11754	12.7	14.0	2
Red Chief	12109	11.9		
Kanred-Hard Federation x Tenmarq	12105	11.1		
Kanred-Hard Federation x Tenmarq	12106	10.9		
Tenmarq	6936	10.2	13.5	4
Pawnee	11669	9.8	13.9	3
Kawvale x Tenmarq	11956	9.6		
Cheyenne	8885	8.4	10.7	8
Kanred	5146	8.4	10.7	8
Kawvale	8180	7.9	11.0	7
Turkey	1558	7.7	10.6	10
Kharkof	1442	7.5	10.0	11

Table 10. — Average yield in bushels per acre of winter wheat varieties grown in plot tests in Oklahoma in 1942, and weighted average for 1940-42.

Variety or cross	C. I. number	Average yield in bushels		
		1942 (2 stations)	1940-42 (6 station yrs.)	Rank
Early Blackhull x Tenmarq	11952	35.4		
Kawvale x Tenmarq	11956	33.2		
Comanche	11673	32.3	29.7	1
Early Blackhull	8856	29.6	24.7	5
Pawnee	11669	27.0	28.1	2
Kawvale	8180	26.9	26.0	4
Tenmarq	6936	26.8	26.2	3
Cheyenne	8885	24.8	24.1	6
Kanred	5146	24.7	22.6	7
Blackhull	6251	23.3	22.1	9
Red Chief	12109	21.9		
Kharkof	1442	20.3	20.4	10
Chiefkan	11754	19.4	22.4	8
Turkey	1558	18.2	20.4	10

Table 11. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Kansas in 1942, and weighted average for 1940-42.

Variety or cross	C. I. number	Average yield in bushels		
		1942 (3 stations)	1940-42 (9 station yrs.)	Rank
Cheyenne x Tenmarq	11972	40.1		
Pawnee	11669	39.3	36.8	1
Early Blackhull x Tenmarq	11952	36.9		
Red Chief	12109	35.7		
Chiefkan	11754	34.6	32.6	3
Comanche	11673	34.4	33.4	2
Tenmarq	6936	32.8	31.5	4
Cheyenne	8885	29.9	28.2	6
Early Blackhull	8856	29.8	28.3	5
Nebred	10094	29.7	28.2	6
Blackhull	6251	29.2	27.6	8
Kanred	5146	26.7	26.3	9
Turkey	1558	26.6	25.4	10
Kharkof	1442	25.5	25.0	11

Table 12. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Nebraska in 1942, and weighted averages for 1940-42.

Variety or cross	C. I. number	Average yield in bushels		
		1942 (4 stations)	1940-42 (8 station yrs.)	Rank
Pawnee	11669	42.6	28.6	1
Comanche	11673	39.5	25.3	3
Cheyenne	8885	37.0	25.5	2
Red Chief	12109	36.6		
Early Blackhull x Tenmarq	11952	36.0		
Kharkof	1442	35.8	22.8	6
Chiefkan	11754	34.0	23.6	5
Tenmarq	6936	33.8	22.2	7
Nebred	10094	33.6	24.2	4
Blackhull	6251	29.6	21.1	8

In Nebraska 10 varieties were grown uniformly at four stations (table 12). Pawnee ranked first having had a 3-bushel advantage over Comanche and more than a 5.5 bushel advantage over Cheyenne. Again Red Chief outyielded Chiefkan. At the bottom of the list are Tenmarq, Nebred, and Blackhull. For the three-year period Pawnee, Cheyenne, Comanche, and Nebred ranked in the order named.

An interesting series of Minturki backcrosses were tested at three Minnesota stations (table 13), and several of these yielded very well in

comparison with the standard varieties. Four of the backcrosses yielded more than Minturki and five yielded less.

In Montana seven varieties were grown uniformly at three stations as shown in table 14. Montana 36-Beloglina x Kanred (C. I. 12108), Nebred, and Karmont had the highest average yields, while Minturki and Marmin gave the lowest yields. For the three-year period Karmont, Kharkof, and Yogo have had the best yield records.

Table 13. - Average yields in bushels per acre of winter wheat varieties grown in plot tests in Minnesota in 1942, and weighted averages for 1940-42.

Variety or cross	Minn. No.	C. I. number	Average yield in bus. 1942 (3 stations)	1940-42 (9 station yrs.)	Rank
Montana 36-Beloglina x Kanred	—	12108	42.6		
H-44 x Minturki^3	2714		42.3		
Minhardi x Marquis	2699		41.8		
Yogo		8033	41.6		
H-44 x Minturki^2	2713		41.2		
do	2711		41.1		
do	2710		40.5		
Marmin		11502	38.8	33.6	1
Minturki		6155	38.0	32.9	2
H-44 x Minturki^2	2702		37.4		
do	2709		37.2		
do	2701		35.9		
Hope x Minturki^2	2712		35.0		
H-44 x Minturki^2	2700		34.4		

Table 14. - Average yield in bushels per acre of winter wheat varieties grown in plots in Montana in 1942, and weighted averages for 1940-42.

Variety or cross	C. I. number	Average yield in bushels 1942 (3 stations)	1940-42 (9 station yrs.)	Rank
Montana 36 - Beloglina x Kanred	12108	55.3		
Nebred	10094	54.3	36.9	4
Karmont	6700	54.0	38.5	1
Kharkof	1442	53.7	38.2	2
Yogo	8033	53.4	37.2	3
Minturki	6155	50.3	35.1	5
Marmin	11502	46.3	31.8	6

SUMMARY OF AGRONOMIC DATA

The agronomic (other than yield) and disease data have been summarized for each district for 1942 in tables 15 to 17. 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.

The data for the southern district are presented in table 15. The crop was slightly later than in 1941 but the relative earliness of the varieties remained the same. Early Blackhull had an average heading date of May 1, and Early Blackhull x Tenmarq (C. I. 11952) headed only two days later. In the next maturity group were Red Chief and Comanche which averaged eight days later, while nine days later were Blackhull, Chiefkan, and Pawnee. The latest varieties were Turkey and Kharkof. Ripening dates showed that Early Blackhull x Tenmarq (C. I. 11952) and Early Blackhull matured together and that Red Chief and Blackhull matured earlier than Chiefkan. No great differences were shown for average height except that Cheyenne was the shortest and Blackhull the tallest although the range was only 5 inches. The least leaf rust was reported on Kawvale x Tenmarq (C. I. 11956), while Kawvale, Pawnee, and Comanche all had readings that were relatively low. Turkey and Cheyenne on the other hand had very high averages. Only two varieties, Early Blackhull x Tenmarq (C. I. 11952) and Red Chief, had average test weights above 60 pounds per bushel. Early Blackhull and Blackhull had averages of 59.7 and 59.5 pounds, respectively, while Tenmarq, Turkey, Kawvale, and Kharkof had the lightest average test weights.

Table 15. - Summary of agronomic data other than yield for winter wheat varieties grown at cooperative stations in the southern district, 1942.

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Average Leaf rust	Average Test weight per bushel
		May	June	(inches)	(Pct.)	(pounds)
Number of stations		4	3	3	2	4
Early Blackhull x Tenmarq	11952	3	9	35	53	60.7
Red Chief	12109	9	16	35	50	60.7
Comanche	11673	9	14	35	15	58.8
Early Blackhull	8856	1	9	35	53	59.7
Blackhull	6251	10	16	36	53	59.5
Chiefkan	11754	10	18	34	50	58.8
Tenmarq	6936	12	17	35	50	56.8
Kawvale x Tenmarq	11956	12	16	34	1	58.0
Turkey	1558	16	18	33	60	56.8
Cheyenne	8885	15	18	31	60	58.2
Pawnee	11669	10	16	32	13	58.1
Kanred	5146	14	18	33	53	57.3
Kharkof	1442	16	19	33	50	55.8
Kawvale	8180	13	17	33	5	56.3

Table 16. - Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the central district, 1942.

Variety or cross	C. I. number	Winter survival	Average Date Headed	Average Date Ripe	Average Ht.	Average Lodging	Average Leaf Rust	Average No. culms per acre	Average Test Wt. per bu.
		(Pct.)	May		(In.)	(Pct.)	(Pct.)	(1000)	(pounds)
Number of stations		2	6	7	7	4	4	2	8
Chiefkan	11754	79.0	26	July 5	42	49	38	2207	61.1
Red Chief	12109	76.5	26	July 6	42	34	47	2480	62.5
Pawnee	11669	89.0	24	July 3	40	25	8	3276	59.2
Nebred	10094	92.5	30	July 5	40	55	61	2855	58.4
Blackhull	6251	85.5	28	July 4	42	67	54	2517	58.8
Tenmarq	6936	79.0	27	July 4	41	61	36	2424	57.6
Comanche	11673	88.0	25	July 3	42	49	24	2220	58.4
Cheyenne	8885	92.5	31	July 6	40	27	56	2775	58.6
Early Blackhull x Tenmarq	11952	81.5	22	June 30	41	48	49	2101	60.1
Kharkof	1442	87.0	31	July 6	41	60	48	2561	57.2

In the central district data are averaged for 10 varieties and are presented in table 16. Two stations reported winterkilling, and at these Cheyenne and Nebred were the most hardy and Red Chief, Tenmarq, and Chiefkan the most tender. These data are not entirely in line with what is known of the relative hardiness of the different varieties. Early Blackhull x Tenmarq (C. I. 11952) again demonstrated its earliness, heading two days ahead of Pawnee and three days ahead of Comanche. Nebred and Cheyenne had the latest heading dates. Ripening dates ranged from June 30 for Early Blackhull x Tenmarq (C. I. 11952) to July 6 for Red Chief, Cheyenne, and Kharkof. Heights varied very little between the different varieties although Pawnee, Nebred and Cheyenne were the shortest. Lodging was reported from four stations, and at these Pawnee and Cheyenne stood up the best, while Blackhull, Tenmarq, and Kharkof showed the most lodging. The most leaf rust resistant variety was Pawnee, with Comanche having the next lowest reading, while Nebred and Cheyenne were most susceptible. The culm counts reported from two stations showed Pawnee to have stooled the most, with Nebred and Cheyenne also having high counts. Red Chief was outstanding for test weight with an average of 62.5 pounds per bushel. Chiefkan averaged 61.1 pounds and Early Blackhull x Tenmarq (C. I. 11952) 60.1 pounds. Pawnee ranked fourth with an average of 59.2 pounds per bushel. Kharkof and Tenmarq had the lowest average test weights.

In the northern district seven varieties are compared (table 17) for agronomic data. Mont. 36-Beloglina x Kanred (C. I. 12108) seemed to be a little less winter hardy than some other varieties. Nebred and Marmin had the earliest heading dates and Kharkof the latest. The spread for dates of ripening was very narrow. Average heights showed Nebred to be the shortest, while the rest of the varieties vary only slightly. Lodging figures were high for all varieties, but Nebred, Marmin, and Minturki had the lowest averages. Average test weights covered a narrow range, with Nebred being slightly the heaviest and Karmont the lightest.

Table 17. -Summary of agronomic data other than yield for winter wheat varieties grown at cooperating stations in the northern district in 1942.

Variety or cross	C. I. number	Winter survival	Average Date Headed	Average Date Ripe	Average Height	Lodging	Test weight per bushel
		(Pct.)	June	July	(In.)	(Pct.)	(Lbs.)
Number of stations		3	6	5	5	2	6
Nebred	10094	—	19	29	36	52	60.6
Kharkof	1442	—	25	30	41	61	59.8
Yogo	8033	94.3	21	31	42	70	60.0
Montana 36-Beloglina x Kanred	12108	78.3	21	31	41	66	60.3
Marmin	11502	97.0	19	30	41	51	60.3
Karmont	6700	—	20	31	40	79	59.0
Minturki	6155	95.7	21	31	41	55	59.9

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SUMMARY OF PLOT DATA

The winter wheat crop of 1942 was generally very good with some stations reporting unusually high yields.

In Texas green bugs (aphids) wiped out the crop at Denton, and injured the stands as far west as Chillicothe. The plots at Lawton also were injured slightly by green bugs.

Leaf rust was fairly heavy at some stations, but in spite of heavy straw growth at most stations very little stem rust was noted.

In the southern district Early Blackhull x Tenmarq (C. I. 11952) had the highest average yield. This variety is nearly as early as Early Blackhull and has better straw. It also carried the high test weight of Blackhull.

Pawnee did not yield as well in the southern district in 1942 as it did in 1941.

Pawnee, Comanche, and Early Blackhull x Tenmarq (C. I. 11952) had the highest average yields in the central district. All of these varieties are early and slightly less hardy than Turkey and Kharkof.

In the northern district Montana 36-Beloglina x Kanred (C. I. 12108) demonstrated an ability to yield, but apparently is not hardy enough for Minnesota. Nebred and Yogo yielded well in this district.

In Minnesota strains of H-44 x Minturki back crossed to Minturki were tested and some proved to be better yielders than Minturki.

Comanche made a good record in the southern and central district. An increase plot of the variety at Chillicothe was destroyed by green bugs although some increase seed was obtained at Manhattan and Hays. Definite action has been taken by Kansas, Oklahoma, and Texas to distribute the variety as soon as seed is available.

Pawnee yielded well in the central district, especially in Nebraska. Distribution of the variety in Nebraska was started by releasing 48 bushels of seed to 24 growers in the southeastern part of the State. Foundation seed is being increased on the Agronomy Farm at Lincoln.

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UNIFORM YIELD NURSERY

In the fall of 1941 the uniform yield nursery was seeded at the same 14 stations in the central and southern districts as in 1940. The nursery consisted of 30 varieties and strains, each seeded in three rod-row plots with three to five replications. In table 18 the varieties making up the 1942 nursery, together with State and C. I. numbers are shown.

A comparison of the 1942 list with that of 1941 will show a number of changes in the nursery. Six strains which seemed to be lacking in agronomic value and which were not needed for ecological studies were replaced by newer selections. As soon as a strain is shown to be lacking in some important character, it is omitted from the nursery, although it may be continued at individual stations. The strains having the best performance in the nursery are tested in plot trials. An attempt is also made to avoid too many duplications between the plot and nursery tests.

Table 18.--Varieties of winter wheat grown in the uniform yield nursery, 1942.

Variety or cross	C. I. No.	State or Hybrid No.
Kharkof	1442	
Blackhull	6251	
Early Blackhull	8856	
Nebred	10094	Nebr. No. 1063
Comanche	11673	Kans. No. 2729
Kanred x Blackhull	11844	Nebr. No. 1098
Pawnee	11669	Nebr. No. 1086
Kawvale x Tenmarq	11950	Kans. No. 2726
Early Blackhull x Tenmarq	11952	Kans. No. 2739
Kan.-Hd. Fed. x Minhardi-Minturki	11970	Akron No. 130
Cheyenne x Tenmarq	11972	Kans. No. 2748
Cheyenne x Tenmarq	12103	Kans. No. 2749
Cheyenne x Tenmarq	12104	Kans. No. 2750
Kawvale x Tenmarq	11956	Denton No. 35-34-117
Kanred-Hd. Federation x Tenmarq	11974	Denton No. 37-34-54
Kanred x Hope-Hard Federation	11975	Akron No. 533
Cheyenne x Early Blackhull	11999	Woodward No. 1126
Cheyenne x Early Blackhull	12000	Woodward No. 1127
Blackhull x Cheyenne	12101	H. C. No. 40-102
Blackhull x Tenmarq	12102	H. C. No. 40-115
Kawvale x Tenmarq	11992	Nebr. No. 1114
Hope x Turkey	11964	Nebr. sel. No. 363401
Kan.-Hd. Fed. 2507 x Tenmarq	12106	Denton sel. No. 25-34-44
Kan.-Hd. Fed. 142 x Tenmarq	12105	Denton sel. No. 33-34-303
Cheyenne x Early Blackhull	12114	H. C. No. 40-91
Tenmarq x Oro	12111	Denton No. 70-38-44
Marquillo x Tenmarq	12113	Kans. No. 2755
Marquillo x Oro	11979	Kans. sel. No. 383483
Cheyenne x Blackhull	12112	Nebr. sel. 3120-A-1-7
Kanred-Hd. Fed. 25007 x Tenmarq	12110	Amarillo No. 25-34-116

DATA OBTAINED

In table 19 are presented the data from 12 nurseries. No yields were obtained at Denton because of green bug damage, and from North Platte because of severe lodging. For each station the varieties are listed in order of 1942 yields, and only C. I. numbers are given for identification. Average yields and ranks for the 2-year period 1941-42 are shown wherever possible. Data other than yield are included when the characters concerned seemed to be related to yield or when the data showed differences believed to be of interest.

At Chillicothe no yields were obtained but estimates were taken on amount of green bug damage. These estimates were averaged and the varieties listed in the table in order of severity of damage. C. I. 11669 (Pawnee) and C. I. 11950 (Kawvale x Tenmarq) were estimated to have suffered the most damage. Pawnee was so badly damaged that heading was retarded since the variety is ordinarily earlier than Kharkof. In other tests at Chillicothe and at Lawton, Pawnee seemed to be rather hard hit by aphids. C. I. 10094 (Nebred), a very late variety, and C. I. 8856 (Early Blackhull), very early, had lower readings while C. I. 6251 (Blackhull) and C. I. 12112 (Cheyenne x Blackhull) showed the most resistance or at least the smallest amount of damage.

No irrigated nursery was seeded at Bushland, but the data from dry land are presented. Heading dates ranged from May 12 to 27, and the ripening dates from June 19 to July 1. Test weights per bushel were rather light, and yields ranged from 24.8 to 12.8 bushels per acre. C. I. 12102 (Blackhull x Tenmarq) C. I. 11999 (Cheyenne x Early Blackhull), C. I. 12105 (Kanred-Hd. Federation x Tenmarq), and C. I. 12101 (Blackhull x Cheyenne) had the highest average yields. C. I. numbers 12105, 11950, 11956, and 11669 (Pawnee) have the highest two-year average yields.

At Stillwater dates of heading and yields were reported. Early Blackhull (C. I. 8856) headed 3 days earlier than any other variety, but C. I. numbers

11952, 12111, 12000, and 12104 were fairly early. The highest yield was reported for C. I. 11952 (Early Blackhull x Tenmarq), closely followed by C. I. numbers 11669 (Pawnee), 12106, and 12111. Of the standard varieties Early Blackhull (C. I. 8856) gave the highest yield, while Blackhull (C. I. 6251), Kharkof (C. I. 1442), and Nebred (C. I. 10094) were extremely low.

Complete agronomic data were reported from Woodward. At this station heading started on April 27 and continued until May 14, while ripening extended from June 5 to 16. Straw was of medium height, test weights were generally high, but yields were somewhat lower than usual. C. I. numbers 12000, 11950, 11673 (Comanche), and 11956 gave the highest yields. Five strains yielded more than Early Blackhull (C. I. 8856) and eleven hybrid selections were above Blackhull (C. I. 6251). Pawnee (C. I. 11669) yielded less than Comanche (C. I. 11673), the same as in the plot test at this station. For the last two years Early Blackhull x Tenmarq (C. I. 11952) has had the highest average yield, followed by C. I. numbers 12105, 11974, and 12106. Here again the late, standard varieties ranked very low in yield.

Early Blackhull (C. I. 8856) was three days earlier in heading than was C. I. 11952 at Manhattan, while two varieties were marked headed respectively 15 and 14 days later than Early Blackhull. Straw heights ranged from 39 to 46 inches and lodging percentages were very high. The least amount of lodging recorded for any variety was 78 percent for C. I. 12104. Leaf rust readings indicated that C. I. numbers 11964, 11979, and 11956 were the most resistant, while for loose smut C. I. numbers 12113, 12106, 11979, and 11974 had the highest counts. Test weights per bushel were light, the highest reading being 57.5 and the lightest 46.5 pounds per bushel. The yield range was unusually wide, varying from 34.7 to 9.2 bushels per acre. The highest yields were recorded for C. I. numbers 11952, 11964, 11992, and 12110. At this station the earlier varieties

tended to outyield the later ones. For the two-year average, C. I. numbers 11952 ranks first, closely followed by C. I. numbers 11992, 11950, 11964, and 11669 (Pawnee). For the lower yielding varieties the 2-year average yields are considerably higher than the 1942 yields.

At Hays, the heading period extended from May 15 to May 30, while all varieties ripened during a 9-day period. Straw was somewhat taller than usual and lodging was rather bad. The least lodging was recorded for C. I. numbers 1442 (Kharkof), 11979, 12112, 12103, and 11669 (Pawnee), while C. I. numbers 11952, 12000, and 12106 had the highest figures. Only a small amount of leaf rust developed. The test weights, reported for a part of the varieties, were rather low. C. I. numbers 11669 (Pawnee) and 11970 had the highest yields for 1942, while C. I. numbers 11844, 11952, and 11950 were also fairly high. For the 1941-42 average yield C. I. number 11950 ranked first, followed by C. I. numbers 11669 (Pawnee), 11974, and 11952. In this nursery Blackhull and Kharkof ranked low for both 1942 and 1941-42 average yields.

Complete data were reported from Ames, where there was lodging, leaf rust, Septoria, and loose smut. Some of the strains having the least lodging were C. I. numbers 11992, 12113, and 11979, while C. I. numbers 12000, 8856 (Early Blackhull) and 11844 lodged rather badly. The disease reaction of several strains is worth some notice. For example, C. I. numbers 11950, 11972, and 11673 (Comanche) had low readings for all three diseases, while other strains had low readings for one disease but high for the other two. C. I. numbers 11979 and 12113 were low for leaf rust and Septoria but had high loose smut counts. Notes such as these are very helpful in evaluating the varieties. Test weights were mostly below 60 pounds per bushel, and yields ranged from 43.4 to 31.4 bushels per acre. The highest yielding strains were C. I. numbers 11992, 12110, 11669 (Pawnee), and 12103, while C. I. 8856 (Early Blackhull) was at the bottom of the list. Based on the 2-year average yield, C. I. numbers 10094 (Nebred), 12101,

1442 (Kharkof), and 11950 rank the highest. In general the 1942 yields do not agree too well with the 1941-42 averages.

Straw was very tall at Lincoln, but the nursery did not lodge. A light infection of leaf rust developed and readings are shown. Test weights per bushel were not especially good, with only a few strains being heavier than 60 pounds per bushel. Six strains yielded above 50 bushels per acre, and only three yielded less than 40 bushels. The strains having the highest yields were C. I. numbers 11669 (Pawnee), 11972, and 11992, while such strains as C. I. numbers 11673 (Comanche), 1442 (Kharkof), 10094 (Nebred), and 6251 (Blackhull) had the lower yields. Based on the 1941-42 average yield C. I. number 11992 ranks first followed by C. I. numbers 11669 (Pawnee), 8856 (Early Blackhull), and 11950. The agreement between 1942 and 1941-42 yields is not too good.

A very good crop developed at Alliance with yields only slightly less than those at Lincoln. At this station a few varieties such as C. I. numbers 12105, 12113, and 11979 suffered from winterkilling and their yields may have been reduced for this reason. The range of heading was rather narrow since Early Blackhull was recorded as headed on June 5 and the latest varieties headed June 9. The ripening range was from July 18 to July 22. All varieties had straw from 40 to 49 inches in height, and there was no lodging. Eighteen of the varieties had yields above 40 bushels per acre, while the rest yielded from 30 to 40 bushels per acre. The highest yields were recorded from C. I. numbers 11974, 11956, 11999, and 12110. For the period 1941-42 the following varieties have had the highest average yields, C. I. numbers 12101, 11972, 11669 (Pawnee), and 12103. Seven strains have had average yields higher than the one for Nebred.

Data for dates of heading were reported from Akron, but hot weather ripened all varieties together on July 13. Here again straw was tall but all strains stood up very well. A number of varieties showed resistant to leaf rust especially C. I. numbers 11992, 11669 (Pawnee), 12110, 11956, 12113, and 11979.

Stem rust was reported by infection classes and showed some sharp differences. A few varieties, i.e., C. I. numbers 11992, 11956, 12113, and 11979, were resistant to both rusts. Yields were unusually high ranging from 56.8 to 42.5 bushels per acre. The highest yielding strains were C. I. numbers 11974, 11972, 8856 (Early Blackhull), and 11950, indicating no definite relation between time of maturity and yield. C. I. numbers 11974, 11972, 12105, and 11952 have had the best average yields for the 1941-42 period.

The nursery grew very rank at Ft. Collins, with nearly all varieties showing considerable lodging as usual but C. I. numbers 11979, 12113, and 12106 had the strongest straw. Leaf rust readings were obtained, and those varieties with known resistance had the lower readings. The range of yields was fairly wide with C. I. numbers 11974, 11950, and 11673 (Comanche) above 50 bushels per acre, while C. I. numbers 1442 (Kharkof), 6251 (Blackhull), and 11992 yielded less than 31 bushels per acre. For the two-year average yield C. I. numbers 11974, 11673 (Comanche), and 11950 ranked the highest.

Yields were unusually high at Hesperus and test weights per bushel ranged from 62 to 63.5 pounds per bushel. The varieties yielding the highest were C. I. numbers 6251 (Blackhull), 11972, and 10094 (Nebred), while C. I. numbers 1442, 11975, and 12104 had the lowest yields. For the 1941-42 period C. I. 6251 (Blackhull), 10094 (Nebred), 11673 (Comanche), and 11972 have had the highest average yields.

Table 19. - Agronomic 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 1942, and average yields for 1940-42.

Chillicothe, Texas
(Four Plots)

C. I. number	Date headed	Average Aphid damage
	May	(Pct.)
11669	15	82.3
11950	12	78.8
1442	12	73.8
11956	15	71.3
11972	12	70.0
11974	12	70.0
11992	12	66.0
12106	12	61.3
12110	12	58.8
12103	12	58.8
11673	11	57.5
12101	12	47.5
10094	14	45.0
12111	12	45.0
12102	5	43.8
11975	9	40.0
12105	5	40.0
11844	14	37.5
8856	4	36.3
12000	5	33.8
12113	11	33.8
11979	12	33.8
12104	5	30.0
12114	9	28.8
11964	15	28.8
11999	5	27.5
11952	4	25.0
11970	12	23.8
6251	12	22.5
12112	12	21.3

Stillwater, Oklahoma
(Four Plots)

C. I. number	Date ripe	Average acre yield
	June	(Bu.)
11952	8	23.7
11669	12	23.3
12106	11	22.9
12111	10	22.9
11950	12	22.5
8856	5	22.4
12110	11	22.4
11956	12	21.8
11992	12	20.9
12105	12	20.3
12000	10	19.6
11970	11	19.5
11974	11	19.3
12103	11	19.2
11972	12	19.1
12104	10	18.6
11673	12	18.3
11964	12	17.1
12114	13	16.4
11844	12	16.3
11975	11	16.1
12112	13	16.0
11979	13	15.4
12102	12	15.4
12113	13	15.2
12101	12	14.8
6251	14	14.7
11999	13	14.2
1442	14	13.4
10094	13	13.2

Standard error of a difference between the mean yields of any two varieties = 2.41 bushels.

Table 19 (Continued)

Bushland, Texas
(Dryland)
(Four plots seeded November 11 & 12)

C. I. number	Date Headed	Date Ripe	Height	Kernel plumpness	Weight per bushel	Average acre yield	Yield Av. 1941-42	Yield Rank
	May		(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
12102	24	6/27	30	85	60.0	24.8	25.3	5
11999	25	6/28	28	81	58.0	24.3	23.4	14
12105	22	6/27	31	86	60.0	23.9	29.6	1
12101	26	6/30	28	88	59.0	23.9	23.8	11
12000	14	6/22	26	81	58.0	23.2	22.7	17
11950	24	6/28	29	70	55.0	21.9	27.3	2
11956	26	6/29	30	82	57.0	21.8	26.4	3
12106	18	6/23	32	78	56.5	21.1	23.8	11
12110	25	6/27	30	86	58.0	20.9		
12114	25	6/28	29	88	59.0	20.7		
11844	25	6/30	28	82	58.0	20.7	24.7	9
12103	26	7/1	28	85	58.0	20.5	25.1	7
11974	22	6/26	29	78	55.0	20.1	23.7	13
12111	25	6/28	28	85	59.0	19.8		
11952	14	6/20	30	85	58.5	19.8	23.1	16
6251	24	6/28	26	82	59.5	19.3	19.5	19
11972	26	6/30	26	85	59.0	19.1	25.0	8
8856	12	6/19	30	74	—	19.0	18.8	20
12104	23	6/27	28	91	59.0	18.9	24.1	10
11673	23	6/27	30	77	57.0	17.9	23.3	15
11669	23	6/27	28	72	56.0	17.6	25.5	4
12112	26	6/30	28	87	59.5	17.5		
11975	22	6/28	29	80	56.0	17.4	17.0	23
10094	28	7/1	25	83	58.0	17.3	16.7	24
12113	21	6/26	29	68	53.5	17.1		
11992	22	6/26	32	76	57.0	17.0	25.3	5
11970	23	6/27	30	86	57.5	16.9	18.8	20
11979	26	6/30	26	64	54.0	15.9		
1442	27	6/30	27	84	57.0	15.5	18.6	22
11964	24	6/27	26	73	55.5	12.8	20.5	18

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

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Table 19 (Continued)

Woodward, Oklahoma
(Four - plots; seeded October 10; emerged October 16, 1941).

C. I. number	Date Headed	Date Ripe June	Height (In.)	Weight per bushel (Lbs.)	Average acre yield (Bu.)	Yield Average 1941-42 (Bu.)	Rank
12000	5/1	10	30	61	24.9	25.6	20
11950	5/6	10	31	59	23.6	31.6	10
11673	5/4	11	29	60	23.4	31.4	11
11956	5/7	10	32	60	22.8	32.8	6
11974	5/5	10	30	60	22.7	34.0	3
8856	4/27	5	29	62	22.5	31.1	13
12106	5/3	10	30	61	22.1	33.4	4
11952	4/30	6	31	62	22.0	37.9	1
11999	5/8	11	31	61	22.0	30.0	16
11992	5/6	10	32	59	21.7	32.5	8
12105	5/1	10	31	62	21.1	35.2	2
12101	5/10	14	28	61	20.2	31.4	11
6251	5/12	13	30	60	19.7	26.2	18
11669	5/6	10	29	60	19.0	33.2	5
12110	5/6	11	32	61	17.4		
11964	5/6	10	29	60	17.1	27.4	17
12112	5/11	16	31	61	15.8		
12104	5/5	11	30	62	15.8	31.9	9
12114	5/9	13	30	62	15.8		
12102	5/6	11	32	61	15.6	30.2	15
11972	5/12	15	30	61	14.7	32.8	6
12111	5/9	12	28	60	14.2		
11970	5/8	13	31	60	14.1	24.9	21
1442	5/13	16	30	60	13.6	23.1	22
10094	5/14	14	29	61	12.5	19.8	24
12103	5/10	12	31	61	12.2	30.7	14
11979	5/12	15	27	61*	11.8		
12113	5/7	13	28	61*	10.9		
11975	5/5	15	28	61*	10.8	20.5	23
11844	5/8	15	29	60*	9.9	26.0	19

* Estimates

Standard error of a difference between the mean yields of any two varieties = 3.11 bushels.

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Manhattan, Kansas

(Three plots; seeded October 13-16; emerged October 19-22, 1941)

C. I. number	Dates Headed	Dates Ripe	Height	Lodging	Leaf rust 1/	Loose smut heads 1/	Weight per bushel	Av. acre yield	Yield Av. 1941-42	Yield Rank
	May	June	(In.)	(Pct.)	(Pct.)	per row	(Lbs.)	(Bu.)	(Bu.)	
11952	14	19	43	100	62	5	57.0	34.7	35.2	1
11964	18	22	39	87	3	1	57.3	32.7	31.9	4
11992	20	25	45	90	8	0	55.0	29.8	33.4	2
12110	19	26	46	94	7	0	53.7	28.1		
12103	20	25	44	97	15	9	53.3	27.0	31.0	8
11974	18	24	43	95	28	21	50.0	26.8	30.0	10
12104	17	23	43	78	20	5	57.3	26.5	31.4	6
11669	18	23	42	87	17	0	55.7	26.2	31.9	4
12102	19	25	43	83	72	16	57.3	26.1	28.1	14
11673	16	22	43	85	15	5	54.0	25.9	29.6	11
11956	23	27	43	97	5	0	53.0	24.7	31.4	6
11972	22	26	42	99	17	1	55.7	24.5	30.6	9
8856	11	21	43	100	63	4	55.3	23.4	29.6	11
12000	16	23	43	100	72	3	53.5	22.7	27.1	15
11950	18	23	43	90	8	1	53.0	22.7	32.0	3
12106	17	23	45	100	32	24	53.0	22.2	26.8	16
11970	21	26	45	97	67	6	52.5	21.0	23.1	17
12101	21	25	43	100	75	tr	54.7	20.9	22.8	18
12111	20	25	43	86	15	1	57.5	20.7		
12113	17	25	43	87	7	45	50.0	19.8		
11979	25	30	40	88	3	21	51.5	18.2		
6251	22	24	45	100	67	16	55.0	17.5	19.4	21
12105	19	23	45	98	13	18	52.0	17.5	29.1	13
12114	23	27	44	100	73	2	50.3	15.3		
11844	20	26	44	99	68	2	50.0	15.0	20.8	20
11999	23	25	43	100	75	1	51.5	13.5	21.4	19
11975	18	24	41	98	68	0	49.0	12.8	19.0	22
10094	25	27	40	100	67	3	46.5	10.7	14.0	23
12112	22	27	44	100	78	3	54.3	9.9		
1442	26	28	43	97	67	1	47.5	9.2	13.4	24

Standard error of a difference between the mean yields of any two varieties = 4.72 bushels

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

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Table 19 (Continued)

Hays, Kansas
(Three plots)

C. I. number	Date Headed	Date Ripe	Height	Lodging	Leaf rust	Weight per bushel	Av. acre Yield	Yield Av. 1941-42	Yield Rank
	May	June	(In.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)	
11669	25	23	39	5	0	55	35.2	39.1	2
11970	21	20	41	48	0	56	35.2	36.3	7
11844	22	23	38	8	22	53	32.2	31.0	16
11952	20	16	39	67	0	55	32.2	38.0	4
11950	23	19	39	8	0	54	30.2	41.4	1
12104	22	20	37	25	0	55	38.9	37.1	6
11673	22	23	38	8	20	52	28.5	29.2	18
11974	22	23	39	25	0	53	28.4	38.5	3
12102	24	23	40	17	0	59	28.3	32.2	13
12105	19	21	40	50	0	58	28.3	29.7	17
11972	26	23	38	18	0	58	27.5	37.3	5
8856	15	15	36	30	10	54	26.8	23.2	20
12000	20	20	36	58	0	58	26.8	32.4	12
11999	23	23	36	30	0	57	26.3	33.3	11
12114	24	23	37	13	0	56	26.2		
12110	24	23	39	8	0	56	25.9		
12103	26	23	38	5	0	—	25.0	34.3	9
12111	26	23	37	17	0	54	24.8		
10094	25	23	36	17	10	—	24.5	22.8	22
12113	21	23	40	30	0	52	24.3		
11992	24	20	38	42	0	—	24.0	34.4	8
12106	20	19	42	50	0	—	23.7	33.6	10
12112	26	23	39	5	0	—	23.3		
11964	22	21	37	22	0	—	21.6	31.7	15
11956	25	23	37	17	0	—	21.4	31.9	14
11979	25	23	39	2	0	—	20.8		
6251	24	20	37	8	10	—	19.4	21.8	23
11975	20	20	40	10	0	—	18.9	22.9	21
12101	25	23	38	7	0	—	18.8	28.3	19
1442	30	24	35	3	10	—	17.0	21.1	24

Standard error of a difference between the mean yields of any two varieties = 4.38 bushels.

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Ames, Iowa
(Four plots)

C. I. number	Date ripe	Height	Lodging	Leaf rust	Septoria	Smutted Heads	Wt. per bu.	Average acre yield	Yield Average 1941-42	Rank
		(In.)	(Pct.)	(Pct.)	(Pct.)	(per row)	(Lbs.)	(Bu.)	(Bu.)	
11992	6/28	41	5	32	5	0	57.5	43.4	29.8	6
12110	6/29	39	10	10	10	1	58.5	42.6		
11669	6/28	39	10	40	T	0	58.6	41.1	28.6	8
12103	6/29	38	10	6	5	12	57.8	40.8	30.2	5
11950	6/30	40	25	3	5	0	57.2	39.4	30.8	4
11952	6/29	42	40	54	5	0	59.0	38.8	27.9	11
12111	6/30	41	20	28	10	0	59.1	38.6		
12114	7/1	40	30	72	10	1	59.7	38.5		
11972	6/30	38	15	8	5	7	58.4	37.9	29.4	7
10004	6/30	38	15	60	10	5	59.1	37.6	33.2	1
1442	7/2	36	15	6	10	4	58.7	37.4	31.1	3
12101	6/30	39	25	45	15	5	57.7	37.4	31.5	2
12104	6/29	41	40	9	10	5	58.6	37.0	26.9	13
12102	6/30	40	20	60	10	11	60.1	36.3	26.1	14
11970	6/30	44	40	54	15	15	58.3	36.3	25.4	16
11956	6/28	40	30	40	20	1	58.4	36.1	28.1	10
11974	6/29	40	25	15	10	10	55.6	36.0	26.0	15
12106	6/29	42	15	12	25	31	57.4	35.5	22.5	21
11999	6/30	39	35	45	15	0	58.2	34.6	28.4	9
11673	6/28	39	10	8	5	0	56.4	34.5	24.2	18
12112	7/1	38	25	80	25	3	59.3	34.1		
12113	6/30	39	5	9	T	80	56.5	33.9		
11844	7/2	38	45	45	20	1	58.1	33.2	27.6	12
12000	6/28	39	70	9	35	7	56.9	33.0	24.6	17
11964	6/28	35	10	15	5	3	59.1	32.8	23.2	20
6251	6/30	40	40	45	40	1	58.6	32.5	24.0	19
11979	7/3	38	5	1	5	166	57.6	32.0		
11975	6/29	38	20	28	10	8	57.7	31.4	19.3	23
8856	7/1	38	50	45	15	9	58.4	31.4	21.7	22

Standard error of a difference between the mean yields of any two varieties = 2.46 bushels.

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Table 19. (Continued)

Lincoln, Nebraska
(Five plots; seeded September 25-26; emerged October 3 & 4, 1941)

C. I. number	Date Headed	Date Ripe	Height	Leaf rust	Weight per bushel	Average acre yield	Yield Average 1941-42	Yield Rank
	May	June	(In.)	1/	(Lbs.)	(Bu.)	(Bu.)	
11669	22	27	47	2	59.0	54.5	40.7	2
11972	26	29	48	3-	58.5	52.5	33.8	10
11992	24	27	49	2	58.1	51.7	41.3	1
12102	24	28	50	3	61.7	50.9	36.5	8
12114	25	28	49	3-	60.3	50.8		
12101	25	29	49	3	59.7	50.8	35.1	9
11952	21	25	51	3	60.7	49.7	37.1	7
11974	23	27	50	2	56.5	49.5	30.9	14
12105	21	26	52	2	58.8	49.3	27.9	22
8856	17	23	49	3	61.2	49.1	39.3	3
11964	23	27	47	3-	60.1	48.9	33.0	11
11844	24	28	49	3+	59.0	48.9	37.4	6
11999	22	28	48	3	61.1	48.7	31.7	12
11956	26	29	49	2	58.6	48.5	38.3	5
12103	25	28	48	3-	58.8	48.3	30.8	15
12104	22	27	50	3-	59.1	47.8	30.8	15
11970	23	28	52	3-	58.7	47.4	30.4	17
12113	22	26	49	2	55.2	47.4		
12110	24	29	51	2	58.1	46.8		
12106	21	27	52	3	58.4	45.9	28.7	20
11950	23	28	48	2	57.3	45.7	38.7	4
12112	25	30	49	3+	60.5	44.5		
12000	21	26	50	3	60.6	44.2	31.4	13
11673	23	27	50	2	57.3	44.2	29.5	18
1442	27	29	48	3	59.4	43.5	29.1	19
11979	25	30	47	2	56.9	43.2		
12111	26	30	49	2	59.0	42.1		
10094	25	27	47	3	58.0	39.1	28.3	21
11975	22	29	48	3-	57.5	38.5	22.6	24
6251	25	29	49	3-	59.1	36.2	24.9	23

Standard error of a difference between the mean yields of any two varieties = 3.29 bushels.

1/ 1 and 2 degrees of resistance.
3 and 4 degrees of susceptibility.

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Alliance, Nebraska
(Three plots)

C. I. number	Winter survival (Pct.)	Date Headed June	Date Ripe July	Height (In.)	Weight per bushel (Lbs.)	Average acre yield (Bu.)	Yield Average 1941-42 (Bu.)	Yield Rank
11974	93	7	20	42	58.4	48.2	29.9	6
11956	100	8	19	45	59.8	46.5	27.6	17
11999	93	6	20	45	61.3	46.3	29.8	7
12110	100	7	20	45	58.7	46.3		
11950	97	6	19	42	59.2	45.7	29.0	11
12114	100	9	20	42	59.8	45.3		
12000	100	5	18	42	62.1	45.0	29.2	9
11972	100	9	19	44	60.0	44.6	32.2	2
12101	100	8	20	45	60.4	44.4	32.5	1
12103	100	9	20	47	59.6	43.7	31.3	4
11669	100	5	18	43	58.8	43.6	31.7	3
12111	100	8	20	44	59.5	43.4		
11964	100	7	18	43	60.9	43.0	29.0	11
10094	100	9	19	44	59.0	42.7	29.6	8
11992	100	6	18	46	57.8	41.3	28.3	13
12102	100	8	20	44	61.5	41.2	31.3	4
12112	100	9	21	47	60.6	41.2		
11970	95	8	20	46	58.8	40.4	25.2	20
11844	98	8	20	42	59.8	39.5	27.7	15
11952	87	5	19	42	61.5	39.1	24.9	21
11673	93	6	21	44	59.4	38.5	28.3	13
1442	100	9	20	49	55.6	38.2	29.1	10
12104	93	7	21	43	60.4	38.0	26.9	18
12106	100	5	19	42	59.2	37.8	26.6	19
6251	97	9	20	47	59.9	37.0	27.7	15
11979	78	9	21	45	56.4	36.1		
11975	93	6	22	44	59.0	34.7	21.8	24
12113	75	6	21	43	58.5	34.6		
8856	88	5	19	40	61.7	32.4	22.9	23
12105	73	7	20	41	59.5	30.4	24.2	22

Standard error of a difference between the mean yields of any two varieties = 3.58 bushels.

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Table 19. (Continued)

Akron, Colorado
(Five plots; seeded September 3; Emerged September 15, 1942).

C. I. number	Date Headed 1/	Height	Leaf rust	Stem 2/ rust	Weight per bushel	Average acre yield	Yield Average 1941-42	Yield Rank
		(In.)	(Pct.)		(Lbs.)	(Bu.)	(Bu.)	
11974	6/2	39	53	3	57.5	56.8	35.2	1
11972	6/4	38	35	1	60.0	55.2	35.0	2
8856	5/28	42	58	1	58.5	54.0	33.8	6
11950	6/2	40	12	1	58.0	53.4	32.4	7
11952	5/30	41	55	2	60.5	53.2	34.0	4
11673	6/1	40	33	2	59.0	52.9	30.7	15
12000	5/30	39	63	2-	59.0	52.2	32.3	8
12102	6/2	41	64	1	60.0	51.8	30.4	19
12111	6/3	40	23	2	60.0	51.7		
12106	5/31	40	56	3	58.5	50.7	33.9	5
12105	6/1	41	3	3	59.0	50.7	34.5	3
11964	6/3	39	14	T	58.0	50.5	30.9	13
11992	6/2	40	0	T	58.5	50.3	31.5	11
11669	6/1	40	2	2	58.5	50.2	32.2	9
11970	6/3	45	58	7	58.0	50.1	32.0	10
12110	6/3	41	T-	3	58.0	50.0		
12114	6/3	39	69	2	59.0	49.8		
12101	6/3	40	66	4	60.0	49.6	30.3	20
12103	6/3	39	36	1	59.0	49.4	31.2	12
12104	6/2	39	38	1	58.5	49.0	30.8	14
6251	6/3	42	67	2	59.0	48.6	30.0	21
10094	6/4	40	59	3	59.0	48.6	30.6	17
11956	6/4	39	0	1	59.0	48.6	27.2	23
12113	5/31	39	1	1	57.5	48.2		
11999	6/3	40	69	2+	60.5	48.0	30.7	15
11844	6/3	40	62	3	58.5	47.7	30.5	18
1442	6/5	44	50	4	57.0	47.0	28.0	22
12112	6/4	40	59	4	59.5	47.0		
11979	6/3	38	T-	T	57.5	45.3		
11975	6/2	39	61	1-	57.5	42.5	25.8	24

1/ Hot weather on July 11 & 12, ripened all varieties on July 13.
2/ 1 = most resistant, 7 = most susceptible.

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

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Fort Collins, Colorado
(Five plots)

C. I. number	Date headed	Height	Lodging	Leaf rust	Average acre yield	Yield	
						Average 1941-42	Rank
	June	(In.)	(Pct.)	(Pct.)	(Bu.)	(Bu.)	
11974	6	47	--	10	59.5	64.4	1
11950	6	47	22	9	55.1	55.6	3
11673	6	48	19	10	53.7	56.0	2
12000	6	48	36	27	49.7	52.9	4
11669	6	45	26	3	48.4	50.3	8
12114	8	48	41	34	48.4		
11952	6	47	55	21	48.3	51.0	7
12106	5	50	11	18	45.7	51.4	6
12101	8	46	56	32	44.1	47.0	11
12105	5	49	41	4	44.0	50.0	9
12112	9	48	38	29	43.9		
12104	6	48	27	19	43.3	44.1	15
11844	7	46	48	19	43.1	46.5	13
12113	5	48	10	6	42.8		
12103	9	48	21	16	41.0	43.5	18
11999	8	46	40	23	40.8	45.7	14
11979	8	47	4	T	40.8		
11964	7	47	37	4	40.7	43.2	19
12102	8	48	24	32	40.3	47.6	10
12111	7	48	42	14	38.8		
11970	8	52	29	22	38.8	51.8	5
8856	4	45	71	24	38.0	46.9	12
10094	9	46	52	21	37.4	41.9	21
12110	7	52	34	3	35.9		
11956	9	48	42	2	35.6	44.1	15
11972	9	46	38	15	35.0	43.8	17
11975	6	46	54	28	31.4	42.3	20
1442	10	47	63	19	30.8	39.5	22
6251	7	47	48	19	30.0	38.7	23
11992	7	47	81	3	26.1	38.3	24

Standard error of a difference between the mean yields of any two varieties = 7.15 bushels.

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Table 19 (Continued)

Hesperus, Colorado

(Three plots; seeded September 27, 1941; irrigated June 12, 26, 1942) 1/

C. I. number	Date ripe	Height	Weight per bushel	Average acre yield	Yield	
					Average 1941-42	Rank
	August	(In.)	(Lbs.)	(Bu.)	(Bu.)	
6251	11	42	62.5	86.6	75.7	1
11972	14	40	63.0	85.7	65.2	4
10094	10	41	62.5	82.9	69.4	2
11956	12	41	63.0	81.0	60.6	8
12111	16	44	63.0	80.2		
12105	13	42	63.0	80.0	60.2	9
12106	11	42	62.5	79.7	59.7	10
12114	14	42	63.5	79.1		
11970	12	44	62.5	78.5	55.7	15
11673	13	39	62.5	77.9	65.9	3
11974	11	39	62.5	76.9	62.2	5
12102	12	43	62.0	76.6	61.2	6
11979	17	42	62.0	75.3		
12000	13	39	63.5	75.2	60.8	7
11950	12	41	62.5	72.7	58.1	12
11844	14	41	62.5	72.6	58.9	11
11964	14	41	62.5	70.9	56.1	14
12103	13	42	62.0	70.1	52.5	20
11999	16	41	63.5	69.0	55.4	16
11992	14	41	62.0	67.6	54.7	18
12110	11	42	62.0	65.9		
8856	10	40	62.5	65.8	57.5	13
11669	12	41	62.5	64.5	52.6	19
12101	15	42	62.5	62.8	55.1	17
12113	16	42	62.0	62.4		
11952	10	38	63.0	62.3	49.0	22
12112	17	42	63.0	59.0		
1442	15	42	62.5	58.6	50.7	21
11975	13	41	62.0	54.4	46.9	24
12104	17	42	63.5	53.8	47.1	23

Standard error of a difference between the mean yields of any two varieties = 9.23 bushels.

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STANDARD ERRORS

Standard errors were calculated for each station as outlined on page 34 of this report. In table 20 will be found the number of plots, average yields, and standard errors for the uniform nursery grown at each of the 11 stations.

Table 20. Number of plots, average yield, and standard errors for the uniform yield nursery at each cooperating station in 1942.

Station	Number of plots	Average yield of varieties	Standard error of a		Mean in	
			Simple plot	Difference between means	Bushels	Pct.
		(Bu.)	(Bu.)	(Bu.)		
Texas:						
Bushland (Dry)	4	19.54	3.63	2.56	1.81	9.26
Oklahoma:						
Stillwater	4	18.49	3.41	2.41	1.71	9.22
Woodward	4	17.66	4.40	3.11	2.20	12.46
Kansas:						
Manhattan	3	21.53	5.79	4.72	3.34	15.51
Hays	3	25.82	5.37	4.38	3.10	12.01
Colorado:						
Akron	5	50.10	4.66	2.94	2.08	4.15
Ft. Collins	5	41.71	11.31	7.15	5.06	12.13
Hesperus	3	71.60	11.31	9.23	6.53	9.12
Iowa:						
Ames	4	36.35	3.47	2.46	1.74	4.79
Nebraska:						
Lincoln	5	46.95	5.22	3.29	2.33	4.96
Alliance	3	40.96	4.38	3.58	2.53	6.18

SUMMARY OF NURSERY YIELDS

The yields of the 30 varieties of winter wheat grown at 11 stations are summarized in table 21, where the varieties are listed in order of the 11-nursery average yield. These averages are of interest only insofar as they show the general adaptation of the variety. The more detailed study is possible as the varieties also have been averaged and ranked by States.

Kanred-Hard Federation x Tenmarq (C. I. 11974) had the highest average yield in 1942. The performance of this strain was not especially consistent, since in Texas, Oklahoma, and Iowa it ranked rather low while in Kansas, Nebraska and

Colorado it was among the higher yielding strains. This strain ranked seventh for yield in 1941. Kawvale x Tenmarq (C. I. 11950) ranked second in 1942 with an average yield just one bushel less than the leading variety, having made its best performance in Oklahoma, Iowa, and Colorado. Pawnee and Early Blackhull x Tenmarq (C. I. 11952) were tied for third place. Pawnee had low yields in Texas and Colorado, a medium one in Oklahoma, and good yields at the other stations. Early Blackhull x Tenmarq (C. I. 11952) had its poorest yields in Texas, Nebraska, and Colorado, but was high in Kansas and Oklahoma. Comanche ranked sixth, Early Blackhull twenty-first, Nebred twenty-fourth, Blackhull twenty-fifth, and Kharkof twenty-ninth which gives some idea as to the performance of the new material. Of the ten highest yielding strains, nine are selections from crosses in which Tenmarq was one parent. Two Marquillo hybrids tested for the first time yielded just below Blackhull and a little higher than Kharkof.

Twenty-four varieties have been grown in the nursery for the 2-year period 1941-42 at 10 stations. These data are presented in table 22 where the yields are averaged by States, and the varieties listed in order of yield at all stations. Kawvale x Tenmarq (C. I. 11950) had the highest average yield, being consistently high at all stations except Woodward. Kanred-Hard Federation x Tenmarq (C. I. 11974) ranked second with an average only 0.2 bushel less than for the leading variety. Pawnee ranked third, Cheyenne x Tenmarq (C. I. 11972) fourth, and Early Blackhull x Tenmarq (C. I. 11952) fifth. Comanche ranked ninth, Early Blackhull nineteenth, while Blackhull, Nebred, and Kharkof were twenty-first, twenty-second, and twenty-third, respectively.

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Table 21. - Summary of the average yields of the 30 varieties grown as uniform yield nurseries at 11 stations in the hard red winter wheat region, 1942.

Bushels Per Acre

Variety or cross	C.I. number	Texas		Oklahoma		Av.	Rank	Kansas		Av.	Rank
		Bushland (Dryland)	Rank	Still-water	Wood-ward			Man-hat-tan	Hays		
Kanred-Hd.Fed.xTenmarq	11974	20.1	13	19.3	22.7	21.0	9	26.8	28.4	27.6	5
Kawvale x Tenmarq	11950	21.9	6	22.5	23.6	23.1	1	22.7	30.2	26.5	11
Pawnee	11669	17.6	21	23.3	19.0	21.2	8	26.2	35.2	30.7	2
EarlyBlackhullxTenmarq	11952	19.8	14	23.7	22.0	22.9	2	34.7	32.2	33.5	1
CheyennexEarly Blackhull	12000	23.2	5	19.6	24.9	22.3	5	22.7	26.8	24.8	15
Comanche	11673	17.9	20	18.3	23.4	20.9	10	25.9	28.5	27.2	6
Cheyenne x Tenmarq	11972	19.1	17	19.1	14.7	16.9	19	24.5	27.5	26.0	12
Kawvale x Tenmarq	11956	21.8	7	21.8	22.8	22.3	5	24.7	21.4	23.1	17
Blackhull x Tenmarq	12102	24.8	1	15.4	15.6	15.5	24	26.1	28.3	27.2	6
Kan-Hd. Fed. x Tenmarq	12106	21.1	8	22.9	22.1	22.5	3	22.2	23.7	23.0	18
Cheyenne x Early Black-hull	12114	20.7	10	16.4	15.8	16.1	21	15.3	26.2	20.8	22
Kan-Hd. Fed. x Tenmarq	12105	23.9	3	20.3	21.1	20.7	11	17.5	28.3	22.9	19
Kan-Hd. Fed. x Tenmarq	12110	20.9	9	22.4	17.4	19.9	12	28.1	25.9	27.0	9
Kan-Hd. Fed.xMink-Mint.	11970	16.9	27	19.5	14.1	16.8	20	21.0	35.2	28.1	3
Cheyenne x Tenmarq	12103	20.5	12	19.2	12.2	15.7	23	27.0	25.0	26.0	12
Tenmarq x Oro	12111	19.8	14	22.9	14.2	18.6	13	20.7	24.8	22.8	20
Kawvale x Tenmarq	11992	17.0	26	20.9	21.7	21.3	7	29.8	24.0	26.9	10
Hope x Turkey	11964	12.8	30	17.1	17.1	17.1	18	32.7	21.6	27.2	6
Cheyenne x Early Blackhull	11999	24.3	2	14.2	22.0	18.1	14	13.5	26.3	19.9	23
Blackhull x Cheyenne	12101	23.9	3	14.8	20.2	17.5	15	20.9	18.8	19.9	23
Early Blackhull	8856	19.0	18	22.4	22.5	22.5	3	23.4	26.8	25.1	14
Kanred x Blackhull	11884	20.7	10	16.3	9.9	13.1	28	15.0	32.2	23.6	16
Cheyenne x Tenmarq	12104	18.9	19	18.6	15.8	17.2	16	26.5	28.9	27.7	4
Nebred	10094	17.3	24	13.2	12.5	12.9	30	10.7	24.5	17.6	27
Blackhull	6251	19.3	16	14.7	19.7	17.2	16	17.5	19.4	18.5	26
Marquillo x Tenmarq	12113	17.1	25	15.2	10.9	13.1	28	19.8	24.3	22.1	21
Marquillo x Oro	11979	15.9	28	15.4	11.8	13.6	25	18.2	20.8	19.5	25
Cheyenne x Blackhull	12112	17.5	22	16.0	15.8	15.9	22	9.9	23.3	16.6	28
Kharkof	1442	15.5	29	13.4	13.6	13.5	26	9.2	17.0	13.1	30
Kan. x Hope-Hd. Fed.	11975	17.4	23	16.1	10.8	13.5	26	12.8	18.9	15.9	29
Standard error of a mean (bushels)		1.81		1.71	2.20	1.39		3.34	3.10	2.28	
Standard error of a mean (percent)		9.26		9.22	12.46	7.75		15.51	12.01	9.81	

(Heading for Table 21 (Continued)

Iowa		Nebraska				Colorado					
Ames	Rank	Lincoln	Alliance	Av.	Rank	Akron	Ft. Collins	Hesperus	Av.	Rank	Ave. 11 Stations
36.0	17	49.5	48.2	48.9	2	56.8	59.5	76.9	64.4	1	40.4
39.4	5	45.7	45.7	45.7	13	53.4	55.1	72.7	60.4	3	39.4
41.1	3	54.5	43.6	49.1	1	50.2	48.4	64.5	54.4	17	38.5
38.8	6	49.7	39.1	44.4	15	53.2	48.3	62.3	54.6	15	38.5
33.0	24	44.2	45.0	44.6	14	52.2	49.7	75.2	59.0	5	37.9
34.5	20	44.2	38.5	41.4	22	52.9	53.7	77.9	61.5	2	37.8
37.9	9	52.5	44.6	48.6	3	55.2	35.0	85.7	58.6	7	37.8
36.1	16	48.5	46.5	47.5	6	48.6	35.6	81.0	55.1	13	37.2
36.3	14	50.9	41.2	46.1	10	51.8	40.3	76.6	56.2	11	37.0
35.5	18	45.9	37.8	41.9	21	50.7	45.7	79.7	58.7	6	37.0
38.5	8	50.8	45.3	48.1	4	49.8	48.4	79.1	59.1	4	36.9
—	—	49.3	30.4	39.9	27	50.7	44.0	80.0	58.2	8	36.6
42.6	2	46.8	46.3	46.6	8	50.0	35.9	65.9	50.6	25	36.6
36.3	14	47.4	40.4	43.9	17	50.1	38.8	78.5	55.8	12	36.2
40.8	4	48.3	43.7	46.0	11	49.4	41.0	70.1	53.5	20	36.1
38.6	7	42.1	43.4	42.8	20	51.7	38.8	80.2	56.9	9	36.1
43.4	1	51.7	41.3	46.5	9	50.3	26.1	67.6	48.0	28	35.8
32.8	25	48.9	43.0	46.0	11	50.5	40.7	70.9	54.0	18	35.3
34.6	19	48.7	46.3	47.5	6	48.0	40.8	69.0	52.6	21	35.2
37.4	11	50.8	44.4	47.6	5	49.6	44.1	62.8	52.2	23	35.2
31.4	28	49.1	32.4	40.8	26	54.0	38.0	65.8	52.6	21	35.0
33.2	23	46.9	39.5	44.2	16	47.7	43.1	72.6	54.5	16	34.5
37.0	13	47.8	38.0	42.9	18	49.0	43.3	53.8	48.7	27	34.3
37.6	10	39.1	42.7	40.9	24	48.6	37.4	82.9	56.3	10	33.3
32.5	26	36.2	37.0	36.6	29	48.6	30.0	86.6	55.1	13	32.9
33.9	22	47.4	34.6	41.0	23	48.2	42.8	62.4	51.1	24	32.4
32.0	27	43.2	36.1	39.7	28	45.3	40.8	75.3	53.8	19	32.3
34.1	21	44.5	41.2	42.9	18	47.0	43.9	59.0	50.0	26	32.0
37.4	11	43.5	38.2	40.9	24	47.0	30.8	58.6	45.5	29	29.5
31.4	28	38.5	34.7	36.6	29	42.5	31.4	54.4	42.8	30	28.1
1.74		2.33	2.53	1.72		2.08	5.06	6.53	2.84		.99
4.79		4.96	6.18	3.96		4.15	12.13	9.12	5.24		2.94

Table 22. - Summary of average yields of 24 winter wheat varieties grown in uniform yield nurseries at 10 stations in the hard red winter wheat region, 1941-42.

Bushels Per Acre

Variety or cross	C. I. number	Texas		Oklahoma		Kansas			
		Bushland (Dryland)	Rank	Woodward	Rank	Manhattan	Hays	Average	Rank
Kawvale x Tenmarq	11950	27.3	2	31.6	10	32.0	41.4	36.7	1
Kan.-Hd. Fed. x Tenmarq	11974	23.7	13	34.0	3	30.0	38.5	34.3	4
Pawnee	11669	25.5	4	33.2	5	31.9	39.1	35.5	3
Cheyenne x Tenmarq	11972	25.0	8	32.8	6	30.6	37.3	34.0	6
E. Blackhull x Tenmarq	11952	23.1	16	37.9	1	35.2	38.0	36.6	2
Kan.-Hd. Fed. x Tenmarq	12105	29.6	1	35.2	2	29.1	29.7	29.4	15
Kawvale x Tenmarq	11992	25.3	5	32.5	8	33.4	34.4	33.9	7
Blackhull x Tenmarq	12102	25.3	5	30.2	15	28.1	32.2	30.2	11
Comanche	11673	23.3	15	31.4	11	29.6	29.2	29.4	15
Kawvale x Tenmarq	11956	26.4	3	32.8	6	31.4	31.9	31.7	10
Cheyenne x Tenmarq	12103	25.1	7	30.7	14	31.0	34.3	32.7	8
Kan.-Hd. Fed X Tenmarq	12106	23.8	11	33.4	4	26.8	33.6	30.2	11
Cheyenne x E. Blackhull	12000	22.7	17	25.6	20	27.1	32.4	29.8	13
Blackhull x Cheyenne	12101	23.8	11	31.4	11	22.8	28.3	25.6	20
Cheyenne x Tenmarq	12104	24.1	10	31.9	9	31.4	37.1	34.3	4
Kanred x Blackhull	11844	24.7	9	26.0	19	20.8	31.0	25.9	19
Cheyenne x E. Blackhull	11999	23.4	14	30.0	16	21.4	33.3	27.4	17
Hope x Turkey	11964	20.5	18	27.4	17	31.9	31.7	31.8	9
Early Blackhull	8856	18.8	20	31.1	13	29.6	23.2	26.4	18
Kan.-Hd. Fed. x Mink-Minturki	11970	18.8	20	24.9	21	23.1	36.3	29.7	14
Blackhull	6251	19.5	19	26.2	18	19.4	21.8	20.6	22
Nebred	10094	16.7	24	19.8	24	14.0	22.8	18.4	23
Kharkof	1442	18.6	22	23.1	22	13.4	21.1	17.3	24
Kan. x Hope-Hd. Federation	11975	17.0	23	20.5	23	19.0	22.9	21.0	21

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(Heading for Table 22 (Continued)

Iowa		Nebraska				Colorado					
Ames	Rank	Lincoln	Alliance	Average	Rank	Akron	Ft. Collins	Hesperus	Av.	Rank	Av.
30.8	4	38.7	29.0	33.9	3	32.4	55.6	58.1	48.7	3	37.7
26.0	15	30.9	29.9	30.4	14	35.2	64.4	62.2	53.9	1	37.5
28.6	8	40.7	31.7	36.2	1	32.2	50.3	52.6	45.0	14	36.6
29.4	7	33.8	32.2	33.0	6	35.0	43.8	65.2	48.0	8	36.5
27.9	11	37.1	24.9	31.0	11	34.0	51.0	59.0	44.7	15	35.8
—		27.9	24.2	26.1	23	34.5	50.0	60.2	48.2	6	35.6 1/
29.8	6	41.3	28.3	34.8	2	31.5	38.3	54.7	41.5	21	35.0
26.1	14	36.5	31.3	33.9	3	30.4	47.6	61.2	46.4	11	34.9
24.2	18	29.5	28.3	28.9	18	30.7	56.0	65.9	50.9	2	34.8
28.1	10	38.3	27.6	33.0	6	27.2	44.1	60.6	44.0	17	34.8
30.2	5	30.8	31.3	31.1	9	31.2	43.5	52.5	42.4	20	34.1
22.5	21	28.7	26.6	27.7	21	33.9	51.4	59.7	48.3	5	34.0
24.6	17	31.4	29.2	30.3	15	32.3	52.9	60.8	48.7	3	33.9
31.5	2	35.1	32.5	33.8	5	30.3	47.0	55.1	44.1	16	33.8
26.9	13	30.8	26.9	28.9	18	30.8	44.1	47.1	40.7	22	33.1
27.6	12	37.4	27.7	32.6	8	30.5	46.5	58.9	45.3	13	33.1
28.4	9	31.7	29.8	30.8	13	30.7	45.7	55.4	43.9	18	33.0
23.2	20	33.0	29.0	31.0	11	30.9	43.2	56.1	43.4	19	32.7
21.7	22	39.3	22.9	31.1	9	33.8	46.9	57.5	46.1	12	32.5
25.4	16	30.4	25.2	27.8	20	32.0	51.8	55.7	46.5	10	32.4
24.0	19	24.9	27.7	26.3	22	30.0	38.7	75.7	48.1	7	30.8
33.2	1	28.3	29.6	29.0	17	30.6	41.9	69.4	47.3	9	30.6
31.1	3	29.1	29.1	29.1	16	28.0	39.5	50.7	39.4	23	28.4
19.3	23	22.6	21.8	22.2	24	25.8	42.3	26.9	38.3	24	25.8

1/ No yield from Ames.

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Table 23. - Summary of agronomic data other than yield for 30 varieties of winter wheat grown as uniform yield nurseries at 13 stations in the hard red winter wheat region, 1942.

Variety or cross	C. I. number	Date Headed	Date Ripe	Height	Lodging	Leaf rust	No. loose smuts	Weight per bushel
		May		(In.)	(Pct.)	(Pct.)	(Heads per row)	(Lbs.)
Number of stations		9	9	10	4	5	2	8
Kharkof	1442	28	7/3	40.1	45	30	3	57.2
Blackhull	6251	26	7/1	40.5	49	42	9	59.2
Early Blackhull	8856	17	6/27	39.2	63	40	7	59.9
Nebred	10094	27	7/2	38.6	46	43	4	57.9
Comanche	11673	23	1	40.0	31	17	3	58.2
Kanred x Blackhull	11844	25	2	39.5	50	43	2	58.2
Pawnee	11669	24	6/30	39.3	32	12	0	58.6
Kawvale x Tenmarq	11950	24	30	40.0	36	6	1	57.7
E. Blackhull x Tenmarq	11952	20	27	40.4	66	38	3	60.3
Kan.-Hd. Fed. x Mink-Mint.	11970	24	7/1	43.0	54	40	11	58.3
Cheyenne x Tenmarq	11972	27	2	39.0	43	15	4	59.5
do	12103	26	1	40.3	33	15	11	58.7
do	12104	22	1	40.1	43	17	5	59.8
Kawvale x Tenmarq	11956	26	7/1	40.4	47	9	1	58.6
Kan.-Hd. Fed. x Tenmarq	11974	23	6/30	39.8	48	21	16	56.9
Kan. x Hope-Hd. Fed.	11975	23	7/1	39.4	46	37	4	57.5
Cheyenne x E. Blackhull	11999	24	2	39.7	51	42	1	59.4
do	12000	20	6/29	39.2	66	34	5	59.3
Blackhull x Cheyenne	12101	26	7/2	39.8	47	44	3	59.4
Blackhull x Tenmarq	12102	24	1	41.1	36	46	14	60.5
Kawvale x Tenmarq	11992	24	6/30	41.1	55	9	0	58.1
Hope x Turkey	11964	24	/30	38.3	39	7	2	59.2
Kan. Hd. Fed. 2507 x Tenmarq	12106	22	29	41.7	44	24	28	58.3
Kan. Hd. Fed. 142 x Tenmarq	12105	21	30	41.3	63	4	9	59.2
Chey. x E. Blackhull	12114	25	7/2	40.0	46	50	2	59.2
Tenmarq x Oro	12111	25	2	40.2	41	16	1	59.6
Marquillo x Tenmarq	12113	23	2	40.0	33	5	63	56.8
Marquillo x Oro	11979	26	4	38.9	25	1	94	57.1
Cheyenne x Blackhull	12112	26	3	40.6	42	49	3	59.7
Kan.-Hd. Fed. x Ten.	12110	24	1	41.7	37	4	1	58.5

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SUMMARY OF AGRONOMIC DATA

Data for characters other than yield are averaged and presented in table 23. Since all stations did not report the same data, the number of stations entering the averages is shown at the top of each column.

Early Blackhull is still the earliest variety in the nursery, although Early Blackhull x Tenmarq (C. I. 11952) and Cheyenne x Early Blackhull (C. I. 12000) averaged only three days later in date of heading. Nearly all strains in the nursery are as early as or earlier than Blackhull and all are earlier than Kharkof. Ripening dates bring out about the same differences although the spread is not so great as in the case of date of heading.

Average heights ranged from 38.3 to 43.0 inches with Hope x Turkey (C. I. 11964) being the shortest and Kanred-Hard Federation x Minhardi-Minturki (C. I. 11970) the tallest. In general the average heights ranged from 39 to 41 inches.

Lodging data were reported from four stations and for the most part the averages are rather high. Comanche, Pawnee, Cheyenne x Tenmarq (C. I. 12103), Marquillo x Oro (C. I. 11979) and Marquillo x Tenmarq (C. I. 12113) had the lowest averages. Early Blackhull, Early Blackhull x Tenmarq (C. I. 11952), Cheyenne x Early Blackhull (C. I. 12000), and Kanred-Hard Federation x Tenmarq (C. I. 12105) seemed to have had the weakest straw.

Leaf rust readings were reported from five stations and at these there was a wide range in varietal reaction. Marquillo x Oro (C. I. 11979), Marquillo x Tenmarq (C. I. 12113), Kanred-Hard Federation x Tenmarq (C. I. 12105 and 12110) and Kawvale x Tenmarq (C. I. 11950) were the most resistant, with several other strains showing readings nearly as low.

Loose smut data were reported from two stations and the average counts were low for all varieties except Marquillo x Tenmarq (C. I. 12113) and Marquillo x Oro (C. I. 11979).

Test weight per bushel data were reported from eight stations. Only two strains, Early Blackhull x Tenmarq (C. I. 11952) and Blackhull x Tenmarq (C. I. 12102), had averages above 60 pounds per bushel. All of the other strains had average test weights ranging from 56.8 to 60.0 pounds per bushel.

DATA FROM THE DISEASE NURSERIES

BUNT NURSERY

For convenience, the data from the uniform winter wheat bunt nursery are included in this report. These data (table 24) were secured in cooperation with Agronomists and Pathologists working in the area.

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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION

Bureau of Plant Industry

SUMMARY OF THE GREAT PLAINS UNIFORM WINTER WHEAT BUNT NURSERY, 1942

By C. O. Johnston, Pathologist, and K. S. Quisenberry, Senior Agronomist, Wheat Investigations, Division of Cereal Crops and Diseases

The uniform winter wheat bunt nursery for the Great Plains area was continued in 1942 in the same manner as in previous years. This report presents a summary of the data obtained in 1942, together with the averages for the varieties grown during different periods from 1932 to 1942.

In the fall of 1941, 50 varieties and strains of winter wheat were sown in duplicate, 8-foot rows at ten stations in the Great Plains and at Bozeman, Mont., Kearneysville, W. Va., Beltsville, Md., and Clarkston, Utah. Readings were obtained from all nurseries. The data from St. Paul are not included in the average because the infection was so light. The smut that developed in the Clarkston, Utah, nursery was caused entirely by the so-called dwarf bunt organism and, therefore, the infection percentages are not included in the averages. At Bozeman, Mont., infection was very high for all varieties and apparently caused by a race or races of the bunt organism not common to the other stations so these data are not included in the average. The 1942 average is, therefore, based on the readings from eleven stations. The nurseries included varieties that had shown resistance in previous years and promising new strains supplied by several of the cooperating stations.

Inoculum for most stations was obtained from the previous year's nursery at that station by selecting bunted heads from all infected varieties, and from collections made from farmers' fields in the State where the test was made. For the Manhattan experiment the inoculum was a composite of races known to be present in Kansas. For the Kearneysville and Beltsville tests the seed was inoculated with a composite made up of inoculum from all of the other nurseries. Clean seed was planted in the Clarkston nursery and infection resulted from the soil borne organism.

The varieties are listed (table 1) in order of the average infection at the 11 stations. These averages ranged from 0.4 to 86.4 percent. The average infections for some standard varieties were as follows: Relief, 0.9; Hussar, 1.2; Ridit, 1.7; Nebred, 3.6; Yogo, 4.2; Minturki, 7.8; and Oro, 14.1. Of the susceptible check varieties, Kharkof had an average infection of 40.0; Cheyenne, 42.9; and Chiefkan, 68.3. Two hybrid strains, Oro x Turkey-Florence (Pullman No. 9), and H-44 x Minturki (Minn. MI-29-62) had average infections slightly lower than Relief, and five hybrid strains had infections lower than Ridit. Comanche had an average infection somewhat lower than Oro while that for Pawnee was about equal to Oro. Red Chief had an average nearly 20 percent higher than the one for Chiefkan.

At the bottom of the table are shown the average infections by stations. The highest percentages of infection, with inoculum other than dwarf bunt were obtained at Bozeman, Mont.; Akron, Colo.; Bushland, Tex.; and Fort Collins, Colo. The Akron, Fort Collins, and Bozeman data give some indication that different races may be present at these stations. The behavior of the varieties at Clarkston is of interest in that some of those carrying resistance to the races present in the Plains are also resistant to the dwarf bunt present at Clarkston. In other cases strains that are quite susceptible on the Plains seem to be moderately resistant at Clarkston.

Long-time averages are shown for varieties grown for more than one year. For the period 1932-42, Turkey selection (C.I. 10016), Nebred, and Hussar have the lowest averages. For the 4-year period 1939-42, Relief, Hope x Hussar (C.I. 11834), Hussar, and Ridit have shown the most resistance. For the 2-year average, 1941-42, the varieties rank in much the same order as for 1942. Several of the varieties that have been highly resistant in these tests and are otherwise agronomically desirable are being tested with individual races that have been identified in all of the wheat-growing areas.

Table 1. - Summary of bunt infection on 50 varieties and strains of winter wheat grown in the Great Plains Uniform Winter Wheat Bunt Nursery at 14 stations in 1942, and average bunt infections for 1932-42

Variety or cross	C.I. or selection number	Average percentage of bunt at: Denton, Texas	Bushland, Texas	Stillwater, Okla.	Woodward, Okla.	Manhattan, Kans.	Akron Colo.	Fort Collins, Colo.	Lincoln, Nebr.	North Platte Nebr.	St. Paul, Minn.	Bozeman, Mont.	Kearneysville, W.Va.	Beltsville, Md.	Clarkston, Utah	Average 11 stations 1942 1/	Weighted average 1941 and 1942	1939 to 1942	1932 to 1942
Oro x Turkey-Florence	Pullman No.9	0.0	0.0	0.0	0.0	0.0	2.2	1.2	0.5	0.0	0.0	4.0	0.0	0.0	7.5	0.4	0.3		
H-44 x Minturki[2]	Minn.II-29-62	0.0	0.0	0.0	0.3	0.0	2.1	0.0	1.4	0.0	0.0	60.0	3.0	0.0	52.5	0.6			
Relief	10062	0.0	0.7	0.3	3.3	5.1	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.5	0.9	1.7	1.3	
Marquillo x Minturki	Ks.Sel.BN381231	0.0	3.7	0.3	0.3	0.4	2.0	3.0	0.0	0.2	0.3	52.5	1.0	0.0	65.0	1.0	1.6		
Hussar	4843	0.0	0.0	0.0	1.8	8.4	0.0	1.0	0.0	0.0	0.0	15.0	0.5	1.5	0.0	1.2	2.2	1.8	3.1
Hope x Turkey 1069	N.P. 151	0.0	5.2	0.0	2.0	0.5	5.6	2.6	0.7	0.0	0.0	30.0	0.0	0.0	60.0	1.5	2.3		
Hope x Hussar	11834	1.1	0.7	0.3	5.0	4.5	0.6	1.6	0.3	1.0	0.0	12.5	1.0	0.5	1.5	1.5	2.0	1.4	
Ridit	6703	0.0	2.5	0.0	1.0	4.1	2.0	2.4	3.4	1.9	0.0	20.0	0.0	1.0	7.0	1.7	1.8	2.8	4.2
Ridit x Quivira	Wood.No.1177	0.0	1.7	0.0	1.3	2.0	3.7	2.6	5.2	0.7	0.0	12.5	1.0	0.5	1.5	1.7	2.8		
Turkey selection	11630	0.0	0.0	0.5	0.0	13.1	0.0	6.0	0.0	0.0	0.0	25.0	1.0	0.5	0.0	1.9	3.7		
H-44 x Minturki[2]	Minn.II-29-68	1.6	7.0	0.0	1.0	0.8	6.3	0.8	0.0	1.6	0.0	80.0	3.5	0.5	35.0	2.1			
Mont.36-Bel.(1667)x Kanred	12108	0.0	3.4	0.0	4.5	8.3	2.7	1.0	1.0	2.0	0.0	37.5	1.5	0.0	32.5	2.2			
Martin x Tenmarq[3]	Denton 50-37-92	0.0	0.0	0.0	5.5	14.7	1.1	4.8	0.0	0.0	0.0	25.0	1.0	3.5	0.0	2.8	4.3		
Martin x Tenmarq[3]	Denton 50-37-85	0.0	1.7	0.0	8.3	10.4	0.4	4.8	0.0	0.0	0.0	60.0	3.5	3.5	2.0	3.0	4.0		
H-44 x Minturki[2]	Minn.II-29-72	1.2	8.5	0.0	3.8	1.0	3.3	1.2	0.8	1.8	0.0	62.5	8.5	2.5	20.0	3.0			
Turkey 1069 x Cheyenne	Nebr.Sel.372765	0.0	10.1	0.0	1.0	0.4	6.1	7.0	0.0	0.6	0.0	55.0	6.5	2.5	65.0	3.1	4.6		
Hope x Turkey 1069	Ks.Sel. 383110	0.0	8.3	0.0	3.0	6.6	6.1	4.6	0.0	1.1	0.0	50.0	4.5	2.0	62.5	3.3	3.6		
Turkey selection	10016	0.0	11.0	0.0	3.0	1.1	6.6	4.6	1.5	0.9	0.0	70.0	8.0	1.5	55.0	3.5	5.6	4.1	2.5
Yogo x Oro	Mont. sel. 5	1.9	4.4	0.3	0.5	0.7	14.9	7.6	0.0	0.0	0.0	65.0	4.5	4.0	30.0	3.5			
Nebred	10094	1.3	7.4	0.0	0.0	0.9	11.7	12.8	1.0	0.9	0.0	57.5	3.0	0.5	65.0	3.6	6.8	4.9	3.1
Utah Kanred x Ridit	54A-40	3.6	7.9	0.7	5.8	3.4	2.2	5.0	3.5	3.2	0.0	10.0	2.0	2.0	16.5	3.6			
Turkey 1069 x Quivira	11990	0.0	13.0	0.0	0.0	0.0	13.2	10.8	0.0	0.0	0.0	70.0	0.5	4.5	57.5	3.8	5.7		
Turkey 1005 selection	Nebr.Sel.4F-381	0.0	20.5	0.0	1.3	0.3	6.5	2.2	0.3	1.0	0.0	62.5	13.0	0.0	52.5	4.1	5.9		
Yogo	8033	0.0	9.8	0.0	0.3	1.7	14.9	17.5	0.7	0.0	0.0	77.5	0.0	1.0	40.0	4.2	6.7	5.5	3.6
Turkey selection	11984	0.2	21.5	0.5	4.3	1.1	11.2	4.0	0.0	0.6	0.0	67.5	2.0	2.5	50.0	4.4	5.0		
Turkey 1069 x Quivira	Nebr.Sel. 372704	0.0	13.1	0.0	0.5	0.5	11.7	10.5	0.4	0.2	0.0	57.5	12.5	2.5	65.0	4.7			
Turkey selection	11985	1.0	8.8	0.0	1.5	2.1	16.1	7.4	0.0	1.6	0.4	70.0	9.5	5.0	52.5	4.8	7.1		
Blackhull x Oro	Wood.37h1176-27	0.0	12.7	0.0	0.0	0.3	25.1	11.6	0.0	0.0	0.0	70.0	5.0	0.0	55.0	5.0			
Blackhull x Oro	11961	0.0	4.0	0.0	0.8	0.9	18.7	16.2	0.4	0.0	0.0	67.5	7.0	8.0	10.0	5.1	6.3	5.3	
Turkey 1069 x Tenmarq	Nebr.Sel.372636	0.0	16.3	0.0	0.0	0.4	14.9	12.8	0.0	0.0	0.0	62.5	8.0	4.0	42.5	5.1	7.8		
Blackhull x Oro	Wood.36h922-59	0.0	11.9	0.0	1.0	0.0	15.5	11.9	0.0	0.0	0.0	67.5	12.5	6.5	32.5	5.4			
Oro x C.I. 8034	Mont.Sel. 26	0.5	3.2	0.0	0.0	0.0	34.5	13.2	1.0	0.0	0.0	55.0	5.0	3.0	52.5	5.5			
Blackhull x Oro	Wood.37h1176-46	0.0	9.8	0.0	0.8	0.5	24.4	19.4	0.0	0.0	0.0	62.5	5.0	4.5	17.5	5.9			
C.I. 8034 x Oro	Mont.Sel. 1	0.0	6.3	0.0	1.0	0.2	25.3	23.2	0.4	0.2	0.0	80.0	3.0	8.0	45.0	6.1			
H-44 x Minhardi	Minn. I-38-2	0.2	12.0	1.0	17.5	11.4	9.4	2.6	1.4	7.6	0.0	70.0	8.5	0.0	75.0	6.5			
Blackhull x Oro	Wood.36h931-2	0.0	1.4	0.0	0.0	0.5	24.9	15.9	0.0	0.0	0.0	70.0	20.5	10.0	7.5	6.7			
H-44 x Minturki[2]	Minn. II-29-65	0.0	19.0	0.3	13.7	16.2	8.1	5.3	4.4	5.5	0.0	72.5	7.5	2.0	52.5	7.5			
Minturki	6155	0.0	15.6	2.8	10.0	4.9	9.6	13.9	6.0	6.8	0.0	65.0	7.0	9.5	62.5	7.8	8.4	6.0	5.9
Marquillo x Oro	Ks.Sel.384146	0.0	10.4	0.0	0.0	0.0	39.1	21.0	0.0	0.2	0.0	45.0	15.0	7.0	55.0	8.4			
Comanche	11673	1.0	10.2	0.0	2.0	1.1	36.0	31.8	0.7	2.4	0.0	62.5	9.0	12.0	15.0	9.7	12.5	8.9	
Tenmarq x Oro	Denton 70-37-38	0.4	17.5	0.0	0.0	0.0	28.7	25.2	0.0	0.0	0.0	45.0	10.0	29.0	40.0	10.1	10.6		
Quivira x Fulhard-Oro	Ks.Sel. 396242	0.0	18.9	0.0	0.0	0.0	30.4	22.8	0.0	0.3	0.1	72.5	20.0	22.5	47.5	10.4			
Pawnee	11669	9.4	12.7	4.5	31.2	9.8	22.9	10.6	8.0	18.9	0.0	45.0	12.5	12.0	22.5	13.9			
Oro	8220	9.9	15.0	4.5	11.3	7.2	36.3	32.0	4.8	8.0	0.0	72.5	12.0	14.5	47.5	14.1	15.6	12.1	8.0
Oro x Marquillo-Tenmarq	Ks.Sel.402404	10.0	41.1	3.0	55.8	22.1	15.8	17.0	8.3	12.5	0.0	70.0	32.0	29.5	72.5	22.5			
Kharkof	1442	39.6	70.9	10.8	58.3	33.1	45.2	39.9	17.5	36.1	0.7	77.5	33.5	55.0	80.0	40.0	38.1	38.9	41.8
Early Blackhull x Tenmarq	11952	46.9	67.8	16.5	68.0	14.5	55.8	37.3	16.4	47.2	0.0	80.0	21.0	79.0	70.0	42.8	49.0		
Cheyenne	8885	38.3	48.3	3.8	79.3	23.2	54.5	58.5	18.0	51.3	0.0	75.0	37.0	59.5	47.5	42.9	41.0	45.1	43.6
Chiefkan	11754	72.4	83.8	25.4	80.7	65.7	78.4	80.9	42.1	77.9	0.5	77.5	61.0	83.5	52.5	68.3	67.8	65.1	
Red Chief	12109	83.9	83.0	54.0	96.3	92.4	95.8	93.2	83.1	82.3	2.9	80.0	95.5	91.0	57.5	86.4			
Average		6.5	15.3	2.6	11.7	7.9	18.1	14.9	4.7	7.5	0.1	55.3	10.8	11.8	39.1				

1/ Excluding St. Paul, Bozeman, and Clarkston.

UNIFORM WINTER WHEAT RUST NURSERIES

In tables 25 and 26 are presented data on severity of leaf-rust and stem-rust infection on the 30 varieties of winter wheat grown in rust observation nurseries throughout the country in 1942. These nurseries are maintained from year to year as a part of a rust research program carried on in cooperation with agronomists and pathologists employed in the several States concerned. These preliminary data are included in this report thru the kindness of Dr. H. B. Humphrey. Later, a complete report of these nurseries will be issued and the rust percentages may not agree entirely with those presented here, since the data shown in this less detailed report include only figures for the severity of infection.

Differential data for leaf-rust infection were obtained for the varieties at 20 stations (table 25). In calculating the average, a trace (T) was considered as equal to 0. Among the semi-hard varieties, Hope x Hussar (C. I. 11682), Cheyenne x Tenmarq (C. I. 11972), and Marquillo x Tenmarq (C. I. 12113) had the lowest average infections. Among the hard wheats, Hope x Cheyenne (C. I. 11969), H-44 x Minturki^2 (C. I. 12022), Marquillo x Oro (C. I. 11979), and Hope x Turkey (C. I. 11964) had the lowest averages. The averages for Comanche and Pawnee were substantially less than for Kharkof and Kanred.

Stem rust readings showing differential reaction were reported from 13 stations (table 26). Among the hard wheats four strains showed very low averages, namely, Marquillo x Oro (C. I. 11979), Hope x Turkey (C. I. 11964), Hope x Cheyenne (C. I. 11969), and H-44 x Minturki^2 (C. I. 12022). These four selections had the lowest averages of any wheats in the nursery. Comanche and Pawnee had averages about half as large as those for Kanred.

Table 25. - Severity of leaf rust infection on winter wheat varieties grown in the Uniform Rust Observation Nurseries in 1942.

Variety or cross	C. I. number	Percent severity of leaf rust infection at: Gainsville, Fla.	Experiment, Georgia	Tifton Ga.	Chilhowie, Va.	Blacksburg, Va.	Union, West Va.	Beltsville, Md.	Wooster Ohio	La Fayette, Ind.	Urbana Ill.	Chatham, Mich.
SOFT RED												
Michigan Amber	5620	T	40	75	80	85	55	65	65	90	40	65
Trumbull	5657	5	40	85	65	90	65	80	25	90	40	65
Denton	8265	T	2	40	85	80	30	70	40	10	35	40
Fulcaster	6471	20	65	35	95	85	20	85	40	100	25	65
Mediterranean	3332	10	75	90	90	80	25	80	65	90	25	50
Minhardi	5149	40	25	85	80	95	25	60	25	90	40	65
Trumbull x Fultz Sel.	12220	T	1	3	75	65	T	50	65	10	15	20
Wabash	11384	T	1	25	40	40	1	30	40	10	20	10
Trumbull x Fultz Sel.	12217	20	1	70	55	35	1	35	40	10	10	5
Fultz Sel. x Hungarian Sel.	11850	0	10	50	25	20	T	40	65	25	10	3
Fultz Sel. x Hungarian Sel.	12017	0	25	T	15	15	T	60	25	T	5	2
Wabash x Trumbull	12216	T	2	65	90	25	1	30	40	25	40	15
SEMI-HARD RED												
Hussar	4843	T	25	75	65	50	10	70	25	25	25	20
Kawvale	8180	T	5	40	80	40	10	60	25	50	25	10
Minturki	6155	5	25	75	70	80	10	70	25	75	30	25
Hope x Hussar	11682	0	5	T	5	10	T	75	5	T	5	2
Cheyenne x Tenmarq	11972	T	10	50	10	5	T	40	5	T	10	20
Marquillo x Tenmarq	12113	0	10	60	25	5	T	10	10	50	—	20
HARD RED												
Kanred	5146	T	25	65	50	25	T	55	10	25	25	15
Tenmarq	6936	0	25	70	55	30	1	60	10	65	10	25
Kharkof	1442	0	25	60	70	55	30	50	25	80	20	25
Malakof	4898	0	25	65	65	15	10	65	10	75	25	15
Comanche	11673	0	5	75	20	20	T	60	10	T	5	25
Pawnee	11669	T	1	60	40	10	T	40	25	35	10	10
Kawvale x Tenmarq	11956	0	1	50	55	10	2	60	25	50	15	10
Kawvale x Tenmarq	11992	0	1	75	70	15	T	30	40	80	10	5
Marquillo x Oro	11979	0	1	40	50	20	T	40	25	5	5	3
Hope x Turkey	11964	0	5	75	65	5	1	10	5	2	15	0
Hope x Cheyenne	11969	0	10	45	50	5	2	5	5	2	5	T
H.44-Minturki2	12022	0	10	40	65	20	1	25	10	0	15	T

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Heading for Table 25 (Continued)

C. I. number	Fayetteville, Ark.	Ames, Ia.	Kanawha, Ia.	College Station, Texas	Denton, Texas	Stillwater, Okla.	Manhattan, Kansas	Lincoln, Nebraska	Madison, Wisconsin	Average for 20 Stations
5620	30	50	40	10	25	25	70	70	70	52.5
5657	40	50	40	25	25	35	80	70	70	54.3
8265	2	30	20	1	5	40	50	10	30	31.0
6471	40	60	50	25	45	5	80	60	70	53.5
3332	40	50	50	5	15	75	70	50	90	56.3
5149	85	60	50	50	65	100	85	80	80	64.3
12220	25	10	T	T	0	0	10	5	10	18.2
11384	60	15	T	T	0	0	10	5	2	15.5
12217	25	15	10	T	T	0	15	5	10	18.1
11850	5	10	T	T	T	0	10	3	5	14.1
12017	50	5	T	T	T	0	10	2	5	11.5
12216	75	20	10	T	5	T	50	10	5	25.4
4843	10	30	10	50	30	20	65	70	70	37.3
8180	25	25	10	5	10	2	40	10	10	24.1
6155	25	50	50	50	35	55	80	50	50	46.8
11682	5	5	T	T	5	T	5	10	T	6.9
11972	5	20	20	5	15	3	25	15	20	13.7
12113	35	10	10	5	5	3	60	10	10	16.9
5146	40	30	30	60	35	25	70	30	20	31.8
6936	20	30	30	40	35	15	50	30	30	31.6
1442	20	50	50	30	45	50	80	55	60	45.0
4898	25	40	50	30	35	10	80	65	50	37.8
11673	40	10	10	15	15	5	15	10	10	17.5
11669	10	15	10	T	5	1	40	15	5	16.6
11956	35	10	5	T	2	T	20	10	5	18.3
11992	10	10	5	5	8	3	25	20	5	20.9
11979	15	5	10	T	T	T	5	T	5	11.5
11964	15	10	T	5	T	T	15	20	5	12.7
11969	15	1	T	T	T	T	5	10	1	8.1
12022	5	10	T	5	T	3	5	30	2	12.3

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Table 26. - Severity of stem rust infection on winter wheat varieties grown in the Uniform Rust Observation Nurseries in 1942.

Variety or cross	C. I. number	Percent severity of stem rust infection at: Hartsville, S. C.	Chilhowie, Va.	Blacksburg, Va.	Elk Creek, Va.	Union, W. Va.	La Fayette, Ind.	Chatham, Michigan
SOFT RED								
Michigan Amber	5620	75	75	65	40	10	20	3
Trumbull	5657	70	15	65	40	5	15	5
Denton	8265	90	35	35	30	2	20	3
Fulcaster	6471	80	8	50	50	1	10	5
Mediterranean	3332	95	10	55	45	T	20	10
Minhardi	5149	85	1	65	35	T	30	20
Trumbull x Fultz Sel.	12220	90	20	70	65	T	10	5
Wabash	11384	95	30	75	55	T	15	15
Trumbull x Fultz Sel.	12217	95	40	65	70	T	15	5
Fultz Sel. x Hungarian Sel.	11850	90	T	50	30	T	15	15
Fultz Sel. x Hungarian Sel.	12017	90	3	60	60	T	15	2
Wabash x Trumbull	12216	85	2	65	40	T	5	10
SEMI-HARD RED								
Hussar	4843	100	3	55	50	T	35	5
Kawvale	8180	70	1	40	10	T	5	0
Minturki	6155	80	T	50	25	T	3	2
Hope x Hussar	11682	60	T	T	5	0	0	0
Cheyenne x Tenmarq	11972	70	1	25	15	0	3	0
Marquillo x Tenmarq	12113	80	1	10	T	0	5	0
HARD RED								
Kanred	5146	80	5	30	20	T	20	2
Tenmarq	6936	85	T	25	10	0	5	2
Kharkof	1442	85	3	50	25	T	25	2
Malakof	4898	90	5	30	20	T	15	2
Comanche	11673	50	5	20	5	0	2	0
Pawnee	11669	40	4	25	10	T	2	0
Kawvale x Tenmarq	11956	70	5	40	15	T	2	0
Kawvale x Tenmarq	11992	70	1	60	10	T	2	0
Marquillo x Oro	11979	50	0	5	T	0	0	0
Hope x Turkey	11964	10	T	5	0	T	0	0
Hope x Cheyenne	11969	15	T	3	T	0	0	0
H-44 Minturki[2]	12022	20	0	2	T	0	-	0

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Heading for Table 26 (Continued).

East Lansing, Michigan	College Station, Texas	Still-water, Tex.	Manhattan, Kansas	Lincoln, Nebraska	Madison, Wisconsin	Average for 13 Stations.
5	100	5	T	T	40	33.7
5	100	0	T	T	60	29.2
5	100	T	T	T	40	27.7
10	100	40	T	T	70	32.6
10	100	0	5	T	60	31.5
5	100	0	5	2	50	30.6
5	100	0	20	2	50	33.6
5	100	0	15	2	50	35.2
5	100	0	5	2	50	34.8
5	100	0	10	T	40	27.3
5	100	0	10	T	30	28.8
10	100	0	T	2	30	26.8
5	100	0	5	T	40	30.6
5	80	0	T	T	5	16.6
5	90	0	T	T	5	20.0
5	25	0	T	T	T	7.3
5	75	0	T	T	20	16.5
5	60	0	T	2	10	13.3
10	80	0	T	2	5	19.5
5	80	0	T	5	20	18.2
5	95	0	2	5	40	25.9
5	95	0	T	5	20	22.1
5	30	0	T	T	20	10.5
5	40	0	T	T	10	10.5
5	40	0	T	T	5	14.0
10	40	0	T	T	10	15.6
5	10	0	T	T	2	5.5
10	5	0	T	2	T	2.5
5	T	0	T	1	T	1.8
5	T	0	T	T	T	2.3

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