UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF PLANT INDUSTRY

Division of Cereal Crops and Diseases

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1937

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Lincoln, Nebraska
February, 1938.

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Plant Industry

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by

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EXPERIMENTS IN 1937

The cooperative winter wheat improvement program has been in operation for seven years, during which time no radical changes have been made in the plans. Each year changes are made in the list of uniform varieties for both plot and nursery experiments and at all stations new varieties are being added to the plot tests. More emphasis is being placed on stem rust resistance and with work now in progress at College Station, Texas, and artificial epidemics being created at Manhattan, Kans., and Lincoln, Nebr., available material should be quickly tested and more resistant strains be isolated.

1/ The writer wishes to express his appreciation to Roland O. Weibel and Ronald W. Carpenter, Agents, of Lincoln, Nebr., for their assistance in assembling the data and making all computations in this summary.

This report is a summary of the 1937 data from all cooperating stations as well as a summary of yield data for the 7-year period ending in 1937.

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
Smut		H. A. Rodenhiser
Leaf Rust		C. O. Johnston
Milling and Baking		C. C. Fifield
TEXAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Corn and Small Grains)		P. C. Mangelsdorf
College Station	Agricultural Experiment Station	E. S. McFadden
Denton	Substation No. 6	I. M. Atkins
Amarillo		I. M. Atkins
OKLAHOMA AGRICULTURAL EXPERIMENT STATION:		
Field Crops and Soils		H. F. Murphy
*Lawton	U. S. Dry Land Field Station 1/	W. M. Osborn
Stillwater	A. and M. College	C. B. Cross
*Woodward	Southern Great Plains Field Station 1/	V. C. Hubbard
Goodwell	Panhandle Agr. Expt. Station	H. A. Daniels
KANSAS AGRICULTURAL EXPERIMENT STATION:		
Agronomy		R. I. Throckmorton
Manhattan	Kansas State College	John H. Parker, H. H. Laude
Hays	Ft. Hays Branch Experiment Station	A. F. Swanson
Colby	Colby Branch Station	E. H. Coles
COLORADO AGRICULTURAL EXPERIMENT STATION:		
Agronomy		Alvin Kezer
*Akron	U. S. Dry Land Field Station 1/	J. J. Curtis
Fort Collins	State Agricultural College	D. W. Robertson
NEBRASKA AGRICULTURAL EXPERIMENT STATION:		
Agronomy (Experimental)		T. A. Kiesselbach
Lincoln	Agricultural Experiment Station	K. S. Quisenberry
North Platte	North Platte Substation 1/	L. L. Zook, O. J. Webster
Alliance	Box Butte Experiment Farm	K. S. Quisenberry
Valentine	Valentine Substation	E. M. Brouse
WYOMING AGRICULTURAL EXPERIMENT STATION:		
*Sheridan	U. S. Dry Land Field Station 1/	R. S. Towle
MINNESOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy and Plant Genetics		H. K. Hayes
St. Paul	University Farm	E. R. Ausemus
Waseca	Southeast Experiment Station	R. E. Hodgson
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 Station	R. H. Bamberg, W. B. Nelson
Moccasin	Judith Basin Branch Station	R. H. Bamberg, S. Litzenberger
Havre	Northern Montana Branch Station	J. J. Sturn

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

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. Therefore, the region has been divided into three districts, as shown by the map on the following page, and the varieties grown uniformly at the cooperating experiment stations are somewhat different in each of the three districts. Changes are made from time to time in the list of varieties grown at the various stations. Those for each district in 1937 are as follows:

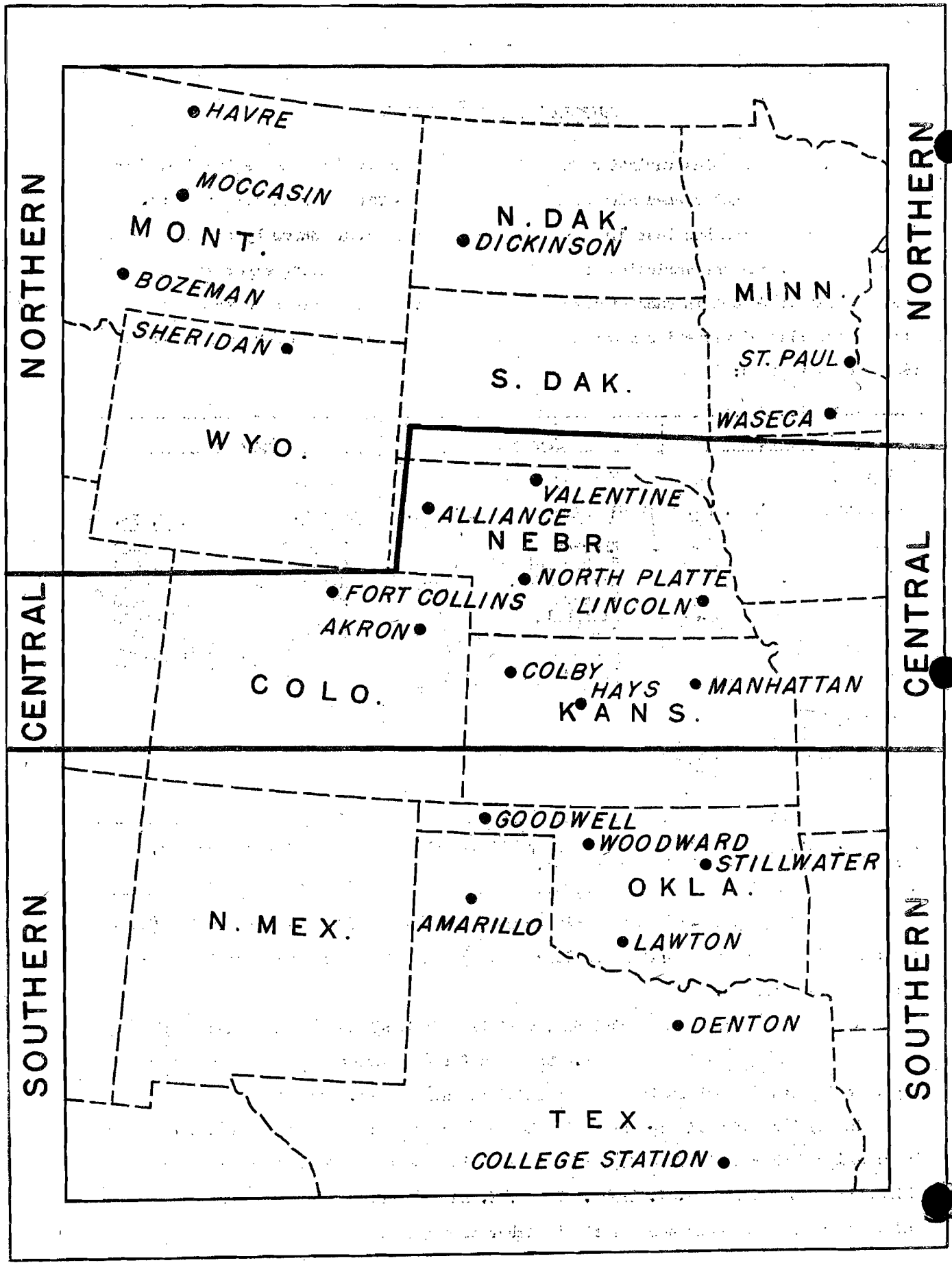
Southern		Central		Northern	
Variety		Variety		Variety	
Hard Red:	C. I. No. 1/	Hard Red:	C. I. No. 1/	Hard Red:	C. I. No.
Kharkof	1442	Kharkof	1442	Kharkof	1442
Turkey selection	10016	Turkey selection	10016	Turkey selection	10016
Nebraska No. 60	6250	Nebraska No. 60	6250	Nebraska No. 60	6250
Tenmarq	6936	Tenmarq	6936	Minturki	6155
Blackhull	6251	Blackhull	6251	Yogo	8033
Quivira	8886	Oro	8220	Karmont	6700
Early Blackhull	8856	Cheyenne	8885	Minturki x Marquis	11502
		Kanred	5146	Minard x Minhardi	8888
		Turkey selection	10094		
Soft Red:					
Fulcaster	6471				
Denton	8265				
Kawvale	8180				

1/ C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

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.

In the list of varieties grown in the northern district attention should be called to Minard x Minhardi (C. I. 8888). In last year's report and in most other records this strain is shown as C. I. 11656. Two C. I. numbers were assigned to the same wheat and it seems best to consider the first number as correct.


NORTHERN
NORTHERN
CENTRAL
CENTRAL
SOUTHERN
SOUTHERN
HAVRE
MOCCASIN
MONT.
BOZEMAN
SHERIDAN
WYO.
N. DAK.
DICKINSON
MINN.
ST. PAUL
S. DAK.
WASECA
VALENTINE
ALLIANCE
NEBR.
NORTH PLATTE
FORT COLLINS
LINCOLN
AKRON
COLO.
COLBY
HAYS
MANHATTAN
KANS.
GOODWELL
WOODWARD
STILLWATER
OKLA.
N. MEX.
AMARILLO
LAWTON
DENTON
TEX.
COLLEGE STATION

PLOT DATA

In the fall of 1936 plots were seeded at 21 experiment stations. Because of severe climatic conditions such as drought, soil blowing, low temperatures, or a combination of these, data were obtained and reported from only 14 stations. Complete failures occurred at North Platte, Alliance, and Valentine, Nebr., and Dickinson, N. Dak. At Goodwell, Okla., yields were so very low and variable that they are not presented. At Colby, Kans., listing to save the plots from blowing was done in such a manner as to prevent the obtaining of comparable data from the remaining plots. At Havre, Mont., germination occurred in the spring and then weeds became so bad that the crop was not harvested. Yield and other agronomic data for the varieties grown at each of the 14 stations are given in table 1. The generalized standard errors for most stations are given and these are summarized in table 2.

To save space, data are given only for those characters that showed a contrasting reaction and that may have had an influence on yield. For each station the varieties are listed in order of yield in 1937 and, where possible, average yields are given for the 7-years (1931-1937) or a shorter period. Where varieties have been grown for varying periods, a percentage of Kharkof (C. I. 1442) is shown so that comparisons may be made more easily.

For the most part the data need very little explanation. As was the case in the two previous years the ground was dry at seeding time at several stations, although fairly good stands were obtained in most cases. The winter was cold, especially January, although no extremely low temperatures were recorded. At several stations the ground was covered with snow and ice during this cold weather and winter-killing was not general.

As in 1936 the spring was dry at many stations and with little or no subsoil moisture tillering was light and straw growth short. In the drier areas plots on fallow did fairly well while those on cropped land were very poor or were a failure. Rains in late May and early June were very beneficial where received. Stem rust was present in varying amounts at stations in the eastern part of the area. No single factor influenced yield throughout the area though again drought reduced yields at some stations, as well as eliminated data from several others.

At Denton both leaf and stem rust were present, but not in serious amounts. Yields were good and test weights ranged from 58 to 62 pounds per bushel. Again the highest yields were made by the early, hard wheats, Early Blackhull, Tenmarq, Quivira, and Blackhull being at the top. The later, hard wheats yielded rather poorly. For the 1931-37 average Quivira, Tenmarq, and Kawvale have the best records. Denton, the standard variety of the territory, ranks fifth. The results this year agree very well with previous years' data.

For the third time in seven years data were obtained at Amarillo. No data other than yields were reported. Chiefkan, the new beardless wheat produced by Earl G. Clark, Quivira, and Kharkof gave the highest yields, with Nebraska No. 60 and Turkey sel. (C. I. 10016) lowest. For the 3-year average, 1931, 1934 and 1937, Tenmarq has the best record followed by Quivira and Kanred. The performance of Chiefkan under Panhandle conditions will be watched with much interest, for already the variety is being found on farms in that part of the State.

The yields at Lawton were nearly twice as large as those obtained in 1936 and were the best that have been obtained since the cooperative work started. Considerable leaf and stem rust was present but nearly all varieties tested 60 pounds per bushel or better. Early varieties gave the highest yields, with Kanred x Marquis (C. I. 11589), Quivira, and Early Blackhull ranking highest. Late wheats were uniformly low in yield. Kawvale gave a rather low yield although for the full time recorded it is tied with Quivira for high yield. Tenmarq ranks third for a 5-year average. At this station Chiefkan yielded 2.4 bushels per acre less than the best variety. Turkey selection (C. I. 10083), an Oklahoma production, has made a very poor record at Lawton.

Yields at Stillwater ranged from 21.2 bushels per acre for Ukrainka to 32.0 bushels for Clarkan. Penquite selection ranked second in yield followed by Turkey (check), Menno, and Quivira. For the 7-year period Penquite selection, Denton, Eagle Chief, and Sibley No. 62 have the highest average yields while Early Blackhull and Harvest Queen are the lowest in yield. Although grown for only three years Clarkan has the best record as expressed by percentage of Kharkof.

At Woodward the drought was very severe, straw was short and ragged, test weights were poor and yields low. The early wheats such as Early Blackhull, Blackhull, Quivira, and Chiefkan gave the highest yields while the later wheats such as Nebraska No. 60, Oro, and Kharkof were lowest. This is the first year that the very early wheats have dominated the picture so completely. For a 6-year average Tenmarq and Kharkof rank first, followed by Cheyenne, Local Turkey, Blackhull, and Quivira, a slight although not decided advantage for early wheats.

Yields and test weights were very good at Manhattan. Some lodging was reported in a few of the varieties. Two Kawvale x Tenmarq strains, in plot tests for the first time, gave the highest yields. The later varieties and the soft red winters gave the lowest yields. The yields of the soft varieties are not entirely comparable as these strains were grown across the alley from the hard red winters. Chiefkan yielded about 7 bushels less than the highest variety and 2 bushels less than Blackhull. For the 7-year period Kawvale ranks first, followed by Cheyenne, Quivira, and Clarkan. Among the varieties grown for more than one year Turkey selection (C. I. 10094) has the best record, having outyielded Kawvale and Tenmarq each of the three years tested.

The season was so dry at Hays that the replications on cropped land were a complete failure, the yields reported being from fallow ground only. Here again the earlier varieties had the best yields. Quivira and Tenmarq ranked first, followed by Chiefkan, Kanred, and Blackhull. For the period 1931 to 1937, excluding 1935, Early Blackhull has the highest average, followed very closely by Quivira, Tenmarq, Blackhull, and Cheyenne. Although grown for only two years Chiefkan has the highest percentage of Kharkof of any variety in the test.

Drought was fairly severe at Akron causing straw to be short, test weights to be low, and yields to range from 11 to 16 bushels per acre. Later varieties such as Oro, Kanred, and Akron selection gave the highest yields in 1937 with Minturki, Turkey selection (C. I. 10016) and Early Blackhull yielding the lowest. The last two varieties are early, while Minturki is one of the latest varieties in the test. For the long-time average Blackhull ranks first, followed by Early Blackhull, Tenmarq, Kanred, and Cheyenne. The high rank of the Blackhulls and Tenmarq is surprising but during the period of the test there has been very little winter-killing and dry weather has injured the later wheats. Turkey selection (C. I. 10016), grown for 6 years, has yielded 125.4 percent of Kharkof, while Turkey selection (C. I. 10094), grown for two years, has yielded 115.8 percent of Kharkof.

At Lincoln there was some winter-killing although there was no sharp spread between varieties. Straw was so short that harvesting with a binder was difficult; stands were thin, but test weights per bushel were good in most cases. Yields were very low and it can hardly be concluded that there were real differences between varieties. Yields were determined more by differences in growth on the various plots caused by location than by differential varietal behavior. Clarkan, a soft wheat, had the highest yield, followed by Blackhull selection and Kharkof. Cheyenne, Turkey selection (C. I. 10094), and Kawvale all yielded very poorly. Based on the 1932-37 average, Kawvale and Cheyenne are tied for high yield, followed by Turkey selection (C. I. 10094), and Tenmarq. Iowin and Nebraska No. 60 have the lowest average yields for the same period.

At Waseca lodging and stem rust was reported, the stem rust being heavy enough on some varieties to reduce test weight and yield. This was especially true in the case of Kharkof and Nebraska No. 60. Turkey selection (C. I. 10094), Minard x Minhardi (C. I. 8888), and Minhardi x Marquis (C. I. 11657) had the highest yields although all varieties except Turkey selection (C. I. 10016), Kharkof, and Nebraska No. 60 yielded about the same. Of the varieties grown from 1931 to 1937, Yogo, Minturki, and Kharkof have the highest yields. For the period grown all varieties except Nebraska No. 60 have percentages of Kharkof greater than 100.

Eight varieties were grown in plot tests at St. Paul. Winter-killing was rather severe and greatly influenced yields. Considerable stem rust was present which probably helped reduce test weight. Minhardi had the highest average yield although only one replication was harvested. Several new hybrid combinations proved to be rather promising.

Winter-killing reduced stands of all varieties nearly 50 percent at Sheridan. Test weights were good and yields ranged from 11.6 to 20.8 bushels per acre. Yogo, Nebraska No. 60, and Cheyenne had the highest yields with Turkey selection (C. I. 10016) and Karmont low. For the 7-year average Yogo and Montana No. 36 are tied for first place with Kanred third. Although grown for only three years Cheyenne has yielded 131.1 percent of Kharkof.

Yields of all varieties at Bozeman were high as usual, ranging from 64.7 to 85.9 bushels per acre. Considerable lodging was present with most varieties going down rather badly, exceptions being Minard x Minhardi (C. I. 8888), Eureka x Minhardi (C. I. 8036), and Minturki. Test weights were all above 61 pounds per bushel. The highest-yielding varieties were Cheyenne and two Turkey selections from Nebraska. The yield of 82.8 bushels per acre for Turkey selection (C. I. 10016) rather disproves the belief that the variety lacks capacity to yield. For the period 1931 to 1937, excluding 1932, Yogo ranks first, followed by Nebraska No. 60 and Kharkof. For the last three years Cheyenne ranks first, followed by Yogo. Although it made a good record this year, Turkey selection (C. I. 10016) is one of the lower-yielding varieties in the test as shown by the percentages of Kharkof.

At Moccasin, winter-killing was rather heavy on tender varieties. Stands were thin at harvest, straw short, weeds bad, and yields low. Test weights per bushel were very good. Minhardi x Minturki (C. I. 8034), Yogo, Eureka x Minhardi (C. I. 8036), and Turkey x Minessa (C. I. 8887) were high for yield. The lower-yielding varieties included Turkey (C. I. 1558) and the two Turkey selections from Nebraska. The 1937 results agree fairly well with the average yields for the period 1931-36. The hybrid strains produced at Moccasin still continue to give the highest average yields.

Table 1. - Agronomic and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 14 experiment stations in the hard winter wheat area in 1937, and average yields for 1931-1937

Denton, Texas

(Four 1/55th-acre plots; Seeded Oct. 13, 1936; Emerged Oct. 25, 1936)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Loose smut	Shattering	Rust Stem	Rust Leaf	Test weight (per bu.)	Acre yield	Yield Av. 1931-1937	Yield Rank	Yield Av. 1934-1937	Yield Rank	Yield No. yrs. grown	Pct. of Kharkof for same years
				(In.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Early Blackhull	8856	Apr. 22	May 24	37	0	0	10	25	61.5	47.6			31.2	3	5	111.8
Tenmarq	6936	May 2	May 29	39	T	0	13	15	59.0	45.0	33.1	2	31.5	2	7	126.8
Quivira	8886	Apr. 29	May 27	39	T	1	20	10	61.0	44.1	34.2	1	32.8	1	7	131.0
Blackhull	6251	May 4	June 2	38	0	0	13	53	62.0	42.6	28.3	6	28.5	6	7	108.4
Mediterranean (Campbell)	--	May 2	May 30	42	1	1	33	13	59.0	40.3					1	122.5
Kanred	5146	May 5	May 30	38	T	0	13	60	58.0	39.5	30.5	4	29.6	4	7	116.9
Kawvale	8180	May 3	May 30	41	0	3	10	3	60.0	39.1	30.6	3	28.5	6	7	117.2
Clarkan	8858	May 4	May 30	44	0	0	35	5	60.0	39.1			28.9	5	4	115.1
Denton x Kanred (T.S.4-31-28)		May 3	May 30	45	T	4	35	T	59.5	37.4					1	113.7
Mediterranean selection	10085	Apr. 30	May 28	38	5	1	30	5	60.0	37.4			25.4	9	6	108.9
Turkey selection	10016	May 3	May 29	36	2	0	25	70	59.0	37.3			26.1	8	4	104.0
Fulcaster	6471	May 3	May 30	42	T	5	60	68	58.0	36.6	26.9	7	24.5	13	7	103.1
Mediterranean selection	11587	May 3	May 31	42	T	0	60	T	60.0	35.4			25.4	9	4	101.2
Denton	8265	May 4	May 30	43	1	2	53	T	59.0	34.4	28.8	5	25.2	11	7	110.3
Mediterranean selection	11525	May 2	May 29	43	4	3	68	T	59.5	33.9			24.3	15	6	105.7
Mediterranean selection	10086	May 2	May 28	38	3	2	28	3	60.0	33.6	26.4	8	23.8	16	7	101.0
Kharkof	1442	May 6	June 2	38	T	0	25	50	58.0	32.9	26.1	9	25.1	12	7	100.0
Nebraska No. 60	6250	May 6	June 2	37	0	0	33	70	58.0	31.7	24.3	10	23.3	17	7	93.1
Mediterranean sel.(T.S.5933-38)		Apr. 30	May 28	41	3	4	53	T	59.0	31.6			24.5	13	6	106.5

Standard error of a difference, 1.3 bu.; standard error of a mean, 0.9 bu., or 2.28 percent.

Table 1 – (Continued)

Amarillo, Texas

(Two plots)

Variety	C. I. No.	Acre yield	Yield				No. of years grown	Percentage of Kharkof for same years
			Average 1931, 1934 and 1937	Rank	Average 1934 and 1937	Rank		
		(Bu.)	(Bu.)		(Bu.)			
Chiefkan	11754	21.0						111.7
Quivira	8886	20.4	15.6	2	15.7	6	3	101.3
Kharkof	1442	18.8	15.4	3	16.3	1	3	100.0
Turkey	1558	18.5			16.3	1	2	100.0
Cheyenne	8885	18.5			16.0	4	2	98.2
Turkey (Vaughn)	---	18.3			15.4	8	2	94.5
Kanred x Hard Federation	10092	17.9					1	95.2
Early Blackhull	8856	17.8			14.4	11	2	88.3
Kanred	5146	17.4	15.4	3	16.3	1	3	100.0
Denton	8265	17.2	14.1	6	14.8	9	3	91.6
Tenmarq	6936	17.1	16.0	1	15.9	5	3	103.9
Blackhull	6251	17.1	15.3	5	15.7	6	3	99.4
Kawvale	8180	16.5	13.8	7	13.2	13	3	89.6
Fulcaster	6471	16.0	12.9	9	13.0	14	3	83.8
Nebraska No. 60	6250	16.0	13.3	8	14.5	10	3	86.4
Turkey selection	10016	14.4			13.9	12	2	85.3

Table 1. - (Continued)

Lawton, Oklahoma

(Three 1/50th-acre plots; seeded Oct. 13, 1936

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Rust Leaf	Rust Stem	Test weight (per bu.)	Acre yield	Yield Average 1931-34 and 1936-37	Rank	Yield Average 1934 and 1936-37	Rank	No. of years grown	Percentage of Kharkof for same years
				(In.)	(Pct.)		(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Kanred x Marquis	11589	Apr.27	May 31	40	T	M	62	36.6			25.1	3	3	114.1
Quivira	8886	Apr.26	May 28	41	T	M	62	35.0	27.0	1	25.5	1	6	107.1
Early Blackhull	8856	Apr.21	May 27	38	50	T	63	34.7	23.7	11	23.7	7	6	94.0
Kawvale x Tenmarq	11750	Apr.26	May 30	39	T	L	60	34.5					1	107.8
Chiefkan	11754	Apr.28	June 1	43	20	L	63	34.2					1	106.9
Turkey x Kawvale (La.35-93)		Apr.30	June 1	42	5	L	61	34.1					1	106.6
Kanred x Hard Federation	11373	Apr.26	May 31	39	10	H	62	34.0			25.4	2	5	107.1
P-1066-1 x Prelude	11590	Apr.26	May 29	42	T	H	62	34.0			24.9	4	3	113.2
Tenmarq	6936	Apr.31	June 3	41	5	L	60	33.5	26.1	3	23.8	6	6	103.6
Penquite	11745	Apr.29	June 2	41	10	H	61	33.4					1	104.4
Blackhull	6251	Apr.29	June 3	43	40	T	63	33.2	25.2	5	23.5	8	6	100.0
Fulcaster	6471	May 1	June 2	42	20	M	61	32.9	24.1	10	22.5	14	6	95.6
Sibley No. 62	11523	May 3	June 3	38	20	L	61	32.8			22.8	12	3	103.6
Cheyenne	8885	May 4	June 3	37	40	H	62	32.8	25.2	5	22.7	13	6	100.0
Kanred	5146	May 4	June 2	40	20	L	61	32.5	25.8	4	23.1	11	6	102.4
Clarkan	8858	Apr.30	June 1	44	10	M	62	32.4					2	102.9
Kawvale	8180	Apr.30	May 31	40	T	H	60	32.1	27.0	1	24.6	5	6	107.1
Kharkof	1442	May 5	June 4	41	20	M	61	32.0	25.2	5	22.0	15	6	100.0
Denton	8265	May 2	June 3	44	5	H	60	31.9	24.5	9	23.4	9	6	97.2
Iobred x Kawvale (La.35-95)		Apr.29	Kune 3	41	1	L	62	31.5					1	98.4
Ioturk	11388	May 5	June 5	40	10	L	61	31.2	23.5	12	21.1	18	6	93.3
Mediterranean	11525	Apr.29	June 1	43	T	H	61	30.5			23.2	10	3	105.5
Turkey selection	10016	Apr.27	May 31	37	65	T	61	30.5			20.2	19	3	91.8
Tenmarq x Kawvale (La.35-87)		May 3	June 3	37	30	H	58	30.5					1	95.3
Nebraska No. 60	6250	May 5	June 5	39	35	M	60	30.2	23.4	13	21.3	17	6	92.9
Turkey	1558	May 6	June 5	40	65	M	60	29.9	24.6	8	21.8	16	6	97.6
Harvest Queen	6199	Apr.30	June 2	46	40	M	60	28.8	21.8	14	20.1	20	6	86.5
Hartwig Strain	--	May 3	June 5	44	25	H	60	26.8					1	83.8
Turkey selection	10083	May 5	June 3	41	65	L	60	26.0			19.4	21	3	88.2

Standard error of a difference, 1.1 bu; standard error of a mean, 0.8 bu., or 2.49 percent.

Table 1. - (Continued)

Stillwater, Oklahoma

(Four 1/138th-acre plots)

Variety	C. I. No.	Date headed	Height	Test weight (per bu.)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for years grown
						Average 1931-37	Rank		
			(In.)	(Lbs.)	(Bu.)	(Bu.)			
Clarkan	8858	May 6	41	62.0	32.0			3	107.7
Penquite selection	11745	May 6	35	60.7	31.4	30.7	1	7	106.6
Turkey (check)	1558	May 6	35	60.2	30.9	28.9	5	7	100.3
Menno	---	May 6	37	59.8	30.2			2	91.1
Quivira	8886	Apr. 26	35	61.5	30.1	27.1	13	7	94.1
Early Blackhull	8856	Apr. 22	34	61.2	29.6	26.4	14	7	91.7
Eagle Chief	8868	May 6	36	60.6	29.5	29.2	3	7	101.4
Chiefkan	11754	May 3	38	61.6	29.4			1	105.0
Tenmarq	6936	May 4	36	60.2	29.2	28.9	5	7	100.3
Kanred x Hard Federation (III-30-38)		May 6	37	60.4	29.1			2	84.1
Denton	8265	May 6	40	59.6	29.0	29.6	2	7	102.8
Kawvale	8180	May 3	36	59.4	28.9	27.7	12	7	96.2
Turkey selection (I-27-84)	---	May 7	35	60.6	28.6			2	91.9
Turkey selection	10083	May 7	36	60.5	28.4			6	104.9
Kharkof	1442	May 6	35	60.2	28.0	28.8	8	7	100.0
Kanred	5146	May 6	34	60.5	27.3	28.0	10	7	97.2
Cheyenne	8885	May 5	35	61.2	26.8	28.9	5	7	100.3
Blackhull	6251	May 5	36	62.8	26.4			6	102.8
Sibley No. 81	10084	May 5	37	60.6	26.4	28.5	9	7	99.0
Turkey selection	10016	May 6	33	60.7	26.3			1	93.9
Harvest Queen	6199	May 6	44	60.0	25.8	25.4	15	7	88.2
Sibley 62	11523	May 6	35	60.6	25.5	29.2	3	7	101.4
Nittany	5962	May 7	42	57.8	25.4			6	93.7
Nebraska No. 60	6250	May 8	35	60.0	23.9	27.9	11	7	96.9
Fulcaster	6471	May 4	40	60.9	21.9			6	92.1
Ukrainka	---	May 8	40	59.4	21.2				

Standard error of a difference, 2.9 bu.; standard error of a mean, 2.1 bu., or 7.48 percent.

Table 1. - (Continued)

Woodward, Oklahoma

(Four 1/47th-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Height	Test weight (per bu.)	Acre yield	Yield Average 1931-37 (omit '35)	Yield Rank	No. of years grown	Percentage of Kharkof for same years
				(In.)	(Lbs.)	(Bu.)	(Bu.)			
Early Blackhull	8856	May 4	June 1	20	54	14.4	22.5	11	6	90.4
Blackhull	6251	May 12	June 9	18	57	10.9	24.0	5	6	96.4
Quivira	8886	May 10	June 2	18	54	10.6	24.0	5	6	96.4
Chiefkan	11754	May 11	June 10	18	56	10.0			1	250.0
Tenmarq	6936	May 11	June 8	19	54	9.5	24.9	1	6	100.0
Fulcaster	6471	May 14	June 11	18	55	9.5	22.4	12	6	90.0
Turkey selection	10016	May 11	June 7	17	54	9.0			3	87.3
Kanred x Marquis	10090	May 11	June 13	17	57	8.9	23.4	8	6	94.0
Kawvale	8180	May 11	June 9	18	52	8.6	22.6	10	6	90.8
Sibley No. 62	11523	May 14	June 12	16	56	8.1			3	94.4
Kanred	5146	May 14	June 13	16	57	7.2	23.1	9	6	92.8
Denton	8265	May 14	June 14	17	56	6.7	19.9	15	6	79.9
Turkey 102 (Goodwell)	---	May 14	June 14	16	56	6.6			5	94.7
Hartwig Strain	---	May 15	June 13	18	56	6.2			1	155.0
Sibley No. 81	10084	May 14	June 11	17	56	5.6	21.9	14	6	88.0
Cheyenne	8885	May 15	June 16	16	56	5.3	24.3	3	6	97.6
Turkey (Local)	---	May 16	June 16	15	57	4.9	24.1	4	6	96.8
Nebraska No. 60	6250	May 16	June 17	14	57	4.3	23.6	7	6	94.8
Oro	8220	May 15	June 16	16	57	4.2	22.2	13	6	89.2
Kharkof	1442	May 16	June 16	15	56	4.0	24.9	1	6	100.0

Standard error of a difference, 1.7 bu.; standard error of a mean, 1.2 bu., or 15.46 percent.

Table 1. - (Continued)

Manhattan, Kansas

(Three 1/40th-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Stand - No. plants per a. Fall	Stand - No. plants per a. At harvest	Lodging	Breaking strength of 10 straws	Test weight (per bu.)	Acre yield	Yield Average 1931-1937	Yield Rank	No. of years grown	Percentage of Kharkof for same yrs.
				(Ins)	(1000)	(1000)	(Pct.)	(Lbs.)	(Lbs.)	(Bu.)	(Bu.)			
Kawvale x Tenmarq	11669	May 18	June 21	35	882	3361	0	5.55	63.0	52.1			1	147.6
Kawvale x Tenmarq	11750	May 18	June 21	37	866	2879	0	6.11	61.8	50.7			1	143.6
P-1066 x Prelude	11590	May 16	June 20	37	991	2620	3	5.41	62.7	49.1			4	107.5
Turkey selection	10016	May 19	June 22	36	1120	3476	1	5.28	62.9	48.3			4	110.6
Oro x Tenmarq	11673	May 18	June 22	36	812	2670	0	6.05	62.3	48.1			1	136.3
Quivira	8886	May 16	June 20	38	1038	2870	3	5.78	63.2	47.7	39.4	3	7	109.4
Kanred x Marquis	11589	May 18	June 22	37	899	2226	0	7.39	63.1	47.1			5	108.7
Oro x Tenmarq	11672	May 18	June 21	36	886	2762	0	5.98	62.3	45.8			1	129.7
Blackhull	6251	May 19	June 24	40	980	2707	8	6.60	63.8	45.7	38.9	5	7	108.1
Chiefkan	11754	May 19	June 24	39	913	2722	7	7.42	63.9	45.5			1	128.9
Turkey selection	10094	May 20	June 24	36	1018	3539	-	4.88	62.3	44.7			3	118.7
Kanred x Hard Federation	10092	May 15	June 22	34	859	2764	0	6.25	61.6	43.4			6	96.2
Tenmarq	6936	May 19	June 24	37	783	2172	T	6.56	60.9	43.3	38.5	6	7	106.9
Kanred	5146	May 20	June 24	39	901	2796	6	5.66	61.0	43.2	36.8	11	7	102.2
Early Blackhull	8856	May 12	June 20	37	889	2366	9	6.54	64.6	42.2	38.3	7	7	106.4
Turkey	1558	May 20	June 24	40	953	2888	7	6.05	61.4	41.5	37.6	8	7	104.4
Cheyenne	8885	May 20	June 24	36	926	2855	0	6.40	60.8	40.9	40.1	2	7	111.4
Oro	8220	May 20	June 24	40	980	2495	1	5.66	61.6	39.1	37.2	10	7	103.3
Kawvale	8180	May 19	June 22	37	944	2091	0	7.17	61.5	38.4	40.7	1	7	113.1
Clarkan	8858	May 20	June 24	42	838	1900	3	9.38	63.1	37.5	39.3	4	7	109.2
Kharkof	1442	May 20	June 24	38	1020	3031	4	6.19	60.8	35.3	36.0	12	7	100.0
Nebraska No. 60	6250	May 21	June 24	39	1021	2903	4	6.48	59.7	35.0	36.0	12	7	100.0
Fulcaster	6471	May 20	June 23	40	851	1927	5	8.56	61.5	34.0	37.6	8	7	104.4
Harvest Queen	6199	May 20	June 24	43	861	1746	8	9.28	60.8	33.0	32.5	14	7	90.3

Standard error of a difference, 2.4 bu.; standard error of a mean, 1.7 bu., or 4.01 percent.

Table 1. - (Continued)

Hays, Kansas

(Two 1/50th-acre plots; seeded Oct. 3, 1936; emerged Oct. 10, 1937) Fallow only

Variety	C. I. No.	Date		Hgt.	Test weight (per bu.)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
		Headed	Ripe				Average 1931-34 and 1936-37	Rank		
				(In.)	(Lbs.)	(Bu.)	(Bu.)			
Quivira	8886	May 16	June 19	25	65	29.6	25.3	2	6	119.3
Tenmarq	6936	May 19	June 20	26	64	29.6	25.2	3	6	118.9
Chiefkan	11754	May 19	June 21	29	65	29.4			2	121.9
Kanred	5146	May 21	June 23	25	65	29.0	23.8	6	6	112.3
Blackhull	6251	May 19	June 21	24	65	28.3	25.2	3	6	118.9
Cheyenne	8885	May 22	June 23	26	63	28.2	25.0	5	6	117.9
Early Blackhull	8856	May 12	June 16	25	65	27.0	25.4	1	6	119.8
Oro x Tenmarq	11672	May 18	June 20	24	65	26.9			1	102.3
Kanred x Marquis	11589	May 19	June 22	25	64	26.7			2	114.3
Oro x Tenmarq	11673	May 18	June 20	24	65	26.5			1	100.8
Kharkof	1442	May 22	June 24	24	64	26.3	21.2	10	6	100.0
Turkey selection	10094	May 21	June 21	24	64	25.9			2	108.8
Nebraska No. 60	6250	May 22	June 24	25	64	25.4	23.3	7	6	109.9
Kanred x Hard Federation	10092	May 16	June 19	22	64	25.2			3	118.9
Oro	8220	May 22	June 24	25	64	25.1	23.4	8	6	109.0
Turkey	1558	May 22	June 24	25	64	24.2	22.3	9	6	105.2

Standard error of a difference, 3.2 bu.; standard error of a mean, 2.3 bu., or 8.47 percent.

Table 1. - (Continued)

Akron, Colorado

Four 1/41-acre plots; seeded Sept. 18, 1936; emerged Sept. 28, 1936)

Variety	C. I. No.	Dates		Hgt.	Test weight (per bu)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
		Headed	Ripe				Average 1931-'37	Rank		
				(In)	(Lbs.)	(Bu.)	(Bu.)			
Oro	8220	June 1	July 8	19	58.8	16.4	12.7	6	7	111.4
Kanred	5146	June 1	July 8	19	58.3	16.0	13.0	4	7	114.0
Akron selection	11660	May 31	July 7	20	56.0	15.6			4	131.0
Kharkof	1583	June 2	July 8	20	58.0	15.5	11.5	7	7	100.9
Alton	1438	June 3	July 10	22	58.0	15.5	9.8	11	7	86.0
Cheyenne	8885	June 1	July 8	18	58.0	15.4	12.8	5	7	112.3
Turkey selection	10094	May 31	July 6	19	57.5	15.4			2	115.8
Tenmarq	6936	May 28	July 3	20	56.8	15.1	13.6	3	7	119.3
Turkey x Marquis	11747	May 30	July 6	20	56.5	15.1			2	111.0
Kanred x Marquis	11746	May 31	July 6	20	57.8	14.7			2	103.5
Kharkof	1442	June 2	July 8	20	57.0	14.7	11.4	9	7	100.0
Turkey selection	11375	June 2	July 9	19	57.3	14.5			4	98.4
Nebraska No. 60	6250	June 3	July 9	20	57.3	14.4	11.5	7	7	100.9
Blackhull	6251	May 27	July 3	19	57.0	14.1	13.9	1	7	121.9
Yogo	8033	June 6	July 11	23	55.8	13.7			4	92.2
Turkey selection	10098	May 29	July 5	19	56.8	13.3			4	120.9
Minturki	6155	June 5	July 9	22	55.3	13.3	9.9	10	7	86.8
Turkey selection	10016	May 28	July 4	18	57.0	13.1			6	125.4
Early Blackhull	8856	May 24	July 1	16	56.3	11.3	13.7	2	7	120.2

Standard error of a difference, 1.8 bu.; standard error of a mean, 1.3 bu., or 8.97 percent.

Table 1. - (Continued)

Lincoln, Nebraska

(Five 1/40th-acre plots; seeded Sept. 22, 1936; emerged Oct. 1, 1936)

Variety	C. I. No.	Winter survival	Date		Hgt.	No. culms per acre	Test weight (per bu.)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
			Headed	Ripe					Average 1932-37	Rank		
		(Pct.)			(In.)	(1000)	(Lbs.)	(Bu.)	(Bu.)			
Clarkan	8858	86	May 28	July 1	19	1531	60.5	16.8			3	104.9
Blackhull selection	11737	90	May 28	June 27	16	2054	63.8	16.5			1	102.5
Kharkof	1442	92	May 31	June 30	18	1531	61.8	16.1	27.1	7	7	100.0
Turkey sel.(Nebr.312)	---	86	May 29	June 29	16	2016	58.5	16.0			5	100.0
Turkey (Crimean)	1435	88	May 30	June 29	16	1718	59.4	15.8	25.9	14	6	95.1
Nebraska No. 60	6250	88	May 31	July 1	16	1942	59.0	15.8	25.8	15	7	95.6
Kanred	5146	91	May 30	June 28	16	1643	62.8	15.5	27.0	8	7	100.3
Early Blackhull	8856	80	May 24	June 25	18	1680	61.2	15.5	26.8	9	6	98.9
Turkey selection	11577	85	May 28	June 28	16	2166	59.1	15.2			3	102.2
Tenmarq	6936	84	May 28	June 27	16	1643	59.5	15.1	28.1	5	7	104.7
Cheyenne selection	11666	86	May 30	June 27	15	2166	59.5	14.8			2	99.1
Turkey (Nebr. No. 1)	---	88	May 30	June 29	16	2016	58.2	14.6	26.5	11	6	97.8
Oro	8220	89	May 31	June 30	16	1867	60.1	14.6	26.7	10	7	98.7
Turkey selection	11734	86	May 29	June 28	16	1867	59.3	14.5			1	90.1
Kawvale x Tenmarq	11669	87	May 27	June 25	16	1942	62.5	14.1			2	100.9
Turkey	3689	91	May 30	June 27	15	2091	62.8	14.1	28.5	4	6	105.2
Cheyenne	8885	89	May 30	June 29	15	1830	59.6	14.0	29.9	1	7	109.8
Turkey (Seward Co.)	---	84	May 29	June 28	15	1979	62.3	13.9			5	101.9
Turkey selection	10016	86	May 28	June 25	16	2128	62.1	13.7	26.5	11	6	97.8
Iowin	10017	89	May 31	June 29	16	1792	62.8	13.7	25.8	15	6	95.2
Turkey selection	11576	85	May 29	June 28	15	2166	59.1	13.6			3	100.9
Tenmarq x Minturki	11580	90	May 28	June 26	15	1830	58.7	13.6			1	84.5
Minhardi - Minturki x Tenmarq	11668	83	May 28	June 26	15	1792	62.3	13.5			2	87.5
Oro x Tenmarq	11579	87	May 29	June 28	16	1904	59.5	13.4			3	98.7
Blackhull	6251	81	May 29	June 28	16	1792	62.8	13.3	27.4	6	7	100.7
Turkey selection	10094	89	May 31	June 27	14	2054	62.4	12.8	28.6	3	6	105.5
Minturki x Blackhull	11671	81	May 31	June 29	15	1942	62.6	12.5			1	77.6
Kawvale	8180	84	May 29	June 27	16	1643	60.7	12.2	29.9	1	6	110.3
Turkey selection	11667	89	May 28	June 26	15	2166	60.3	11.2			2	87.1
Turkey selection	10015	88	May 29	June 28	15	2054	62.4	10.5	26.2	13	6	96.7

Standard error of a difference, 1.9 bu.; standard error of a mean, 1.4 bu., or 9.69 percent.

Table 1. - (Continued)

St. Paul, Minnesota

(Three 1/40th-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Winter survival	Hgt.	Stem rust	Grain Plump	Grain Texture	Test weight (per bu.)	Acre yield
		June	July	(Pct.)	(In.)	(Pct.)	(Pct.)	(Pct.)	(lbs.)	(Bu.)
Minhardi	5149	19	18	50	40	60	65	60	50.7	30.3 1/
Minard x Minhardi	8888	17	12	28	40	3	50	75	51.5	26.8 1/
Minard	6690	19	19	50	47	25	40	75	49.2	25.4 1/
Minturki x Marquis	11501	16	14	37	42	17	55	72	51.8	25.2
Minturki x Marquis	11502	14	11	32	39	2	58	68	52.7	24.8
Minturki	6155	16	12	38	39	0	43	70	47.4	21.0
Minturk x Marquis (Minn.2552)		16	14	10	40	3	45	75	49.4	20.9
Minhardi x Marquis	11657	15	12	23	42	0	38	65	48.0	18.9

1/ Only one replication

Waseca, Minnesota

(Three 1/40th-acre plots).

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Lodging Pct.	Lodging Degree	Stem rust		Grain Plump	Grain Texture	Test weight (per bu.)	Acre yield	Yield Av.1931-1933 and 1935-37	Rank	Yield Av.1935 and 1937	Rank	No. of years grown	Percentage of Kharkof for same years
		June	July	(In.)			(Pct.)		(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Turkey sel.	10094	13	15	41	0	--	30	S	95	72	60.5	22.4					1✓	163.5
Minard x Minhardi	8888	16	14	44	0	--	40	S	92	75	59.5	22.3			30.8		~~4~~5	104.9
Minhardi x Marquis	11657	13	14	45	22	13	15	SR	95	73	60.0	22.3			33.0	1	3✓	113.9
Minturki	6155	15	15	46	0	--	30	SR	95	63	59.3	22.2	34.1	2	31.4	2	5✓	105.2
Minturki x Marquis (Minn.2552)		13	16	45	3	3	20	SR	95	65	60.0	22.1					1✓	161.3
Minturki x Marquis	11501	13	15	47	13	3	18	SR	95	75	60.1	20.5			30.0	5	3	112.5
Yogo	8033	16	16	46	23	13	20	SR	92	73	59.9	19.4	34.3	1	30.8	3	5✓	105.9
Minturki x Marquis	11502	15	14	47	13	10	45	S-SR	95	75	59.9	19.2			28.4	6	3✓	105.4
Turkey sel.	10016	12	15	41	10	10	40	S	92	68	59.2	15.5			30.7	4	②	117.2
Kharkof	1442	15	14	43	23	7	50	S	85	55	56.9	13.7	32.4	3	26.2	7	5✓	100.0
Nebraska No. 60	6250	18	15	44	23	13	80	S	67	60	52.5	7.4	30.0	4	21.0	8	⑤	92.6

Table 1. - (Continued)

Sheridan, Wyoming

(Three 1/55th-acre plots; seeded Sept. 22, 1936; emerged Oct. 13, 1936)

Variety	C. I. No.	Date		Winter survival	Hgt.	Test weight (per bu.)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
		Headed	Ripe					Average 1931-37	Rank		
				(Pct.)	(In.)	(Lbs.)	(Bu.)	(Bu.)			
Yogo	8033	June 17	July 24	56.7	32	60.7	20.8	22.8	1	7	109.6
Nebraska No. 60	6250	June 15	July 25	46.7	31	61.3	17.7	22.1	4	7	106.3
Cheyenne	8885	June 17	July 24	48.3	30	58.0	17.1			3	131.1
Minard x Minhardi	8888	June 15	July 24	58.3	29	60.3	16.8			2	105.3
Kanred	5146	June 17	July 24	45.0	33	59.3	15.9	22.7	3	7	109.1
Kharkof	1442	June 17	July 24	50.0	33	60.3	15.6	20.8	6	7	100.0
Montana No. 36	5549	June 15	July 25	43.3	31	61.3	15.0	22.8	1	7	109.6
Minturki x Marquis	11502	June 15	July 25	45.0	30	61.7	14.7			2	99.1
Minturki	6155	June 17	July 24	46.7	33	59.3	14.1	19.2	7	7	92.3
Turkey sel.	10094	June 14	July 24	50.0	29	60.7	13.4			1	85.9
Turkey selection	10016	June 16	July 24	40.0	30	59.0	12.8			4	98.3
Karmont	5700	June 17	July 24	36.7	30	58.7	11.6	21.1	4	7	101.4

Standard error of a difference, 3.9 bu.; standard error of a mean, 2.8 bu., or 18.00 percent.

Table 1. - (Continued)

Bozeman, Montana

(Three 1/56th-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Lodging	Test weight (per bu.)	Acre yield	Yield Average 1931 and 1933-37	Rank	Yield Average 1934 and 1937	Rank	No. of yrs. grown	Percentage of Kharkof for same years
				(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Cheyenne	8885	July 1	Aug.10	49	50	62.1	85.9			85.5	1	4	109.3
Turkey selection	10094	June 27	Aug. 9	47	37	62.8	83.1					1	117.5
Turkey selection	10016	June 24	Aug. 9	48	50	63.0	82.8			70.8	9	4	90.5
Eureka x Minhardi	8036	July 2	Aug.11	47	20	62.3	80.0					1	113.2
Minard x Minhardi	8889	July 2	Aug.10	51	42	62.6	79.6	67.8	4	76.2	5	6	98.5
Minard x Minhardi	8888	July 2	Aug.10	49	8	63.8	79.1					2	104.3
Nebraska No. 60	6250	June 30	Aug.13	50	80	61.9	77.5	70.1	2	79.0	3	6	101.9
Yogo sel. 2	--	July 1	Aug.11	49	70	62.4	75.3					3	103.9
Oro	8220	June 30	Aug.11	50	67	63.0	75.0			71.2	8	4	91.0
Yogo	8033	July 1	Aug.11	53	77	62.4	74.0	71.7	1	81.3	2	6	104.2
Kharkof	1442	June 30	Aug.12	51	78	61.9	70.7	68.8	3	78.2	4	6	100.0
Newturk	6935	June 30	Aug.11	48	57	62.0	70.7	62.1	7	70.8	9	6	90.3
Minturki x Marquis	11502	June 29	Aug. 9	53	32	63.3	68.8					2	87.9
Minturki	6155	June 30	Aug.10	55	28	62.1	66.9	62.9	6	71.9	7	6	91.4
Montana No. 36	5549	July 1	Aug.10	49	85	61.9	64.7	65.0	5	74.8	6	6	94.5

Standard error of a difference, 3.7 bu.; standard error of a mean, 2.6 bu., or 3.41 percent.

Table 1. - (Continued)

Moccasin, Montana

(Four 1/50th-acre plots; seeded Sept. 4, 1936; emerged Sept. 10, 1936)

Variety	C. I. No.	Winter survival	Date		Hgt.	Test weight (per bu.)	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
			Headed	Ripe				Average 1931-35 and 1937	Rank		
		(Pct.)			(In.)	(Lbs.)	(Bu.)	(Bu.)			
Minhardi x Minturki	8034	79	June 26	July 21	22	60.3	7.8	14.3	5	6	109.2
Yogo	8033	79	June 27	July 22	21	61.3	7.4	15.1	3	6	115.3
Eureka x Minhardi	8036	83	June 26	July 21	20	62.5	7.3	15.7	1	6	119.8
Turkey x Minessa	8887	85	June 26	July 25	20	59.9	7.3	15.2	2	6	116.0
Kanred x Minessa	8045	84	June 27	July 23	20	61.8	7.2	14.4	4	6	109.9
Nebraska No. 60	6250	78	June 24	July 22	21	60.2	7.1	14.2	6	6	108.4
Turkey x Kanred	11725	83	June 26	July 23	21	60.3	7.1			1	139.2
Cheyenne	8885	79	June 24	July 21	20	61.7	6.8			3	100.0
Newturk	6935	71	June 24	July 21	20	60.8	6.7	13.4	8	6	102.3
Minard x Minhardi	8889	81	June 25	July 22	20	61.2	6.6	13.8	7	6	105.3
Minturki x (Bel.-Buffum)	11661	78	June 28	July 23	22	60.3	6.6			1	129.4
Minard x Minhardi	8888	89	June 25	July 22	19	61.5	6.5			1	127.5
Minessa x (Bel.Buf.)B.H.23-2	--	90	June 22	July 24	20	59.5	6.5			1	127.5
Kanred x Minhardi	11726	75	June 28	July 23	20	61.5	5.8			1	113.7
Kanred	5146	56	June 27	July 22	19	62.0	5.2			4	90.4
Kharkof	1442	66	June 25	July 22	19	61.5	5.1	13.1	9	6	100.0
Karmont	6700	61	June 24	July 22	20	61.0	5.0	13.1	9	6	100.0
Minturki	6155	63	June 24	July 23	21	60.9	4.7	12.8	12	6	97.7
Turkey selection	10094	78	June 24	July 21	18	62.1	4.7			1	92.2
Turkey	1558	55	June 25	July 23	20	61.3	4.2	12.9	11	6	98.5
Turkey selection	10016	68	June 23	July 21	19	60.5	3.2			3	81.6

Standard error of a difference, 1.2 bu.; standard error of a mean, 0.8 bu., or 13.56 percent.

STANDARD ERRORS

In previous reports probable errors have been calculated where possible. This year the long-contemplated change to standard errors has been made, since this measure of reliability is now in general use.

The standard error of a difference in bushels and the generalized standard error of a mean in bushels and percent were determined for each station by "Student's formula, i.e.,:

$$\text{Standard error of a difference} = \pm \sqrt{\frac{2M\,(\sigma^2_T - \sigma^2_V - \sigma^2_R)}{(M-1)\,(N-1)}}$$

where T = yields of individual plots
V = mean yields of varieties
R = mean yields of replicates
M = number of varieties
N = number of plots of each variety.

A generalized standard error of a mean in bushels may be calculated by dividing the standard error of a difference by $\sqrt{2}$. The standard error of an average of averages was determined by the formula -

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

where a, b, c, -- n = the separate standard errors and N = the number of separate averages. The standard errors in bushels can be expressed in percent by dividing by the mean yield of all varieties 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.

The standard error may be used in the same manner as the probable error, the only difference being in the magnitude of the value. Probable error is .6745 times the standard error. If at least three times the probable error has been used as the desired level of significance, the same level will be obtained with at least twice the standard error.

The errors are higher than in 1936. This is especially true in the case of Woodward, Lincoln, Sheridan, and Moccasin, the reason being that at these stations conditions were so severe that slight differences in moisture content of the soil, or soil spots made so much difference in growth that the yields were very variable. At the stations listed above it is impossible to show any significance in yield differences between varieties except the one or two yielding highest and lowest in the test. It is unfortunate that this is the case but it cannot be helped.

Table 2. - Average yield, standard error of a difference, and standard error of the mean for plot tests at each cooperating station, 1937

Station	No. of plots	Average yield of varieties	Standard error of a difference	Standard error[14] of a mean in	
				Bushels	Percent
		(Bu.)	(Bu.)		
Texas:					
Denton	4	41.3	1.3	0.9	2.28
Amarillo	2	---	---	---	---
Oklahoma:					
Lawton	3	32.1	1.1	0.8	2.49
Stillwater	4	27.9	2.9	2.1	7.48
Woodward	4	7.7	1.7	1.2	15.46
Kansas:					
Manhattan	3	42.9	2.4	1.7	4.01
Hays	2	27.1	3.2	2.3	8.47
Colorado:					
Akron	4	14.5	1.8	1.3	8.97
Nebraska:					
Lincoln	5	14.1	1.9	1.4	9.69
Minnesota:					
Waseca	3	18.8	---	---	---
St. Paul	3	24.2	---	---	---
Wyoming:					
Sheridan	3	15.5	3.9	2.8	18.00
Montana:					
Bozeman	3	75.6	3.7	2.6	3.41
Moccasin	4	6.1	1.2	0.8	13.56

SUMMARY OF YIELDS

The yields of the uniform varieties, as well as others grown in the cooperative experiments have been summarized for the different districts and States. A summary has also been added showing the comparative records of some varieties of interest which are not grown uniformly at any group of stations.

Districts

Summaries of the yield data for the uniform varieties grown in 1937 and the 1931-37 averages, where available, are presented in tables 3 to 8.

In the southern district in 1937, yields were reported from five stations. Eleven varieties were grown uniformly at these stations and the data are shown in table 3, where the varieties are listed in order of average yield. Early Blackhull, Quivira, and Tenmarq had the best averages. In the southern district in 1936 Nebraska No. 60 ranked first and Early Blackhull last, just the reverse of this year. The high ranking of Early Blackhull is unusual, but Quivira and Tenmarq have good records. For the period 1931-37 (table 4) averages are shown for nine varieties. The varieties are listed in order of the weighted average yield based on the results of 39 station-years. Tenmarq ranks first followed by Blackhull and Quivira. Kawvale ranks below Kharkof, and Denton and Fulcaster are at the bottom.

Table 3. - Summary of average yields of uniform winter wheat varieties grown in plot tests at 5 stations in the southern district, 1937

Variety	C. I. No.	Average yield in bushels per acre at: Denton	Amarillo	Lawton	Stillwater	Woodward	Average
Early Blackhull	8856	47.6	17.8	34.7	29.6	14.4	28.8
Quivira	8886	44.1	20.4	35.0	30.1	10.6	28.0
Tenmarq	6936	45.0	17.1	33.5	29.2	9.5	26.9
Blackhull	6251	42.6	17.1	33.2	26.4	10.9	26.0
Kawvale	8180	39.1	16.5	32.1	28.9	8.6	25.0
Kanred	5146	39.5	17.4	32.5	27.3	7.2	24.8
Denton	8265	34.4	17.2	31.9	29.0	6.7	23.8
Turkey selection	10016	37.3	14.4	30.5	26.3	9.0	23.5
Fulcaster	6471	36.6	16.0	32.9	21.9	9.5	23.4
Kharkof	1442	32.9	18.8	32.0	28.0	4.0	23.1
Nebraska No. 60	6250	31.7	16.0	30.2	23.9	4.3	21.2
Standard error of a mean (bu.)		0.9	---	0.8	2.1	1.2	---
Standard error of a mean (pct.)		2.28	---	2.49	7.48	15.46	---

Table 4. - Summary of average yields of 9 uniform winter wheat varieties grown in plot tests at 8 stations in the southern district for a part or all of the period 1931-37

Variety	C. I. No.	Average yield in bushels per acre at: Denton	Amarillo	Lawton	Stillwater	Carrier	Helena	Woodward	Goodwell	Weighted average
No. of years grown		7	3	6	7	3	3	6	4	
Tenmarq	6936	33.1	16.0	26.1	28.9	27.8	19.2	24.9	25.1	26.4
Blackhull	6251	28.3	15.3	25.2	29.5 1/	26.9 1/	28.9	24.0	27.3	26.1
Quivira	8886	34.2	15.6	27.0	27.1	22.5	20.3	24.0	22.7	25.7
Kanred	5146	30.5	15.4	25.8	28.0	25.8	16.2	23.1	27.6	25.3
Kharkof	1442	26.1	15.4	25.2	28.8	27.3	17.4	24.9	29.3	25.2
Kawvale	8180	30.6	13.8	27.0	27.7	25.5	16.0	22.6	21.0	24.5
Nebraska No.60	6250	24.3	13.3	23.4	27.9	26.4	17.3	23.6	28.6	23.9
Denton	8265	28.8	14.1	24.5	29.6	25.0	17.7	19.9	21.7	23.9
Fulcaster	6471	26.9	12.9	24.1	26.9 1/	21.5	13.2	22.4	20.1	22.4

1/ Grown 1 year less than shown.

For the central district data were reported from only four stations in 1937 (table 5). Kanred, Tenmarq, and Blackhull have the best averages, all being nearly equal. In fourth place is Turkey selection (C. I. 10094) and Cheyenne. Turkey selection (C. I. 10094) dropped from first place in average because of a poor record at Hays and Lincoln. Turkey selection (C. I. 10016) could not be ranked because it was not grown at Hays in 1937. For the 1931-37 average, complete records are available for only six varieties (table 6). Cheyenne still holds a slight advantage closely followed by Blackhull and Tenmarq.

For the northern district the 1937 data are presented in table 7. The varieties are arranged in order of average yield at three stations (Waseca, Sheridan, and Moccasin). Bozeman data are not included in the average because the yields are so much higher than at other stations. Yogo and Minard x Minhardi (C. I. 8888) have the best average yields. Turkey selection (C. I. 10094) had an average yield slightly less than Minturki. For the period 1931-37 the data are presented in table 8. Because of the nature of the data the varieties are ranked in order of the percentage of Kharkof in comparable tests. Yogo and Minhardi x Minturki (C. I. 8034) have the highest rank followed by Kanred, Nebraska No. 60, Kharkof, and Minturki. Some of the newer varieties could not be included as they have been grown for shorter periods.

Table 5. - Summary of average yields of 10 winter wheat varieties grown in uniform plot tests at 4 stations in the central district in 1937

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Hays	Lincoln	Akron	Average
Kanred	5146	43.2	29.0	15.5	16.0	25.9
Tenmarq	6936	43.3	29.6	15.1	15.1	25.8
Blackhull	6251	45.7	28.3	13.3	14.1	25.4
Turkey selection	10094	44.7	25.9	12.8	15.4	24.7
Cheyenne	8885	40.9	28.2	14.0	15.4	24.6
Early Blackhull	8856	42.2	27.0	15.5	11.3	24.0
Oro	8220	39.1	25.1	14.6	16.4	23.8
Kharkof	1442	35.3	26.3	16.1	14.7	23.1
Nebraska No. 60	6250	35.0	25.4	15.8	14.4	22.7
Turkey selection	10016	48.3	---	13.7	13.1	---
Standard error of a mean(bu.)		1.7	2.3	1.4	1.3	0.9
Standard error of a mean (pct.)		4.01	8.47	9.69	8.97	4.05

Table 6. - Summary of average yields of uniform varieties of winter wheat grown in plot tests at 8 stations in the central district, 1931-37

Variety	C. I. No.	Average yield in bushels per acre at: Manhattan	Hays	Colby	Akron	Lincoln	North Platte	Alliance	Valentine	Weighted Average
No. of years grown		7	6	3	7	7	5	2	1	
Cheyenne	8885	40.1	25.0	32.8	12.8	29.9	30.5	17.8	9.8	27.0
Blackhull	6251	38.9	25.2	32.7	13.9	27.4	28.8	17.8	9.1	26.3
Tenmarq	6936	38.5	25.2	30.5	13.6	28.1	29.5	17.3	8.4	26.2
Oro	8220	37.2	23.1	29.7	12.7	26.7	28.2	18.4	7.1	25.0
Kanred	5146	36.8	23.8	28.7	13.0	27.0	27.8	16.5	7.9	24.9
Nebraska No.60	6250	36.0	23.3	38.0 1/	11.5	25.8	28.4	17.1	8.8	24.7
Kharkof	1442	36.0	21.2	38.8 1/	11.4	27.1	--	16.8	9.6	---

1/ Grown 1 year less than shown.

Table 7. - Summary of average yields of 9 varieties of winter wheat grown in uniform plot tests at 5 stations in the northern district in 1937

Variety	C. I. No.	Average yield in bushels per acre at:					Average 1/ (3 stations)
		Waseca	St.Paul	Sheridan	Bozeman	Moccasin	
Yogo	8033	19.4		20.8	74.0	7.4	15.9
Minard x Minhardi	8888	22.3	26.8	16.8	79.1	6.5	15.2
Minturki	6155	22.2	21.0	14.1	66.9	4.7	13.7
Turkey selection	10094	22.4		13.4	83.1	4.7	13.5
Kharkof	1442	13.7		15.6	70.7	5.1	11.5
Nebraska No. 60	6250	7.4		17.7	77.5	7.1	10.7
Turkey selection	10016	15.5		12.8	82.8	3.2	10.5
Minturki x Marquis	11502	19.2	24.8	14.7	68.8	---	---
Standard error of a mean (bu.)		---	---	2.8	2.6	0.8	---
Standard error of a mean (pct.)		---	---	18.00	3.41	13.56	---

1/ Average of Waseca, Sheridan, and Moccasin.

Table 8. - Summary of average yields of 6 uniform winter wheat varieties grown in plot tests at 9 stations in the northern district during all or a part of the period 1931-37

Variety	C. I. No.	Average yield in bushels per acre at: Waseca	Redfield	Dickinson	Archer	Sheridan	Bozeman	Huntley	Moccasin	Havre	Weighted average	Percentage of Kharkof for same tests
Number of years grown		5	2	3	3	7	6	2	6	4		
Yogo	8033	34.3	24.1	10.9		22.8	71.7		15.1	8.6	29.3	109.7
Minhardi x Minturki	8034		18.6	9.3	11.4						12.4	108.8
Kanred	5146		15.6		9.8	22.7		19.6		7.1	16.0	103.9
Nebraska No. 60	6250	30.0	18.5	10.2	10.4	22.1	70.1		14.2		28.4	102.2
Kharkof	1442	32.4	15.9	8.8	11.1	20.8	68.8	21.3	13.1	6.0	25.2	100.0
Minturki	6155	34.1	16.3	10.0		19.2	62.9		12.8	7.8	25.5	96.6

States

In several of the States there are two or more cooperating stations. At some of these stations only the uniform varieties are grown, while at others additional varieties are included. It has been the practice to summarize the data for the States by averaging the yields from all stations within a State. In 1937, only one station reported yields in Colorado and Wyoming, and in Montana the yields from Bozeman are so much higher than those from Moccasin that they are not averaged.

In Texas 11 varieties were grown at both Denton and Amarillo. The yields for 1937 and for the period 1931-37 are averaged in table 9. For 1937 the early varieties had a decided advantage in yield; Early Blackhull, Quivira, and Tennarq have the highest yields. For the average of 10 station-years Quivira and Tennarq have the best records.

In Oklahoma 14 varieties were grown at each of three stations (table 10). Based on the 1937 figures Early Blackhull has the highest average yield, followed by Quivira and Chiefkan. Turkey selection (C. I. 10016) and Nebraska No. 60 had the lowest average. The standing of Nebraska No. 60 and Early Blackhull is just the reverse of their standing in 1936. Based on the long-time average for these three stations Tennarq ranks first, followed by Kharkof and Quivira. The average of Nebraska No. 60 is one of the lowest as is that of Early Blackhull and Fulcaster.

Sixteen varieties were grown at both Manhattan and Hays. The yields are averaged in table 11. Quivira has the highest average, followed by Chiefkan, Oro x Tennarq (C. I. 11673), and Blackhull. Kharkof and Nebraska No. 60 are low. For the long-time average Cheyenne has a slight advantage followed by Quivira, Blackhull, and Tennarq.

In Minnesota six varieties were grown at both St. Paul and Waseca (table 12). Minard x Minhardi (C. I. 8888) has the highest yield. Two Minturki x Marquis strains rank second and third while Minturki ranked fourth.

Table 9. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Texas in 1937 and weighted average for 1931-37

Variety	C. I.	Average yield in bushels	
		1937 2 stations	1931-37 10 station-years
Early Blackhull	8856	32.7	----
Quivira	8886	32.3	28.6
Tenmarq	6936	31.1	28.0
Blackhull	6251	29.9	24.4
Kanred	5146	28.5	26.0
Kawvale	8180	27.8	25.6
Fulcaster	6471	26.3	22.7
Kharkof	1442	25.9	22.9
Turkey selection	10016	25.9	----
Denton	8265	25.8	24.4
Nebraska No. 60	6250	23.9	21.0

Table 10. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Oklahoma in 1937 and weighted average for 1931-37

Variety	C. I.	Average yield in bushels	
		1937 3 stations	1931-37 19 station-years
Early Blackhull	8856	26.2	24.3
Quivira	8886	25.2	26.1
Chiefkan	11754	24.5	----
Tenmarq	6936	24.1	26.8
Blackhull	6251	23.5	24.6
Kawvale	8180	23.2	25.9
Denton	8265	22.5	24.9
Kanred	5146	22.3	25.8
Sibley No. 62	11523	22.1	----
Turkey selection	10016	21.9	----
Cheyenne	8885	21.6	26.3
Fulcaster	6471	21.4	23.3
Kharkof	1442	21.3	26.4
Nebraska No. 60	6250	19.5	25.1

Table 11. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Kansas in 1937 and weighted average for 1931-37

Variety	C. I. No.	Average yield in bushels	
		1937 2 stations	1931-37 10 station-years
Quivira	8886	38.7	32.9
Chiefkan	11754	37.5	-----
Oro x Tenmarq	11673	37.3	-----
Blackhull	6251	37.0	32.6
Kanred x Marquis	11589	36.9	-----
Tenmarq	6936	36.5	32.4
Oro x Tenmarq	11672	36.4	-----
Kanred	5146	36.1	30.8
Turkey selection	10094	35.3	-----
Early Blackhull	8856	34.6	32.3
Cheyenne	8885	34.6	33.1
Kanred X Hard Federation	10092	34.3	-----
Turkey	1558	32.9	30.5
Oro	8220	32.1	30.7
Kharkof	1442	30.8	29.2
Nebraska No. 60	6250	30.2	30.1

Table 12. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Minnesota in 1937

Variety	C. I. No.	Average yield in bushels 2 stations
Minard x Minhardi	8888	24.6
Minturki x Marquis	11501	22.9
Minturki x Marquis	11502	22.0
Minturki	6155	21.6
Minturki x Marquis (Minn.2552)	-----	21.5
Minhardi x Marquis	11657	20.6

New Varieties

At various times since the program was started new varieties have been included in the tests. Because these varieties are not grown uniformly at a group of stations, it is difficult to summarize the data. There are several varieties that are causing considerable discussion in the different districts. An attempt has been made to compare the yields of some of these varieties with standard wheats of the districts (table 13).

The data indicate that in neither the southern nor central district does Early Blackhull equal Blackhull, although it has outyielded Kharkof in the central district. Cheyenne is nearly equal to Blackhull in 24 tests in the southern district. Chiefkan, although tested in only a few cases, is superior to both Kharkof and Blackhull. In the central district Turkey selections, C. I. 10016 and 10094, both slightly outyielded Kharkof but neither is equal to Cheyenne. In the northern district Cheyenne in 10 tests has outyielded both Kharkof and Yogo. In this same district the record of Turkey selection (C. I. 10016) is rather poor, but Turkey selection (C. I. 10094) compares very well with Yogo.

Table 13. - Comparative yields of some varieties of wheat grown in plot tests in the hard red winter wheat region from 1931-37

Variety	No. of comparable tests	Comparative yield in percentage of			
		Kharkof	Blackhull	Cheyenne	Yogo
Southern District					
Early Blackhull	29	98.4	96.8	---	---
Cheyenne	24	98.8	100.4	---	---
Turkey sel. (C. I. 10016)	13	95.2	90.0	---	---
Chiefkan	4	113.5	107.3	---	---
Central District					
Chiefkan	3	124.9	103.5	---	---
Early Blackhull	30	105.6	96.7	---	---
Turkey selection (C. I. 10094)	18	108.8	---	98.6	---
Turkey selection (C. I. 10016)	26	106.3	---	97.1	---
Northern District					
Cheyenne	10	107.4	---	---	102.9
Turkey selection (C. I. 10016)	16	93.5	---	---	82.6
Turkey selection (C. I. 10094)	4	117.5	---	---	101.6
Minard x Minhardi (C. I. 8888)	7	107.5	---	---	97.8
Minhardi x Minturki (C. I. 11502)	6	94.0	---	---	86.3

SUMMARY OF AGRONOMIC DATA

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

For the southern district the data are shown in table 14. The average dates of heading and ripening place the varieties very nicely for time of maturity. The two soft wheats, Denton and Fulcaster, were the tallest on the average, and Turkey selection (C. I. 10016) the shortest. Blackhull and Early Blackhull had the highest average test weight per bushel. The leaf rust readings very clearly show the resistance of Kawvale, Denton, and Quivira.

The data from the central district are summarized in table 15. The average dates of heading and ripening differentiate the early and late wheats. The stand counts show rather clearly that the two Turkey selections tend to tiller rather heavily. All varieties had good average test weights but again Blackhull had a slight advantage.

Data were averaged for seven varieties in the northern district (table 16). Minard x Minhardi had the highest average winter survivals. Turkey selection (C. I. 10016) was the earliest, also the shortest variety. Wide differences were obtained for lodging with Minard x Minhardi (C. I. 8888) standing up the best. Average test weights were all above 60 pounds per bushel except Nebraska No. 60. Turkey selection (C. I. 10094) had slightly the highest average test weight.

Table 14. - Summary of agronomic data other than yield for varieties of winter wheat grown at the cooperating stations in the southern district in 1937

Variety	C. I. No.	Date		Leaf rust	Height	Average Test weight per bushel
		Headed	Ripe			
No. of stations		4	3	2	4	4
				(Pct.)	(In.)	(Lbs.)
Kharkof	1442	May 8	June 7	35.0	32.3	58.8
Kanred	5146	May 7	June 5	40.0	32.0	59.1
Nebraska No. 60	6250	May 9	June 8	52.5	31.3	58.8
Blackhull	6251	May 5	June 5	46.5	33.8	61.2
Tenmarq	6936	May 5	June 3	10.0	33.8	58.3
Early Blackhull	8856	Apr.25	May 28	37.5	32.3	59.9
Quivira	8886	Apr.30	May 29	5.0	33.3	59.6
Turkey selection	10016	May 4	June 2	67.5	30.8	58.7
Kawvale	8180	May 4	June 3	1.5	33.8	57.9
Denton	8265	May 7	June 5	2.5	36.0	58.7
Fulcaster	6471	May 6	June 4	44.0	35.5	58.7

Table 15. - Summary of agronomic data other than yield for varieties of winter wheat grown at cooperative stations in the central district in 1937

Variety	C. I. No.	Date		No. culms per acre	Height	Average Test weight per bushel
		Headed	Ripe			
Number of stations		4	4	2	4	4
				(1000)	(In.)	(Lbs.)
Kharkof	1442	May 27	June 29	2281	25.0	61.2
Kanred	5146	May 26	June 28	2219	24.8	61.8
Nebraska No. 60	6250	May 27	June 30	2422	25.0	60.0
Blackhull	6251	May 24	June 27	2249	24.8	62.2
Tenmarq	6936	May 24	June 26	1907	24.8	60.3
Oro	8220	May 26	June 29	2181	25.0	61.1
Early Blackhull	8856	May 18	June 23	2023	24.0	61.8
Cheyenne	8885	May 26	June 29	2342	23.8	60.4
Turkey selection	10016	May 25	June 27	2802	23.3	60.7
Turkey selection	10094	May 26	June 27	2796	23.3	61.6

Table 16. - Summary of agronomic data other than yield for varieties of winter wheat grown at cooperating stations in the northern district in 1937

Variety	C. I. No.	Winter survival	Date		Average		
			Headed	Ripe	Hgt.	Lodging	Test weight per bushel
Number of stations		2	4	4	4	2	4
		(Pct.)			(In.)	(Pct.)	(Lbs.)
Kharkof	1442	58.0	June 22	July 26	36.5	50.5	60.2
Minturki	6155	54.9	June 22	July 26	38.8	14.0	60.4
Nebraska No. 60	6250	62.4	June 22	July 27	36.5	51.5	59.0
Yogo	8033	67.9	June 23	July 26	38.0	50.0	61.1
Minard x Minhardi	8888	73.7	June 22	July 25	35.3	4.0	61.3
Turkey selection	10016	54.0	June 19	July 25	34.5	30.0	60.4
Turkey selection	10094	64.0	June 20	July 25	33.8	18.5	61.5

SUMMARY OF PLOT DATA

Hard wheats continue to outyield soft wheats at Denton, Texas.

At all stations in the southern district except Stillwater early wheats gave the highest yields.

Early Blackhull and Quivira had the highest average yields of all uniform varieties grown in the southern district. Nebraska No. 60 had the lowest average in this district, just the reverse of last year.

Based on the average yield at all stations in the southern district for the period 1931-37 Tenmarq has the best yield record.

Early wheats led in yield at Manhattan and Hays, but at Akron and Lincoln later types were the better.

Cheyenne has the highest average yield for the period of testing in the central district.

Chiefkan, a new beardless, hard wheat tested for only two years, has made an unusually good record and is being tested more thoroughly.

Turkey selection (C. I. 10094) continues to yield slightly less than Cheyenne but it is resistant to bunt races now known to be present in the area and to which Cheyenne is susceptible.

In the northern district some new hybrid strains appear to have promise, especially Minard x Minhardi (C. I. 8888) and Minhardi x Minturki (C. I. 11502).

Where killing is not too severe in the northern district Cheyenne and Turkey selection (C. I. 10094) give good yields. Turkey selection (C. I. 10016) has been very disappointing.

Nebraska No. 60 and Turkey selection (C. I. 10016) are being dropped as uniform varieties.

There is still a need for new strains to be tested and room can easily be made for such strains.

For the eastern part of the area, superior varieties carrying resistance to stem rust are badly needed.

UNIFORM YIELD NURSERY

In the fall of 1936, the uniform yield nursery was seeded at the same eleven stations in the central and southern districts as in 1936. The nursery was limited to 30 varieties and strains, each seeded in replicated 3, rod-row plots. The number of plots of each variety at a station varied from 3 to 5. In table 17 the varieties making up the 1937 nursery, together with State and C. I. numbers, are shown.

A comparison of the 1937 list with that of 1936 will show some changes in the nursery. Five strains which seemed to be lacking in agronomic value and which were not needed for ecological studies were replaced by newer material. As soon as a strain is shown to be lacking in some important character it is dropped from the nursery, although it still may be continued at individual stations. The best strains are advanced to the uniform plot trials.

Table 17. - Varieties of winter wheat grown as a uniform yield nursery, 1937

Variety	C. I. No.	State or hybrid No.
Kharkof	1442	---
Blackhull	6251	---
Nebraska No. 60	6250	---
Early Blackhull	8856	---
Turkey selection	10083	Okla. No. 1
Sibley No. 62	11523	Oklahoma
Penquite sel.	11745	Oklahoma
Kanred x Marquis	11589	Kans. No. 2690
Turkey sel.	11667	Nebraska No. 1088
Minturki x Blackhull	11671	Nebraska No. 1089
Beloglina x Hussar	11513	No. Platte 126
Prelude x Kanred	11591	Kans. No. 2689
Oro x Tenmarq	11672	Kans. No. 2728
Oro x Tenmarq	11673	Kans. No. 2729
Cheyenne sel.	11666	Nebr. No. 1087
Kanred x Hard Federation	10092	Kans. No. 2673
Kanred x (Kanred-Marquis)	11592	Kans. sel. No. 303942
Turkey sel.	10016	Nebr. No. 1069
Turkey sel.	10094	Nebr. No. 1063
Turkey sel.	11576	Nebr. No. 1082
Kanred x Marquis	11746	Akron sel. No. 46
Turkey x Marquis	11747	Akron sel. No. 49
Turkey sel.	11577	Nebr. No. 1081
Oro x Fulhard	11579	Nebr. No. 1083
(Minhardi-Minturki) x Tenmarq	11668	Nebr. No. 1085
Kawvale x Tenmarq	11669	Nebr. No. 1086
Kawvale x Tenmarq	11750	Kans. No. 2727
Akron sel.	11660	Akron sel. No. 7
Blackhull sel.	11737	Nebr. No. 1093
Tenmarq x Minturki	11580	Nebr. No. 1094

DATA OBTAINED

In table 18 are presented the data from nine of the nurseries. No data were obtained from North Platte and Alliance, Nebr., because of drought and winter-killing. For each station the varieties are listed in order of the 1937 yield. The average yields and ranks for the 6-year period, 1932-37, and the 2-year period, 1936-37, are given wherever possible. A percentage of Kharkof (C. I. 1442) is also shown for each variety. Data other than yield are given when the character concerned seemed to be related to yield, or when the data demonstrated differences believed to be of interest.

At Denton, rust, both leaf and stem, was rather heavy and seemed to influence yield. The early varieties, those heading in April and ripening in May, outyielded the later types. The standard varieties, Blackhull, Nebraska No. 60, and Kharkof were outyielded by most of the strains in the nursery. A number of hybrid conbinations in which Tenmarq was a parent gave very good yields. For the most part the later Turkey type wheats gave low yields. For the 5-year period Kanred x Hard Federation and Early Blackhull have the highest averages. For the average of the last two years Kawvale x Tenmarq (C. I. 11669), Prelude x Kanred (C. I. 11591), and Kanred x Hard Federation gave the highest yields.

From Amarillo, yields only were reported, and these were the first that have been obtained on the nursery since the cooperative work was started. Oro x Tenmarq, Blackhull, Kanred x (Kanred-Marquis), and Prelude x Kanred (C. I. 11591) gave the highest yields. Several Turkey selections and Early Blackhull were at the bottom of the list.

At Stillwater yields ranged from 27.6 to 41.2 bushels per acre, while test weights ranged from 55 to nearly 60 pounds per bushel. Here Blackhull yielded very well, being exceeded only by Kanred x Hard Federation (C. I. 10092). Akron selection was the next highest yielding variety. For the 1932-37 average the Kanred x Hard Federation strain ranks first with Turkey selection (C. I. 10083) fron Oklahoma second. For the two-year average Blackhull ranks first for yield.

At Woodward, straw was short, and yields were rather low. Some shattering was noted, especially in Kanred x Marquis (C. I. 11589). Test weights were all rather low. Akron selection yielded highest followed by Beloglina x Hussar (C. I. 11513), a very late-maturing strain. Blackhull selection, a hardy strain, gave a yield nearly double that of Blackhull. There seems to be no close agreement between time of maturity and yield. For the 1932-37 average Kanred x Hard Federation (C. I. 10092) ranks first and Early Blackhull last, both being very early wheats.

Very complete data were reported for the nursery at Manhattan. Of special interest are the three lodging notes, taken at 7-day intervals on June 2, 9, and 16. On June 9, all of the varieties except Oro x Tenmarq (C. I. 11672) were nearly flat, but by June 16 all had come up in differing amounts, giving good differentiation. Rust readings show that no strain in the nursery is resistant to stem rust, while a number have resistance to leaf rust. In general, with increasing amounts of rust, test weights and yields were reduced. Eleven new hybrids and selections outyielded Blackhull. At the top of the list are two Oro x Tenmarq strains, both of which are resistant to bunt. For the six-year average two Turkey selections (C. I. 10094 and 10016) rank first and second and Kanred x Hard Federation third. Kharkof, Penquite selection, and Nebraska No. 60 have very poor records at Manhattan.

Yields at Hays ranged from 24.0 to 35.9 bushels per acre. Prelude x Kanred (C. I. 11591) and Oro x Tenmarq (C. I. 11672) ranked first and second and Blackhull third. In this case Blackhull selection yielded less than Blackhull. Early Blackhull was rather far down the list when its record in plots is considered. Turkey selection (C. I. 10094) has the best long-time record, followed by Blackhull and Kanred x Hard Federation. Grown for three years Prelude x Kanred (C. I. 11591) has a very high yield record. In general, the nursery data agree with those from the plots in that early wheats have the best yield records.

Ten new strains and Early Blackhull outyielded Blackhull at Akron. Three Tenmarq hybrids were at the top of the list; two of these having Oro as the other parent. Blackhull has the best long-time average, followed by Turkey selection (C. I. 10094) and Kanred x Hard Federation.

Lodging data at Fort Collins showed that (Minhardi-Minturki) x Tenmarq (C. I.11668), Akron selection, and Kanred x Hard Federation were the most resistant. Five varieties yielded more than 60 bushels per acre, two of these being winter x spring hybrids and three are selections developed at Nebraska. The behavior of the two Oro x Tenmarq strains is a bit disappointing. Prelude x Kanred (C. I. 11591) ranks first for average yield for the period 1934-37 and 1936-37. For the four-year period Early Blackhull and Kanred x Hard Federation are lowest indicating the lack of yielding ability under favorable conditions.

At Lincoln dry weather caused the crop to be early, straw to be short, and yields to be low. Test weights were unusually high, however. Blackhull selection and two hybrid strains, all produced at Lincoln, gave the highest yields. Twelve strains were higher than Nebraska No. 60 which made a surprisingly good showing. Early Blackhull and Blackhull have the best 5-year record, while Prelude x Kanred (C. I. 11591), Akron selection, and Blackhull have the highest averages for the last two years.

STANDARD ERRORS

Standard errors were calculated by Student's generalized formula as outlined on page 23 of this report. In table 19 will be found the number of plots, average yields, and standard errors for the uniform nursery grown at each station. Except for Amarillo and Woodward, the errors in percent are not large, although in general slightly higher than those of last year.

Table 18. - Agronomic and other data for the uniform winter wheat varieties grown in replicated nursery plots in cooperative experiments at nine stations in the winter wheat area, 1937

Denton, Texas
(Four plots)

Variety	C. I. No.	Date		Hgt.	Rust		Acre yield	Yield				No. of years grown	Percentage of Kharkof for same years
		Headed	Ripe		Leaf	Stem		Average 1932-34 and 1936-37	Rank	Average 1936 and 1937	Rank		
				(In.)	(Pct.)	(Pct.)	(Bu.)	(Bu.)		(Bu.)			
Kawvale x Tenmarq	11750	Apr. 30	May 28	34	1	21	35.4					1	183.4
Oro x Tenmarq	11673	Apr. 30	May 29	34	5	13	33.7					1	174.6
Kawvale x Tenmarq	11669	Apr. 30	May 28	33	18	21	32.5			36.4	1	2	128.6
Early Blackhull	8856	Apr. 24	May 24	31	48	0	1/ 31.4	30.8	2	33.9	6	5	136.3
Oro x Tenmarq	11672	Apr. 29	May 28	33	8	13	31.3					1	162.2
Tenmarq x Minturki	11580	Apr. 29	May 29	33	38	18	30.7					1	159.1
(Minhardi x Minturki) x Tenmarq	11668	Apr. 29	May 27	31	18	14	30.1			32.9	7	2	116.3
Prelude x Kanred	11591	Apr. 29	May 28	32	23	14E	29.6			35.6	2	3	152.5
Kanred x Hard Federation	10092	Apr. 29	May 29	30	40	41	29.5	32.3	1	35.1	3	5	142.9
Blackhull sel.	11737	May 4	June 3	34	85	21	29.4					1	152.3
Kanred x Marquis	11589	May 2	May 30	33	18	8	28.7			34.0	5	3	137.7
Turkey x Marquis	11747	May 2	June 2	34	70	31	28.1			31.8	11	3	112.4
Turkey sel.	10083	May 6	June 3	34	65	35	27.8	28.1	3	32.7	8	5	124.3
Turkey sel.	10016	May 2	May 30	34	75	25	27.5	22.5	6	31.1	10	5	99.6
Turkey sel.	11576	May 4	June 1	34	73	19	26.8			29.8	20	3	93.2
Minturki x Blackhull	11671	May 5	June 4	35	65	26	26.4			32.1	9	3	113.4
Sibley No. 62	11523	May 6	June 2	34	35	31	26.3			31.2	12	3	127.5
Turkey sel.	10094	May 4	June 1	32	83	13	26.2	21.9	7	31.2	12	3	96.9
Kanred x (Kanred-Marq.)	11592	May 4	June 1	33	65	24	26.1			33.2	4	3	108.3
Cheyenne sel.	11666	May 5	June 3	31	83	15	26.0			31.2	12	2	110.2
Oro x Fulhard	11579	May 4	June 5	33	75	65	25.8			30.3	19	2	107.1
Turkey sel.	11667	May 3	June 1	33	85	21	25.7			27.9	23	2	98.6
Turkey sel.	11577	May 4	June 3	33	83	16	25.6			30.6	16	2	108.1
Blackhull	6251	May 4	June 2	34	65	28	23.9	24.7	4	30.8	15	3	109.3
Kanred x Marquis	11746	May 4	June 3	33	30	46	23.3			30.5	17	2	107.8
Penquite sel.	11745	May 5	June 3	32	60	45	23.2			28.8	21	2	101.8
Akron sel.	11660	May 4	June 2	33	75	40	23.1			30.5	17	2	107.8
Beloglina x Hussar	11513	May 8	June 5	34	58	76	20.8			27.5	24	3	93.2
Nebraska No. 60	6250	May 7	June 5	33	60	66	19.9	21.0	8	25.7	25	5	92.9
Kharkof	1442	May 8	June 4	31	55	59	19.3	22.6	5	28.3	22	2	100.0

1/ Escaped.

Standard error of a difference, 2.8 bu.; standard error of a mean, 2.0 bu., or 7.20 percent.

Table 18. - (Continued)

Amarillo, Texas

(Two plots)

Variety	C. I. No.	Stand March 8	Acre yield	Percentage of Kharkof
		(Pct.)	(Bu.)	
Oro x Tenmarq	11673	80	10.3	128.8
Blackhull	6251	63	10.3	128.8
Kanred x (Kanred - Marquis)	11592	70	10.1	126.3
Prelude x Kanred	11591	77	10.1	126.3
Sibley No. 62	11523	87	9.7	121.3
Tenmarq x Minturki	11580	70	9.6	120.0
Kawvale x Tenmarq	11669	70	9.3	116.3
Turkey sel.	10016	65	8.6	107.5
Blackhull sel.	11737	73	8.5	106.3
(Minhardi-Minturki)x Tenmarq	11668	60	8.3	103.8
Kawvale x Tenmarq	11750	70	8.2	102.5
Kharkof	1442	63	8.0	100.0
Oro x Fulhard	11579	80	7.8	97.5
Turkey sel.	11667	55	7.7	96.3
Akron sel.	11660	70	7.6	95.0
Cheyenne sel.	11666	45	7.2	90.0
Turkey x Marquis	11747	45	7.0	87.5
Penquite sel.	11745	70	6.9	86.3
Kanred x Marquis	11589	80	6.9	86.3
Minturki x Blackhull	11671	55	6.8	85.0
Kanred x Marquis	11746	65	6.3	78.8
Beloglina x Hussar	11513	50	5.8	72.5
Turkey sel.	10083	77	5.7	71.3
Kanred x Hard Federation	10092	55	5.7	71.3
Oro x Tenmarq	11672	60	5.7	71.3
Turkey sel.	10094	40	5.1	63.8
Nebraska No. 60	6250	55	4.9	61.3
Turkey sel.	11577	70	4.6	57.5
Turkey sel.	11576	68	4.5	56.3
Early Blackhull	8856	80	3.4	42.5

Standard error of a difference, 2.4 bu.; standard error of a mean, 1.7 bu., or 22.73 percent.

Table 18. - (Continued)

Stillwater, Oklahoma

(Four plots)

Variety	C. I. No.	Date headed	Hgt.	Test weight (per bu.)	Acre yield	Yield				No. of years grown	Percentage of Kharkof for same years
						Average 1932 - 1937	Rank	Average 1936 - 1937	Rank		
			(In.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Kanred x Hard Federation	10092	Apr. 24	25	57.4	41.2	35.5	1	29.8	8	6	115.6
Blackhull	6251	May 1	30	58.4	38.5	31.3	4	33.8	1	6	102.0
Akron sel.	11660	Apr. 29	27	56.5	37.3			29.1	11	3	87.5
Oro x Fulhard	11579	May 2	31	57.1	37.1			28.8	15	3	93.2
Prelude x Kanred	11591	Apr. 25	29	55.5	37.0			30.3	6	4	123.2
Kawvale x Tenmarq	11669	Apr. 26	25	56.5	36.8			27.9	18	3	107.5
Tenmarq x Minturki	11580	Apr. 26	29	55.5	36.1					1	109.1
(Minhardi-Minturki) x Tenmarq	11668	Apr. 26	25	55.6	36.1			25.6	25	3	95.7
Early Blackhull	8856	Apr. 22	26	56.9	35.9	28.5	8	27.1	20	6	92.8
Turkey sel.	11577	May 2	30	57.7	35.5			31.7	4	3	96.4
Oro x Tenmarq	11672	Apr. 27	29	56.6	35.4					1	106.9
Beloglina x Hussar	11513	May 4	28	55.3	35.2			32.3	2	4	115.6
Kawvale x Tenmarq	11750	May 1	29	59.5	34.7					1	104.8
Blackhull sel.	11737	May 3	29	53.5	34.7					1	104.8
Turkey sel.	10083	May 3	27	57.4	34.6	32.6	2	29.7	9	6	106.2
Kanred x Marquis	11589	Apr. 28	28	56.8	34.5			29.1	11	4	109.4
Turkey sel.	10094	May 3	27	56.8	34.1	32.1	3	31.0	5	6	104.6
Oro x Tenmarq	11673	Apr. 26	28	57.0	33.9					1	102.4
Turkey sel.	11667	May 1	26	56.7	33.8			26.7	22	2	89.9
Cheyenne sel.	11666	May 4	27	56.0	33.5			28.4	17	2	95.6
Kharkof	1442	May 2	28	57.6	33.1	30.7	6	29.7	9	6	100.0
Sibley No. 62	11523	May 3	28	54.9	32.4			32.0	3	2	118.1
Penquite sel.	11745	May 2	29	56.2	32.3			26.5	23	2	89.2
Turkey sel.	11576	May 3	29	55.3	32.3			30.0	7	2	92.4
Minturki x Blackhull	11671	May 3	29	56.0	32.0			28.8	15	2	97.0
Turkey sel.	10016	Apr. 30	28	56.6	31.6	29.5	7	25.8	24	6	96.1
Nebraska No. 60	6250	May 4	29	58.6	31.5	31.0	5	29.1	11	6	101.0
Turkey x Marquis	11747	May 2	29	57.2	31.2			27.7	19	2	93.3
Kanred x Marquis	11746	May 2	29	56.0	30.2			27.1	20	2	91.2
Kanred x (Kanred-Marquis)	11592	May 2	29	55.1	27.6			29.0	14	4	97.5

Standard error of a difference, 2.7 bu.; standard error of a mean, 1.9 bu., or 5.55 percent.

Table 18. - (Continued)

Woodward, Oklahoma

(Four plots)

Variety	C. I. No.	Date Headed May	Date Ripe June	Hgt. (In.)	Lodging (Pct.)	Shattering (Pct.)	Test weight (per bu.) (Lbs.)	Acre yield (Bu.)	Yield Av. 1932-1937 (Bu.)	Rank	Yield Av. 1936-1937 (Bu.)	Rank	No. of years grown	Percentage of Kharkof for same years
Akron sel.	11660	11	5	23	2	8	54	20.1			21.0	2	3	126.0
Beloglina x Hussar	11513	11	11	25	2	11	55	19.7			21.3	1	4	116.6
Blackhull sel.	11737	11	6	22	3	6	57	19.0					1	200.0
Kawvale x Tenmarq	11669	9	2	24	1	12	52	18.8			20.7	3	3	133.3
Prelude x Kanred	11591	8	2	25	3	9	56	18.6			19.6	5	4	114.6
Early Blackhull	8856	5	30	23	2	1	56	17.6	19.0	8	17.8	12	6	95.5
Penquite sel.	11745	11	8	23	T	5	56	17.1			18.1	10	2	112.4
Oro x Fulhard	11579	12	8	23	1	7	56	16.4			20.0	4	3	129.3
Kanred x Hard Federation	10092	8	2	20	1	1	56	16.0	22.4	1	19.0	7	6	112.6
Kawvale x Tenmarq	11750	10	2	23	3	7	52	15.4					1	162.1
Kanred x Marquis	11589	9	5	24	1	23	54	15.2			17.2	14	4	114.0
Turkey sel.	11577	13	8	23	1	2	53	15.1			18.5	9	3	113.3
Turkey sel.	11667	9	5	23	1	1	53	14.7			18.0	11	2	111.8
Tenmarq x Minturki	11580	12	8	20	1	3	53	14.5					1	152.6
Kanred x (Kanred- Marquis)	11592	12	7	22	0	8	55	14.4			18.6	8	4	122.3
Turkey sel.	11576	12	8	21	0	1	53	14.3			19.2	6	4	110.8
Oro x Tenmarq	11673	9	3	23	1	3	54	13.8					1	145.3
Turkey sel.	10016	10	5	21	0	6	54	13.0	20.0	3	15.7	22	6	100.5
Oro x Tenmarq	11672	7	3	24	2	4	56	12.5					1	131.6
Cheyenne sel.	11666	14	6	19	0	T	56	12.5			17.2	14	2	106.8
Turkey sel.	10083	12	13	22	1	T	55	12.0	20.8	2	17.5	13	6	104.5
Sibley No. 62	11523	11	13	20	0	T	55	11.8			16.2	18	4	94.3
Minturki x Blackhull	11671	13	8	25	1	T	54	11.7			16.9	17	2	105.0
Turkey sel.	10094	13	7	20	0	1	54	11.3	19.9	4	17.1	16	6	100.0
Nebraska No. 60	6250	17	12	21	0	4	56	10.6	19.3	7	16.1	20	6	97.0
Turkey x Marquis	11747	12	7	22	0	T	53	10.6			15.5	23	2	96.3
Blackhull	6251	12	6	21	T	T	55	10.5	19.8	6	16.2	18	6	99.5
Kharkof	1442	17	15	20	T	0	56	9.5	19.9	4	16.1	20	6	100.0
(Minhardi-Minturki) x Tenmarq	11668	7	2	23	1	11	54	9.2			13.6	24	3	100.7
Kanred x Marquis	11746	12	9	22	1	5	54	8.5			13.6	24	2	84.5

Standard error of a difference, 3.5 bu.; standard error of a mean, 2.5 bu., or 17.77 percent.

Table 18. - (Continued)

Manhattan, Kansas

(Three plots)

Variety	C. I. No.	Date first headed	Hgt.	Lodging			Rust		Kernel plumpness	Test weight (per bu.)	Acre yield	Yield				No. of years grown	Percentage of Kharkof for same years
				6-2	6-9	6-16	Stem	Leaf				Av. 1932-1937	Rank	Av. 1936-1937	Rank		
		(May)	(In.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Oro x Tenmarq	11672	19	35	0	5	0	35	7	89	60.9	46.1					1	158.4
Do	11673	19	35	0	65	Tr.	33	10	89	60.6	44.3					1	152.2
Prelude x Kanred	11591	19	37	2	70	0	65	10	90	61.3	43.8			33.7	16	4	129.3
Minturki x Blackhull	11671	23	37	Tr.	80	8	38	75	87	61.7	43.3			38.9	1	2	131.4
Early Blackhull	8856	16	36	17	80	Tr.	25	65	95	63.5	42.9	35.0	4	33.5	17	6	121.5
Kawvale x Tenmarq	11750	21	36	17	90	5	43	7	86	60.1	42.9					1	147.4
Tenmarq x Minturki	11580	21	37	18	95	3	43	17	85	59.1	42.2					1	145.0
Kanred x Marquis	11589	21	38	8	95	3	53	15	92	60.8	41.9			37.3	6	4	123.0
Cheyenne sel.	11666	23	37	13	90	35	65	75	89	59.8	41.6			38.5	4	2	130.1
Turkey sel.	11577	23	37	27	100	28	58	82	86	58.7	41.6			38.9	1	3	125.8
Kawvale x Tenmarq	11669	20	34	0	85	25	50	12	92	61.8	40.3			38.9	1	3	136.6
Blackhull sel.	11737	22	39	18	95	28	43	82	89	61.9	40.0					1	137.5
Turkey sel.	10016	21	36	27	100	13	68	73	88	60.5	39.7	36.8	2	35.9	10	6	127.8
Kanred x Hard Federation	10092	18	34	Tr.	75	0	80	15	90	58.8	39.1	36.7	3	32.2	20	6	127.4
Turkey sel.	10094	23	36	15	100	48	68	82	88	58.6	39.0	39.1	1	38.3	5	6	135.8
Akron sel.	11660	22	37	7	65	10	55	82	86	59.3	38.6			34.6	14	3	109.1
Turkey sel.	11667	22	38	32	100	48	68	82	87	60.0	38.6			33.3	18	2	112.5
(Minhardi-Minturki) x Tenmarq	11668	19	33	3	80	0	65	28	87	60.3	38.1			35.4	12	3	111.1
Turkey sel.	10083	24	38	27	100	60	65	72	85	57.0	37.3	34.4	5	35.3	13	6	119.4
Kanred (Kanred-Marquis)	11592	22	38	13	95	20	53	73	87	58.0	37.0			37.2	7	4	125.2
Turkey sel.	11576	24	38	28	100	28	65	82	86	58.4	36.7			36.0	9	4	123.0
Blackhull	6251	22	39	5	90	38	38	80	90	61.4	35.5	34.3	6	30.5	21	6	119.1
Beloglina x Hussar	11513	24	37	16	90	38	85	35	79	56.0	35.2			35.7	11	4	121.5
Sibley No. 62	11523	24	38	30	100	58	65	77	84	56.6	35.1			33.8	15	4	122.6
Oro x Fulhard	11579	23	37	22	95	15	48	80	84	58.0	32.4			36.6	8	3	118.1
Kanred x Marquis	11746	23	39	25	100	35	60	18	83	56.9	31.8			33.0	19	2	111.5
Turkey x Marquis	11747	23	38	30	100	13	70	83	74	56.0	29.8			28.4	24	2	95.9
Kharkof	1442	24	38	23	95	45	75	65	83	56.6	29.1	28.8	8	29.6	22	6	100.0
Penquite sel.	11745	23	37	27	100	40	73	75	85	58.5	28.6			29.0	23	2	98.0
Nebraska No. 60	6250	26	39	18	95	43	88	77	80	53.5	28.1	30.7	7	27.8	25	6	106.6

Standard error of a difference, 3.7 bu.; standard error of a mean, 2.6 bu., or 6.92 percent.

Table 18. - (Continued)

Hays, Kansas

(Three plots)

Variety	C. I. No.	Date Headed May	Date Ripe June	Hgt.	Acre yield	Yield Av. 1932-34 and 1936-37	Rank	Yield Av. 1936-1937	Rank	No. of years grown	Pct. of Kharkof for same years
				(In.)	(Bu.)	(Bu.)		(Bu.)			
Prelude x Kanred	11591	17	18	24	35.9			35.9	1	3	130.1
Oro x Tenmarq	11672	15	18	24	33.6					1	106.3
Blackhull	6251	18	20	24	32.2	28.7	2	31.5	8	5	118.1
Kanred x Marquis	11589	18	19	24	32.1			32.9	3	3	128.8
Kawvale x Tenmarq	11750	16	19	22	32.1					1	101.6
Oro x Tenmarq	11673	15	17	22	31.9					1	100.9
Sibley No. 62	11523	20	--	23	31.9			31.7	6	3	130.1
Kharkof	1442	21	--	24	31.6	24.3	7	29.7	16	5	100.0
Akron sel.	11660	21	--	24	31.0			32.7	4	2	110.1
Turkey sel.	10083	21	--	24	31.0	27.0	5	30.5	13	5	111.1
Kanred x Hard Fed.	10092	15	16	20	30.8	28.4	3	31.5	8	5	116.9
Tenmarq x Minturki	11580	16	18	23	30.5					1	96.5
Minturki x Blackhull	11671	20	--	24	30.4			30.3	14	2	102.0
Oro x Fulhard	11579	19	--	23	29.9			31.7	6	2	106.7
Blackhull sel.	11737	18	20	24	29.6					1	93.7
Kawvale x Tenmarq	11669	13	16	22	29.6			33.1	2	2	111.4
Cheyenne sel.	11666	20	--	19	29.4			32.5	4	2	109.4
Nebraska No. 60	6250	21	--	24	29.3	23.4	8	27.8	23	5	96.3
Kanred x Marquis	11746	19	--	22	29.3			30.2	15	2	101.7
Beloglina x Hussar	11513	21	--	25	29.2			29.0	19	3	117.5
Kanred x (Kanred - Marquis)	11592	19	20	21	28.6			29.6	17	3	107.9
Turkey sel.	10094	20	20	20	28.6	29.0	1	31.0	11	5	119.3
Early Blackhull	8856	12	16	25	28.0	27.8	4	28.2	22	5	114.4
Turkey sel.	11577	20	20	22	27.5			30.6	12	2	103.0
(Minhardi-Minturki) x Tenmarq	11668	15	17	21	26.8			31.3	10	2	105.4
Turkey sel.	11667	18	19	22	26.5			29.0	19	2	97.6
Turkey sel.	11576	20	20	21	26.1			29.0	19	3	117.5
Penquite sel.	11745	19	20	24	25.7			26.5	25	2	89.2
Turkey sel.	10016	15	17	21	24.8	25.1	6	29.2	18	5	103.3
Turkey x Marquis	11747	19	--	23	24.0			27.1	24	2	91.2

Standard error of a difference, 3.1 bu.; standard error of a mean, 2.2 bu., or 7.44 percent.

Table 18. - (Continued)

Akron, Colorado

(Five plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Acre yield	Average 1933-1937	Rank	Average 1936-1937	Rank	No. of years grown	Percentage of Kharkof for same years
				(In.)	(Bu.)	(Bu.)		(Bu.)			
Oro x Tenmarq	11672	May 28	July 4	22	22.3					1	122.5
Kawvale x Tenmarq	11750	May 29	July 5	22	22.3					1	122.5
Oro x Tenmarq	11673	May 28	July 4	22	21.8					1	119.8
Early Blackhull	8856	May 24	July 2	21	21.2	17.4	4	26.6	4	4	118.4
Kanred (Kanred - Marquis)	11592	June 1	July 6	22	21.1			25.0	9	3	116.6
Turkey sel.	10094	June 2	July 7	21	21.1	18.0	2	25.5	7	4	122.4
Cheyenne sel.	11666	June 1	July 1	22	20.7			25.6	6	2	117.4
Kawvale x Tenmarq	11669	May 28	July 5	21	20.5			26.7	3	2	122.5
Blackhull sel.	11737	May 29	July 5	21	20.5					1	112.6
Sibley No. 62	11523	June 1	July 7	23	20.4			24.1	14	3	103.0
Kanred x Marquis	11589	May 30	July 5	23	20.4			28.4	1	3	135.5
Blackhull	6251	May 28	July 5	22	20.0	18.5	1	25.4	8	4	125.9
Prelude x Kanred	11591	May 26	July 3	23	19.9			27.6	2	3	132.5
Akron sel.	11660	June 1	July 7	22	19.9			24.3	11	2	111.5
Kanred x Marquis	11746	May 30	July 6	24	19.6			23.4	16	2	107.3
Kanred x Hard Federation	10092	May 26	July 4	20	19.5	17.5	3	26.4	5	4	119.0
Turkey sel.	10083	June 1	July 8	22	19.5	14.7	6	24.3	11	4	100.0
Oro x Fulhard	11579	June 1	July 6	22	19.5			24.6	10	2	112.8
Turkey sel.	11577	May 31	July 6	22	19.3			22.2	19	2	101.8
Tenmarq x Minturki	11580	May 31	July 6	21	18.6					1	102.2
Turkey x Marquis	11747	May 29	July 5	22	18.6			21.5	22	2	98.6
Beloglina x Hussar	11513	June 2	July 7	24	18.6			22.5	17	3	103.0
Turkey sel.	11667	May 30	July 5	20	18.6			24.3	11	2	111.5
Turkey sel.	10016	May 29	July 5	21	18.5	16.2	5	23.6	15	4	110.2
Kharkof	1442	June 3	July 8	23	18.2	14.7	6	21.8	21	4	100.0
Turkey sel.	11576	June 1	July 7	23	17.8			22.3	18	3	103.6
(Minhardi-Minturki)x Tenmarq	11668	May 27	July 4	20	17.7			22.2	19	2	101.8
Minturki x Blackhull	11671	June 1	July 6	23	17.4			21.5	22	2	98.6
Penquite sel.	11745	May 31	July 6	23	17.2			21.4	24	2	98.2
Nebraska No. 60	6250	June 3	July 8	23	16.3	14.4	8	21.0	25	2	96.3

Standard error of a difference, 1.4 bu.; standard error of a mean, 1.0 bu., or 5.13 percent.

Table 18. - (Continued)

Fort Collins, Colorado

(Five plots)

Variety	C. I. No.	Date ripe July	Hgt.	Lodging	Acre yield	Yield Av. 1934-1937	Rank	Yield Av. 1936-1937	Rank	No. of years grown	Pct. of Kharkof for same years
			(In.)	(Pct.)	(Bu.)	(Bu.)		(Bu.)			
Prelude x Kanred	11591	16	46	48	62.6	60.9	1	65.6	1	4	122.0
Kanred x Marquis	11589	16	46	27	61.0	58.0	2	63.2	3	4	116.2
Cheyenne sel.	11666	18	43	60	60.6			57.5	10	2	102.7
Turkey sel.	10094	18	44	74	60.3	56.6	3	63.4	2	4	113.4
Turkey sel.	11576	18	46	76	60.2	54.9	5	61.4	5	4	110.0
Turkey x Marquis	11747	18	43	70	59.4			61.1	6	2	109.1
Oro x Fulhard	11579	19	44	68	59.3			57.5	10	3	105.4
Turkey sel.	11577	19	45	68	58.7			60.9	7	3	114.3
Kawvale x Tenmarq	11750	16	44	34	58.5					1	107.3
Turkey sel.	10016	17	44	59	57.7	51.6	9	57.0	13	4	103.4
Minturki x Blackhull	11671	17	48	47	57.4			56.3	15	2	100.5
Sibley's No. 62	11523	19	45	78	57.1	53.1	6	60.4	8	4	106.4
Penquite sel.	11745	18	44	69	56.7			52.7	21	2	94.1
Kanred x Marquis	11746	21	45	70	56.5			55.4	19	2	98.9
Akron sel.	11660	18	44	20	56.0			57.1	12	3	105.2
Blackhull sel.	11737	18	45	78	55.6					1	102.0
Kawvale x Tenmarq	11669	16	40	28	55.4			62.9	4	3	111.2
Tenmarq x Minturki	11580	17	44	62	55.0					1	100.9
Turkey sel.	10083	19	45	76	54.7	52.1	8	55.9	17	4	104.4
Kanred x (Kanred-Marquis)	11592	18	48	74	54.6	52.3	7	56.4	14	4	104.8
Kharkof	1442	20	45	75	54.5	49.9	12	56.0	16	4	100.0
Blackhull	6251	17	46	62	54.0	51.6	9	55.6	18	4	103.4
Beloglina x Hussar	11513	21	48	74	53.5	55.8	4	55.3	20	4	111.8
Oro x Tenmarq	11673	16	43	44	53.2					1	97.6
Nebraska No. 60	6250	21	44	70	52.4	50.4	11	58.0	9	4	101.0
Turkey sel.	11667	19	44	76	50.5			51.9	22	2	92.7
Oro x Tenmarq	11672	17	43	41	45.4					1	83.3
Kanred x Hard Federation	10092	16	40	22	44.4	49.0	13	49.4	23	4	98.2
Early Blackhull	8856	14	43	32	43.1	48.4	14	47.3	25	4	97.0
(Minhardi-Minturki) x Tenmarq	11668	16	41	10	41.4			47.4	24	3	82.6

Standard error of a difference, 5.6 bu.; standard error of a mean, 3.9 bu., or 7.13 percent.

Table 18. - (Continued)

Lincoln, Nebraska

(Five plots; seeded Sept. 29, 1936; emerged Oct. 6, 1936)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Test weight (per bu.)	Acre yield	Yield Average 1932-37	Rank	Yield Average 1936-37	Rank	No. of years grown	Percentage of Kharkof for same years
				(In.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Blackhull sel.	11737	May 28	June 28	20	63.0	20.3					1	130.1
(Minhardi-Minturki)x Tenmarq	11668	May 28	June 24	18	62.5	20.0			24.9	9	3	103.7
Kawvale x Tenmarq	11669	May 25	June 24	19	63.0	20.0			25.1	7	3	133.3
do	11750	May 27	June 24	20	62.0	19.8					1	126.9
Prelude x Kanred	11591	May 27	June 26	21	63.5	19.2			26.2	1	4	113.9
Cheyenne sel.	11666	May 29	June 28	18	62.5	18.4			24.0	11	2	98.8
Kanred x Hard Fed.	10092	May 27	June 25	18	61.5	18.1	21.6	5	25.7	4	6	103.3
Blackhull	6251	May 29	June 29	20	62.5	17.3	26.4	2	25.8	3	6	126.3
Turkey sel.	10083	May 29	June 29	19	61.0	17.3	20.0	8	22.6	19	6	95.7
Early Blackhull	8856	May 25	June 23	20	63.0	17.2	26.5	1	25.0	8	6	126.8
Kanred x Marquis	11589	May 28	June 26	20	62.5	16.6			23.5	13	4	95.7
Beloglina x Hussar	11513	May 29	June 29	20	61.0	16.5			22.1	22	4	85.2
Nebraska No. 60	6250	May 31	July 1	19	61.0	16.3	20.5	7	25.7	4	6	98.1
Turkey sel.	10094	May 29	June 27	18	62.0	16.3	25.1	3	25.6	5	6	120.1
Akron sel.	11660	May 28	June 29	20	61.5	16.2			26.1	2	3	123.0
Oro x Fulhard	11579	May 28	June 28	19	62.0	16.0			22.6	19	3	93.4
Turkey sel.	11577	May 28	June 28	19	61.5	15.9			22.7	17	3	95.5
Kharkof	1442	May 30	June 29	18	61.5	15.6	20.9	6	24.3	10	6	100.0
Minturki x Blackhull	11671	May 30	June 29	19	62.5	15.4			23.5	13	2	96.7
Oro x Tenmarq	11673	May 27	June 26	19	61.5	15.1					1	96.8
Kanred x Marquis	11746	May 28	June 29	18	61.5	15.0			23.4	15	2	96.3
Tenmarq x Minturki	11580	May 28	June 28	18	60.5	14.8					1	94.9
Turkey sel	11576	May 28	June 28	19	61.5	14.5			23.7	12	4	98.6
Oro x Tenmarq	11672	May 27	June 26	19	60.5	14.1					1	90.4
Penquite sel.	11745	May 29	June 28	18	61.5	14.0			21.5	25	2	88.5
Sibley No. 62	11523	May 30	June 29	18	62.0	13.8			22.2	21	4	80.9
Turkey sel.	11667	May 28	June 27	18	61.0	13.7			22.0	23	2	90.5
Turkey x Marquis	11747	May 28	June 28	18	61.0	13.7			23.1	16	2	95.1
Turkey sel.	10016	May 28	June 26	17	60.5	12.8	24.0	4	21.9	24	6	114.8
Kanred x (Kanred - Marquis)	11592	May 28	June 28	18	62.0	12.5			22.7	17	4	95.2

Standard error of a difference, 1.9 bu.; standard error of a mean, 1.4 bu., or 8.38 percent.

Table 19. - Average yield, standard error of a difference, and standard error of a mean in bushels and percent for the uniform yield nursery at each cooperating station in 1937

Station	No. of plots	Average yield of varieties (Bu.)	Standard error of a difference (Bu.)	Standard error of a mean	
				Bushels	Percent
Texas:					
Denton	4	27.1	2.8	2.0	7.20
Amarillo	2	7.3	2.4	1.7	22.73
Oklahoma:					
Stillwater	4	34.4	2.7	1.9	5.55
Woodward	4	14.1	3.5	2.5	17.77
Kansas:					
Manhattan	3	38.1	3.7	2.6	6.92
Hays	3	29.6	3.1	2.2	7.44
Colorado:					
Akron	5	19.6	1.4	1.0	5.13
Ft. Collins	5	55.0	5.6	3.9	7.13
Nebraska:					
Lincoln	5	16.2	1.9	1.4	8.38

SUMMARY OF NURSERY YIELDS

The yields of the 30 varieties of winter wheat grown at nine stations are summarized in table 20. In this table the varieties are listed in the order of the 9-station average. These averages are of interest only insofar as they show the general adaptation of the variety. A more detailed study is made possible, as the varieties also have been averaged and ranked by States. Thus it is possible to study the record of any particular strain.

For 1937 the strain having the highest average yield was Prelude x Kanred (C. I. 11591). It ranked no worse than fifth in any State and was tied for first in Kansas. Two Kawvale x Tenmarq strains ranked second and third. One of them, C. I. 11669, had the highest average yield in 1936. Of the two Oro x Tenmarq strains, C. I. 11673 ranked fourth and 11672 ranked ninth, the latter being so far down because of a poor record at Fort Collins. Blackhull selection, a winter-hardy selection, had an average about two bushels better than Blackhull. Thirteen wheats ranked above Blackhull which was the highest yielding standard variety. Turkey selection (C. I. 10094), ranking number two last year, was below Blackhull but above all the other Turkey selections except C. I. 11577. Penquite selection yielded poorly as might be expected because most of the stations are outside the soft wheat area. The record of Kanred x Marquis (C. I. 11746) is very poor. At the botton of the list is Kharkof and Nebraska No. 60.

In table 21 the yields for the two-year period, 1936-37, are summarized. A total of 25 varieties have been grown at eight stations during the 2-year period. In the table the varieties are listed in order of average yield at all stations. Averages and ranks by States are also shown. Prelude x Kanred (C. I. 11591) has the highest average yield. This strain ranked first in 1937 and fourth in 1936. The second highest variety is Kawvale x Tenmarq (C. I. 11669), third in 1937 and first in 1936. Kanred x Marquis (C.I.11589) ranked third and Turkey selection (C. I. 10094) fourth. Eleven new strains have average yields higher than Blackhull. Early Blackhull is well down the list as is Penquite selection, (Minhardi-Minturki) x Tenmarq, Turkey selection (C. I. 11667), and Nebraska No. 60.

Eight varieties have remained in the nursery since it was started. In table 22 the data for these varieties from each of the 12 stations is presented and averaged by States and for all stations. The order of the varieties remains about the same as it was in 1936. Two strains, Kanred x Hard Federation and Turkey selection (C. I. 10094), have average yields higher than Blackhull, the highest-yielding standard variety. Turkey selection (C. I. 10016) is consistently lower than C. I. 10094 but higher than Kharkof and Nebraska No. 60.

Table 20. - Summary of average yields of the 30 winter wheat varieties grown as uniform yield nurseries at 9 stations in the hard red winter-wheat region, 1937

Variety	C. I. No.	Texas Bushels per acre				Oklahoma Bushels per acre				Kansas Bushels per acre				Nebraska Bushels per acre		Colorado Bushels per acre				Average bushels per acre 9 stations
		Denton	Amarillo	Av.	Rank	Stillwater	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank	Lincoln	Rank	Akron	Ft. Collins	Av.	Rank	
Prelude x Kanred	11591	29.6	10.1	19.9	5	37.0	18.6	27.8	3	43.8	35.9	39.9	1	19.2	5	19.9	62.6	41.3	1	30.7
Kawvale x Tenmarq	11750	35.4	8.2	21.8	2	34.7	15.4	25.1	11	42.9	32.1	37.5	4	19.8	4	22.3	58.5	40.4	5	29.9
Kawvale x Tenmarq	11669	32.5	9.3	20.9	3	36.8	18.8	27.8	3	40.3	29.6	35.0	10	20.0	2	20.5	54.5	37.5	16	29.1
Oro x Tenmarq	11673	33.7	10.3	22.0	1	33.9	13.8	23.9	17	44.3	31.9	38.1	3	15.1	20	21.8	53.2	37.5	16	28.7
Kanred x Marquis	11589	28.7	6.9	17.8	12	34.5	15.2	24.9	12	41.9	32.1	37.0	5	16.6	11	20.4	61.0	40.7	2	28.6
Blackhull sel.	11737	29.4	8.5	19.0	7	34.7	19.0	26.9	6	40.0	29.6	34.8	12	20.3	1	20.5	55.6	38.1	11	28.6
Tenmarq x Minturki	11580	30.7	9.6	20.2	4	36.1	14.5	25.3	9	42.2	30.5	36.4	7	14.8	22	18.6	55.0	36.8	22	28.0
Akron sel.	11660	23.1	7.6	15.4	24	37.3	20.1	28.7	1	38.6	31.0	34.8	12	16.2	15	19.9	56.0	38.0	14	27.8
Cheyenne sel.	11666	26.0	7.2	16.6	20	33.5	12.5	23.0	20	41.6	29.4	35.5	8	18.4	6	20.7	60.6	40.7	2	27.8
Oro x Tenmarq	11672	31.3	5.7	18.5	8	35.4	12.5	24.0	16	46.1	33.6	39.9	1	14.1	24	22.3	45.4	33.9	27	27.4
Kanred x Hard Fed.	10092	29.5	5.7	17.6	13	41.2	16.0	28.6	2	39.1	30.8	35.0	10	18.1	7	19.5	44.4	32.0	29	27.1
Turkey sel.	11577	25.6	4.6	15.1	25	35.5	15.1	25.3	9	41.6	27.5	34.6	14	15.9	17	19.3	58.7	39.0	7	27.1
Oro x Fulhard	11579	25.8	7.8	16.8	17	37.1	16.4	26.8	7	32.4	29.9	31.2	25	16.0	16	19.5	59.3	39.4	6	27.1
Blackhull	6251	23.9	10.3	17.1	16	38.5	10.5	24.5	14	35.5	32.2	33.9	16	17.3	8	20.0	54.0	37.0	20	26.9
Turkey sel.	10094	26.2	5.1	15.7	22	34.1	11.3	22.7	21	39.0	28.6	33.8	17	16.3	13	21.1	60.3	40.7	2	26.9
Minturki x Blackhull	11671	26.4	6.8	16.6	20	32.0	11.7	21.9	25	43.3	30.4	36.9	6	15.4	19	17.4	57.4	37.4	18	26.8
Early Blackhull	8856	31.4	3.4	17.4	15	35.9	17.6	26.8	7	42.9	28.0	35.5	8	17.2	10	21.2	43.1	32.2	28	26.7
Turkey sel.	10083	27.8	5.7	16.8	17	34.6	12.0	23.3	18	37.3	31.0	34.2	15	17.3	8	19.5	54.7	37.1	19	26.7
Sibley No. 62	11523	26.3	9.7	18.0	11	32.4	11.8	22.1	24	35.1	31.9	33.5	18	13.8	26	20.4	57.1	38.8	10	26.5
Beloglina x Hussar	11513	20.8	5.8	13.3	29	35.2	19.7	27.5	5	35.2	29.2	32.2	22	16.5	12	18.6	53.5	36.1	24	26.1
Turkey sel.	10016	27.5	8.6	18.1	9	31.6	13.0	22.3	23	39.7	24.8	32.3	23	12.8	29	18.5	57.7	38.1	11	26.0
Turkey sel.	11576	26.8	4.5	15.7	22	32.3	14.3	23.3	18	36.7	26.1	31.4	24	14.5	23	17.8	60.2	39.0	7	25.9
Kanred x (Kanred-Marquis)	11592	26.1	10.1	18.1	9	27.6	14.4	21.0	28	37.0	28.6	32.8	19	12.5	30	21.1	54.6	37.9	15	25.8
Turkey sel.	11667	25.7	7.7	16.7	19	33.8	14.7	24.3	15	38.6	26.5	32.6	20	13.7	27	18.6	50.5	34.6	25	25.5
(Minhardi-Minturki) x Tenmarq	11668	30.1	8.3	19.2	6	36.1	9.2	22.7	21	38.1	26.8	32.5	21	20.0	2	17.7	41.4	29.6	30	25.3
Turkey x Marquis	11747	28.1	7.0	17.6	13	31.2	10.6	20.9	29	29.8	24.0	26.9	30	13.7	27	18.6	59.4	39.0	7	24.7
Penquite sel.	11745	23.2	6.9	15.1	25	32.3	17.1	24.7	13	28.6	25.7	27.2	29	14.0	25	17.2	56.7	37.0	20	24.6
Kanred x Marquis	11746	23.3	6.3	14.8	27	30.2	8.5	19.4	30	31.8	29.3	30.6	26	15.0	21	19.6	56.5	38.1	11	24.5
Kharkof	1442	19.3	8.0	13.7	28	33.1	9.5	21.3	26	29.1	31.6	30.4	27	15.6	18	18.2	54.5	36.4	23	24.3
Nebraska No. 60	6250	19.9	4.9	12.4	30	31.5	10.6	21.1	27	28.1	29.3	28.7	28	16.3	13	16.3	52.4	34.4	26	23.3
Standard error of a mean (bu.)		2.0	1.7	1.3		1.9	2.5	1.6		2.6	2.2	1.7		1.4		1.0	3.9	2.0		0.8
Standard error of a mean (pct.)		7.20	22.73	11.92		5.55	17.77	9.31		6.92	7.44	5.08		8.37		5.13	7.13	4.39		3.79

Table 21. - Summary of average yields of 25 winter wheats grown in uniform yield nurseries at 8 stations in the hard red winter wheat region, 1936-37

Variety	C. I. No.	Texas		Oklahoma				Kansas				Nebraska		Colorado				Average bushels per acre, 8 stations
		Bushels per acre		Bushels per acre				Bushels per acre				Bushels per acre		Bushels per acre				
		Denton	Rank	Still-water	Wood-ward	Av.	Rank	Man-hattan	Hays	Av.	Rank	Lin-coln	Rank	Akron	Ft. Collins	Av.	Rank	
Prelude x Kanred	11591	35.6	3	30.3	19.6	25.0	4	33.7	35.9	34.8	5	26.2	1	27.6	65.6	46.6	1	34.3
Kawvale x Tenmarq	11669	36.4	2	27.9	20.7	24.3	9	38.9	33.1	36.0	1	25.1	7	26.7	62.9	44.8	3	34.0
Kanred x Marquis	11589	34.0	5	29.1	17.2	23.2	14	37.3	32.9	35.1	3	23.5	13	28.4	63.2	45.8	2	33.2
Turkey sel.	10094	31.2	12	31.0	17.1	24.1	10	38.3	31.0	34.7	6	25.6	6	25.5	63.4	44.5	4	32.9
Turkey sel.	11577	30.6	17	31.7	18.5	25.1	2	38.9	30.6	34.8	4	22.7	17	22.2	60.9	41.6	7	32.0
Akron sel.	11660	30.5	18	29.1	21.0	25.1	2	34.6	32.7	33.7	9	26.1	2	24.3	57.1	40.7	11	31.9
Cheyenne sel.	11666	31.2	12	28.4	17.2	22.8	17	38.5	32.5	35.5	2	24.0	11	25.6	57.5	41.6	7	31.9
Sibley No. 62	11523	31.2	12	32.0	16.2	24.1	10	33.8	31.7	32.8	13	22.2	21	24.1	60.4	42.3	5	31.5
Oro x Fulhard	11579	30.3	20	28.8	20.0	24.4	7	36.6	31.7	34.2	8	22.6	19	24.6	57.5	41.1	10	31.5
Kanred x (Kanred - Marquis)	11592	33.2	7	29.0	18.6	23.8	12	37.2	29.6	33.4	10	22.7	17	25.0	56.4	40.7	11	31.5
Turkey sel.	11576	29.8	21	30.0	19.2	24.6	6	36.0	29.0	32.5	15	23.7	12	22.3	61.4	41.9	6	31.4
Blackhull	6251	30.8	16	33.8	16.2	25.0	4	30.5	31.5	31.0	20	25.8	3	25.4	55.6	40.5	13	31.2
Turkey sel.	10083	32.7	9	29.7	17.5	23.6	13	35.3	30.5	32.9	12	22.6	19	24.3	55.9	40.1	15	31.1
Kanred x Hard Fed.	10092	35.1	4	29.8	19.0	24.4	7	32.2	31.5	31.9	17	25.7	4	26.4	49.4	37.9	22	31.1
Minturki x Blackhull	11671	32.1	10	28.8	16.9	22.9	15	38.9	30.3	34.6	7	23.5	13	21.5	56.3	38.9	18	31.0
Beloglina x Hussar	11513	27.5	24	32.3	21.3	26.8	1	35.7	29.0	32.4	16	22.1	23	22.5	55.3	38.9	18	30.7
Turkey sel.	10016	31.1	15	25.8	15.7	20.8	22	35.9	29.2	32.6	14	21.9	24	23.6	57.0	40.3	14	30.0
Early Blackhull	8856	33.9	6	27.1	17.8	22.5	19	33.5	28.2	30.9	21	25.0	8	26.6	47.3	37.0	24	29.9
Kanred x Marquis	11746	30.5	18	27.1	13.6	20.4	24	33.0	30.2	31.6	18	23.4	15	23.4	55.4	39.4	17	29.6
Turkey x Marquis	11747	31.8	11	27.7	15.5	21.6	23	28.4	27.1	27.8	23	23.1	16	21.5	61.1	41.3	9	29.5
Kharkof	1442	28.3	22	29.7	16.1	22.9	15	29.6	29.7	29.7	22	24.3	10	21.8	56.0	38.9	18	29.4
Penquite sel.	11745	38.8	1	26.5	18.1	22.3	21	29.0	26.5	27.8	23	21.5	25	21.4	52.7	37.1	23	29.3
(Minhardi-Minturki) x Tenmarq	11668	32.9	8	25.6	13.6	19.6	25	35.4	31.3	33.4	10	24.9	9	22.2	47.4	34.8	25	29.2
Turkey sel.	11667	27.9	23	26.7	18.0	22.4	20	33.3	29.0	31.2	19	22.0	21	24.3	51.9	38.1	21	29.1
Nebraska No. 60	6250	25.7	25	29.1	16.1	22.6	18	27.8	27.8	27.8	23	25.7	4	21.0	58.0	39.5	16	28.9

Table 22. - Summary of average yields of 8 winter varieties grown in uniform yield nurseries at 12 stations in the hard red winter-wheat region for all or a part of the 6-year period, 1932-37

Variety	C. I. No.	Texas Bushels per acre				Oklahoma Bushels per acre				Kansas Bushels per acre					Colorado Bu. per acre				Nebraska Bushels per acre					Weighted Av. all stations (bu.)
		Denton	Amarillo	Av.	Rank	Stillwater	Woodward	Av.	Rank	Manhattan	Hays	Colby	Av.	Rank	Akron	Ft. Collins	Av.	Rank	Lincoln	North Platte	Alliance	Av.	Rank	
Number of years grown		5	1			6	6			6	5	1			4	4			6	3	3			
Kanred x Hard Fed.	10092	32.3	5.7	27.9	1	35.5	22.4	29.0	1	36.7	28.4	36.8	33.3	2	17.5	49.0	33.3	5	21.6	31.4	15.0	22.4	5	29.0
Turkey sel.	10094	21.9	5.1	19.1	6	32.1	19.9	26.0	3	39.1	29.0	36.7	34.7	1	18.0	56.6	37.3	1	25.1	28.9	16.4	23.9	1	28.6
Blackhull	6251	24.7	10.3	22.3	4	31.3	19.8	25.6	4	34.3	28.7	33.5	31.9	3	18.5	51.6	35.1	2	26.4	27.0	13.6	23.4	3	27.7
Turkey sel.	10083	28.1	5.7	24.4	3	22.6	20.8	26.7	2	34.4	27.0	38.8	31.7	4	14.7	52.1	33.4	4	20.0	31.0	15.3	21.6	7	27.5
Early Blackhull	8856	30.8	3.4	26.2	2	28.5	19.0	23.8	8	35.0	27.8	20.3	30.8	6	17.4	48.4	32.9	6	26.5	26.3	13.8	23.3	4	27.1
Turkey sel.	10016	22.5	8.6	20.2	5	29.5	20.0	24.8	7	36.8	28.1	32.6	31.6	5	16.2	51.6	33.9	3	24.0	30.3	15.7	23.5	2	27.0
Kharkof	1442	22.6	8.0	20.2	5	30.7	19.9	25.3	5	28.8	24.3	40.2	27.9	8	14.7	49.9	32.3	8	20.9	30.7	15.9	22.1	6	25.7
Nebraska No. 60	6250	21.0	4.9	18.3	7	31.0	19.3	25.2	6	20.7	23.4	34.9	28.0	7	14.4	50.4	32.4	7	20.5	29.5	12.8	20.8	8	25.1

SUMMARY OF AGRONOMIC DATA

In table 23 the data for characters other than yield are presented. For each character the number of stations entering the average is shown.

Average dates of heading ranged from May 10 for Early Blackhull to May 20 for Nebraska No. 60. Several hybrid strains averaged two or three days later than Early Blackhull but these would be considered as early strains. Average dates of ripening show about the same range as the heading dates.

Most of the varieties are susceptible to leaf rust, the exceptions being Kawvale x Tenmarq (C. I. 11750 and C. I. 11669) and Oro x Tenmarq (C. I. 11672 and C. I. 11673).

In the case of stem rust, average infections ranged from 12.5 percent on Early Blackhull to 80.5 percent on Beloglina x Hussar (C. I. 11513). In the case of Early Blackhull the variety is probably more escaping than resistant. The two Oro x Tenmarq strains had average infections of 23 and 24 percent and several strains had averages between 30 and 40 percent. It is hoped that before long this picture may be changed.

Lodging data showed the following strains to have good straw: Early Blackhull, Kanred x Hard Federation, Kanred x Marquis (C. I. 11589), Akron selection, and (Minhardi-Minturki) x Tenmarq (C. I. 11668). The last variety had the lowest average percentage of lodging.

Average test weights per bushel showed a very narrow range, but Early Blackhull and Blackhull had the highest averages. The lowest average test weights were for Beloglina x Hussar (C. I. 11513) and Turkey x Marquis (C. I. 11747).

DATA FROM THE DISEASE NURSERIES

BUNT NURSERY

For convenience a copy of the data from the uniform winter wheat bunt nursery is included in this report. The data are presented in table 24.

Table 23. - Summary of agronomic data other than yield for 30 varieties of winter wheat grown as uniform yield nurseries at 9 stations in hard red winter wheat region, 1937

Variety	C. I. No.	Average						
		Date headed May	Date ripe June	Leaf rust	Stem rust	Height	Lodging	Test weight per bushels
Number of stations		7	5	2	2	8	4	4
				(Pct.)	(Pct.)	(In.)	(Pct.)	(Lbs.)
Kharkof	1442	19	27	60.0	67.0	28.4	40.0	57.9
Nebraska No. 60	6250	20	27	68.5	77.0	29.0	37.7	57.3
Blackhull	6251	16	24	72.5	33.0	29.5	33.3	59.3
Early Blackhull	8856	10	18	56.5	12.5	28.1	11.3	59.9
Turkey sel.	10016	15	22	74.0	46.5	27.8	24.0	57.9
Turkey sel.	10083	18	26	68.5	50.0	28.9	45.7	57.6
Kanred x Hard Fed.	10092	12	21	27.5	60.5	25.9	7.7	58.4
Turkey sel.	10094	18	24	82.5	40.5	27.3	40.7	57.9
Beloglina x Hussar	11513	19	27	46.5	80.5	30.1	38.0	56.8
Sibley No. 62	11523	18	26	56.0	48.0	28.6	45.3	57.1
Turkey sel.	11576	18	24	77.5	42.0	28.9	34.7	57.1
Turkey sel.	11577	17	25	82.5	37.0	28.9	32.3	57.7
Oro x Fulhard	11579	17	25	77.5	56.5	29.0	28.0	58.3
Tenmarq x Minturki	11580	15	23	27.5	30.5	28.1	22.0	57.0
Kanred x Marquis	11589	15	22	16.5	30.5	29.5	10.3	58.5
Prelude x Kanred	11591	13	21	16.5	39.5	29.6	17.0	59.1
Kanred x (Kanred-Marquis)	11592	17	24	69.0	38.5	27.8	31.3	57.5
Akron sel.	11660	17	24	78.5	47.5	28.8	10.7	57.8
Cheyenne sel.	11666	18	23	79.0	40.0	27.0	31.7	58.6
Turkey sel.	11667	16	23	83.5	44.5	28.0	41.7	57.7
(Minhardi-Minturki) x Tenmarq	11668	13	20	23.0	39.5	26.5	3.7	58.1
Kawvale x Tenmarq	11669	13	21	15.0	35.5	27.3	18.0	58.3
Minturki x Blackhull	11671	18	25	70.0	32.0	30.0	18.7	58.6
Oro x Tenmarq	11672	13	21	7.5	24.0	28.6	14.3	58.5
Oro x Tenmarq	11673	13	21	7.5	23.0	28.3	15.0	58.3
Blackhull sel.	11737	16	24	83.5	32.0	29.3	36.3	58.9
Penquite sel.	11745	17	25	67.5	59.0	28.8	36.3	58.1
Kanred x Marquis	11746	17	26	24.0	53.0	29.0	35.3	57.1
Turkey x Marquis	11747	16	24	76.5	50.5	28.6	27.7	56.8
Kawvale x Tenmarq	11750	15	21	4.0	32.0	28.8	14.0	58.4

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Plant Industry

SUMMARY OF THE GREAT PLAINS UNIFORM WINTER WHEAT BUNT NURSERY, 1936-37

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The uniform winter-wheat bunt nursery for the Great Plains area was continued in 1936-37, in the same manner as in previous years. This report is a summary of the data obtained in 1937, together with averages for varieties grown during different periods from 1932 to 1937.

In the fall of 1936, 50 varieties and strains of winter wheat were sown in duplicate 8-foot rows at 10 stations in the Great Plains and at Bozeman, Mont., and Kearneysville, W. Va. The nursery included varieties that had shown resistance in previous years and interesting new strains from several cooperating stations.

Inoculum for each station was obtained from the previous year's nursery at that station by selecting bunted heads from all infected varieties. For the Kearneysville test, the seed was inoculated with a composite made up of inoculum from all other nurseries. In all cases the smut was Tilletia levis, the smooth-spored species.

Data from 11 nurseries are recorded in table 24. A nursery was seeded at Moccasin, Mont., but was a failure because of winter-killing and drought. The data from St. Paul are not included in the average because of light infection and small number of heads per row.

The varieties are listed in the table in order of average infection at 10 stations. The average infections ranged from 0 to 59.3 percent. Minturki had an average infection of 7.7 percent, while 35 strains had averages lower than this, and 13 strains had averages lower than those of Ridit. The wheat x rye (Meister) strain was entirely free of smut in 1937 although in previous years it has produced some smut. The seed used for the 1937 crop was from hand-picked, hairy-necked heads. A number of hybrid strains had low infections at all stations except Bozeman and Kearneysville, especially strains with the Oro, Minturki, and Turkey type of resistance. It will be noticed that Hussar had an average infection of 11.5 percent, a figure much higher than in previous years. The seed of Hussar was obtained from the Pacific coast, supposedly from a clean source, and was therefore not treated with formaldehyde before inoculation. It is entirely possible that this seed was contaminated with a race of Tilletia prevalent in the west and to which Hussar is completely susceptible.

For the 6-year period, 1932-37, only 10 varieties may be compared. For this period Turkey selections, C. I. 10016 and 10094, and Yogo have the lowest averages. For the shorter periods Beloglina x Hussar (C. I. 11583), Martin-Blackhull x Blackhull, wheat x rye (Meister), Relief, and several Oro x Tennarq strains have low averages.

Again there are indications of the presence of different physiological races in these tests. The situation has been explained for Hussar but it will be noticed that many of the strains that showed low infections at most stations developed more smut at Bozeman and Kearneysville. True, the infection was heavy at these stations but in terms of the behavior of Kharkof, Cheyenne, and Quivira, not so much heavier than at several other stations. At these two stations races are present that infect Oro, Minturki, and certain Turkey selections. Cheyenne selection, fairly resistant at several stations, developed 35 percent of bunt at Bozeman. Mediterranean x Hope (C. I. 11812), rather susceptible at several stations, developed less than 4 percent of bunt at Bozeman. Turkey selection (C. I. 11576) had less than 2 percent of bunt at Bozeman in 1936 and 40 percent in 1937, indicating that it escaped in 1936. Obviously, the presence of these different races complicates the problem of breeding for resistance.

December 1, 1937.

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Table 4. - Summary of bunt infection on 50 varieties and strains of wheat grown in the Great Plains uniform winter-wheat bunt nursery at 11 stations in 1936-37, and average bunt infections for 1932 to 1937.

Variety	C. I. No.	Average percentage of bunt at-											Average			
		Denton, Texas	Amarillo, Texas	Stillwater, Okla.	Woodward, Okla.	Manhattan, Kans.	Lincoln, Nebr.	Akron, Colo.	Fort Collins, Colo.	St. Paul, Minn.	Bozeman, Mont.	Kearneysville, W. Va.	11 stations 1937	1936 and 1937 (Weighted)	1935 to 1937 (Weighted)	1932 to 1937 (Weighted)
Wheat x rye (Meister)	11403	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.4	---
Beloglina x Hussar	11819	0.4	0	0.9	0.4	0.7	0.3	0.4	0.7	0	1.7	1.9	0.7	---	---	---
Martin x Blackhull x Blackhull	11572	0	0.5	0	0.2	0.5	0	0	0.2	0	7.0	0	0.8	0.6	0.5	---
Beloglina x Hussar	11583	2.7	1.2	2.2	0	0	0.8	1.0	0.4	1.3	0	0	0.8	0.5	0.5	---
Martin x (Tenmarq)$_3$	11805	0	0	0	0.2	1.6	0	0.2	0	0	1.3	4.8	0.8	---	---	---
Kanred x Oro	11803	0.9	0	0	0	0.6	0	0	0	0	7.0	1.3	1.0	---	---	---
Relief	10082	0	0	0	0.2	0.4	0	0	0.3	0	9.3	1.6	1.2	1.4	---	---
Oro x Tenmarq	11807	0	0	0.2	0.5	0	0	0	0.9	0	2.3	9.2	1.3	---	---	---
Martin x (Tenmarq)$_3$	11804	0	1.1	0	0	2.7	0	0.2	0	0	6.8	4.7	1.6	---	---	---
Turkey selection	10016	0.7	0	3.3	0.5	0.3	1.5	1.2	0.5	0	6.7	5.1	2.0	2.4	2.1	1.5
Tenmark x Minturki	11810	0.2	2.6	2.4	0.8	3.5	0	0.4	0.7	0.2	6.0	3.4	2.0	---	---	---
Oro x Tenmarq	11729	0.7	0	0.4	0.4	0	0	0.2	0	0	16.3	9.4	2.7	1.7	---	---
Oro x Tenmarq	11806	0	1.1	0	0	0	2.0	0.2	0.4	0	12.7	10.8	2.7	---	---	---
Ridit	6703	2.1	0	5.6	6.9	0.3	3.3	2.3	0.7	0	2.7	6.2	3.0	2.3	3.7	3.5
Turkey selection	10094	0.9	0.4	3.8	2.1	0.2	1.3	1.5	0.8	0.1	10.0	8.5	3.0	2.6	2.7	2.1
Oro x Tenmarq	11677	0.6	0	0.3	0	0.2	0	0	0.2	0	8.0	22.9	3.2	2.3	1.7	---
Beloglina x Hussar	11513	0	0	0.5	3.4	0.6	1.5	0.5	2.9	0	19.3	4.4	3.3	1.9	1.6	---
Fulhard x Oro	11732	0	0	0	0	0	0	0.2	0	0	26.0	7.0	3.3	2.4	---	---
Minturki x Blackhull	11671	0.4	0	1.6	1.3	0.7	0.5	0.4	1.2	0.2	12.7	16.2	3.5	2.6	2.2	---
Iotark	11388	0.5	0	4.1	1.0	3.0	1.5	0.8	0.3	1.0	21.3	7.4	4.0	3.6	3.3	---
Oro x Tenmarq	11727	0.2	0.4	0.4	0.2	0	0.3	0	0	0	20.3	17.9	4.0	3.1	---	---
Minturki x Blackhull	11817	4.2	0.5	5.7	4.1	0.7	0.8	0.9	2.3	0.2	22.3	1.5	4.3	---	---	---
Ridit x Nebraska No. 6	11670	1.7	0.5	2.5	1.5	1.9	0.8	1.5	1.2	0	15.0	20.4	4.7	3.0	2.2	---
Yogo	8033	1.2	1.3	6.5	2.6	0.7	1.6	1.3	0.7	1.6	23.3	8.3	4.8	3.6	3.2	2.3
Oro x Tenmarq	11731	0.4	5.3	0.9	0.8	0.9	0.3	0.5	0.7	0	17.3	22.1	4.9	3.4	---	---
Minturki x Beloglina-Buffum	11661	3.7	0	6.3	1.4	1.3	1.3	1.2	0.5	0.8	29.0	5.0	5.0	3.9	3.6	---
Cheyenne selection	11666	0.5	0	0.4	1.5	0.9	0.5	0.5	1.3	0	35.0	11.4	5.2	3.0	2.4	---
Oro x Tenmarq	11808	0.9	0	0	0.2	0	2.4	0.2	0.2	0	26.3	23.4	5.4	---	---	---
Sherman x Kanred	11820	0.2	0	0.7	0.2	0	0.6	0	0.5	0	39.7	11.7	5.4	---	---	---
Oro x Tenmarq	11674	0.5	1.0	6.0	1.8	0	1.1	0.8	1.2	0	39.7	8.9	6.1	3.6	2.5	---
Turkey selection	11576	2.2	1.0	0.6	2.0	2.2	1.3	0.7	1.5	0.5	40.0	9.9	6.1	3.5	2.7	---
Oro x Tenmarq	11673	0.4	3.1	0.4	2.1	0	0	0.7	0.9	0	29.0	25.4	6.2	4.1	3.1	---
Oro x Fulhard	11733	2.2	4.3	1.3	1.4	0.6	1.1	2.5	1.2	0.4	34.0	15.8	6.4	4.2	---	---
Oro x Tenmarq	11728	0	1.3	0	0.1	0.9	0	0.4	0.8	0	38.0	25.3	6.7	4.6	---	---
Quivira x (Fulhard-Oro)	11811	1.2	0	0.5	2.0	0	1.4	0.2	1.2	0	23.7	40.6	7.1	---	---	---
Minturki	6155	3.0	2.6	16.6	2.3	1.0	3.4	0.7	0.9	0.2	29.7	17.0	7.7	4.1	8.5	6.3
Oro x Tenmarq	11672	0	4.0	1.0	1.0	0	0.3	0.2	0.7	0	44.3	35.6	8.7	5.8	4.7	---
Oro	8220	4.3	5.8	5.3	6.9	0.5	4.2	2.3	2.8	0.4	39.3	17.9	8.9	6.2	5.2	5.1
Bulk hybrid	11744	0	0	24.4	0.5	5.6	0.3	4.4	3.2	1.0	20.0	30.6	8.9	5.3	---	---
Tenmarq x Minturki	11809	4.5	1.5	22.8	11.0	2.9	2.9	3.2	3.0	0	19.7	23.6	9.5	---	---	---
Minturki x Blackhull	11815	7.2	3.5	9.2	8.6	0.8	7.8	2.4	3.2	1.4	34.0	21.0	9.8	---	---	---
Hussar	4843	12.0	7.8	12.0	12.3	7.9	11.7	5.9	19.2	0.4	18.0	8.1	11.5	6.7	4.6	2.7
Turkey selection	11818	0.9	2.8	15.2	5.8	0.5	2.6	1.8	0.9	0.2	52.0	39.7	12.2	---	---	---
Mediterranean x Hope	11812	10.8	11.4	53.3	62.5	0.4	7.1	18.7	26.0	0	3.7	28.4	22.2	---	---	---
Mediterranean x Hope	11813	27.9	10.1	71.9	76.9	5.6	32.9	18.9	18.8	0	17.0	49.0	32.9	---	---	---
Kanvale x Tenmarq	11816	23.2	15.0	35.5	52.4	17.4	44.1	20.3	31.2	1.2	42.0	69.5	35.1	---	---	---
Hope x Kanvale	11814	20.3	13.2	57.0	51.6	12.0	47.1	25.7	30.3	5.9	44.3	50.3	35.2	---	---	---
Kharkof	1442	41.2	21.7	85.9	74.4	27.5	54.3	32.7	27.2	20.2	46.3	45.9	45.7	41.3	45.0	45.1
Cheyenne	8885	44.5	36.4	83.4	92.3	40.5	53.3	38.4	51.3	24.6	37.0	87.4	56.5	46.4	48.4	43.7
Quivira	8886	45.5	29.2	78.9	93.9	38.5	74.3	54.7	44.0	28.8	42.7	90.9	59.3	50.3	53.7	43.4
Average		5.5	3.8	12.6	11.8	3.7	7.5	5.0	5.7	1.8	22.0	19.7				

1/ St. Paul excluded.

DISEASE GARDEN

In table 25 is presented a summary of the data obtained in the disease garden at Manhattan, Kansas. The data were obtained by C. O. Johnston and are presented through his kind cooperation. In 1937 readings were obtained for leaf and stem rust, bunt, and mildew.

Several strains in the garden were fairly resistant to leaf rust, the more resistant ones being hybrids with Hope as one parent. Nearly all strains grown were very susceptible to stem rust, the only exception being Mediterranean x Hope (C. I. 11813). In the case of both bunt and mildew resistant material is available.

In the 1936 report it was stated that Kanred x (Kanred-Marquis) (C. I. 11592) had not been inoculated. The strain was grown again in 1937 and had 36.5 percent of bunt.

As was pointed out in 1936 the more promising wheats of the area are not resistant to stem rust. A serious epidemic in 1937 again emphasized the seriousness of this situation. While it would be wrong to put too much emphasis on a single disease, it is highly important that stem rust resistance be added to the other desirable characteristics of new wheats. Progress is being made along this line and it is to be hoped some worth-while results will be obtained in the near future.

Table 25. - Reaction of varieties of winter wheat in the disease garden at Manhattan, Kans., to leaf rust, stem rust, bunt, and mildew, 1937

Variety	C. I. No.	Percent of infection			Mildew coefficient of infection 1/
		Leaf rust	Stem rust	Bunt	
Kharkof	1442	90	90	30.3	1
Kawvale x Tenmarq	11750	10	90	46.6	2
Blackhull Sel.	11737	90	85	77.6	2
Blackhull	6251	100	90	40.0	2
Cheyenne	8885	100	90	37.0	1
Cheyenne Sel.	11666	100	90	0	1
Minturki	6155	90	85	5.0	1
Minturki x Blackhull	11815	90	80	.4	2
Turkey Sel.	10094	100	90	0	1
Turkey Sel.	11576	100	90	1.8	1
Turkey Sel.	11577	100	90	0	1
Turkey Sel.	11667	100	90	0.8	1
Tenmarq x Minturki	11580	10-60	80	2.3	1
Minturki x Blackhull	11671	80	85	1.5	2
Beloglina x Hussar	11513	60	100	0.6	1
Kanred x Marquis	11589	10	95	47.5	4
Prelude x Kanred	11591	10	90	34.0	2
Kanred x Marquis	11746	10-80	95	38.2	4
Kanred x (Kanred-Marquis)	11592	65	100	36.5	3
Oro x Fulhard	11579	80	100	3.6	2
Oro x Tenmarq	11672	10	85	0	3
Oro x Tenmarq	11673	20	90	0	1
Oro x Tenmarq	11674	20	90	0.4	4
Oro x Tenmarq	11729	25	100	0	3
Oro x Tenmarq	11731	10	95	0	2
Minturki x Marquis	11658	100	100	.8	4
Oro x Fulhard	11733	100	100	0	3
Minturki x Marquis	11501	90	100	1.8	3
Mediterranean x Hope	11763	T	T-80	3.7	0
Kanred x Oro	11803	80	90	0	0
Wheat x Rye (Meister)	11403	100	45	0	0
Mediterranean x Hope	11813	5	2	1.0	0
Hope x Kawvale	11814	5	100	8.5	3
Kawvale x Tenmarq	11816	10	100	6.4	4
Fulhard x Oro	11732	10	100	0	4
Oro x Tenmarq	11806	10	100	0	4
Oro x Tenmarq	11807	10	100	0	4
Oro x Tenmarq	11808	20	100	0.4	2
Tenmarq x Minturki	11809	20	90	0.4	3
Tenmarq x Minturki	11810	10	100	0	3
Turkey Sel.	11530	100	90	4.1	1
Kanred x (Hope - Hard Fed.)	11843	100	45	35.0	4
Tenmarq x Kawvale (Lawton 35-87)		100	85	42.1	2
Iobred x Kawvale (Lawton 35-95)		25	100	32.6	3
Turkey x Kawvale (Lawton 35-93)		100	100	27.9	3
Kawvale x Tenmarq (Nebr.Sel.2059)		100	100	30.4	1
Hungarian Sel. (Nebr. 31646)		10	100	22.2	2
Ridit x Nebraska No. 6	11670	80	90	2.1	2
Tenmarq x Kawvale(Nebr. 23908)		20	100	24.6	1
Chiefkan	11754	80	85	54.1	2

1/ Based on scale of 0 to 4 with 0 = immunity and 4 = susceptibility.

UNITED STATES DEPARTMENT OF AGRICULTURE

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 1938

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Lincoln, Nebraska
January, 1939.