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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 1936

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Lincoln, Nebraska
February 1, 1937

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Plant Industry

COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1936

by

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EXPERIMENTS IN 1936

The sixth year of the cooperative winter wheat improvement program was completed with the 1936 harvest. The program was continued along the same general lines as outlined in previous reports, the only changes being in the lists of varieties grown at various stations. Several changes were made in the list of uniform varieties in both the plots and the nursery. This report is a summary of the data received by December 15, 1936.

The cooperating agencies, stations, and personnel concerned in these experiments are as follows:

1/ The writer wishes to express his appreciation to Mr. Gilbert T. Webster, of Lincoln, Nebr., for his assistance in calculating the probable errors and in assembling the data.

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
Helena		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	Agr. Expt. Station	C. A. Suneson
North Platte	North Platte Substation 1/	L. L. Zook, Orrin J. Webster
Alliance	Box Butte Experiment Farm	C. A. Suneson
Valentine	Valentine Substation	E. M. Brouse
WYOMING AGRICULTURAL EXPERIMENT STATION:		
Archer	Cheyenne Experiment Farm 1/	A. L. Nelson
*Sheridan	U. S. Dry Land Field Station 1/	R. S. Towle
MINNESOTA AGRICULTURAL EXPERIMENT STATION:		
Agronomy and Plant Genetics		H. K. Hayes, 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		Clyde McKee
Bozeman	Montana Experiment Station	L. P. Reitz, W. B. Nelson
Moccasin	Judith Basin Branch Station	J. L. Sutherland, E.C. Coey
Havre	Northern Montana Branch Station	M. A. Bell, J. J. Sturm

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, as in previous years, 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. Some changes are made from time to time in the varieties grown uniformly at each station. Those for each district in 1936 are as follows:

Southern		Central		Northern	
Variety	C. I. No. 1/	Variety	C. I. No.	Variety	C. I. No.
Hard Red:		Hard Red:		Hard Red:	
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	Kanmont	6700
Early Blackhull	8856	Cheyenne	8885	Minturki x Marquis	11502
		Kanred	5146	Minard x Minhardi	11656
Soft Red:					
Fulcaster	6471				
Denton	8265				
Kawvale	8180				

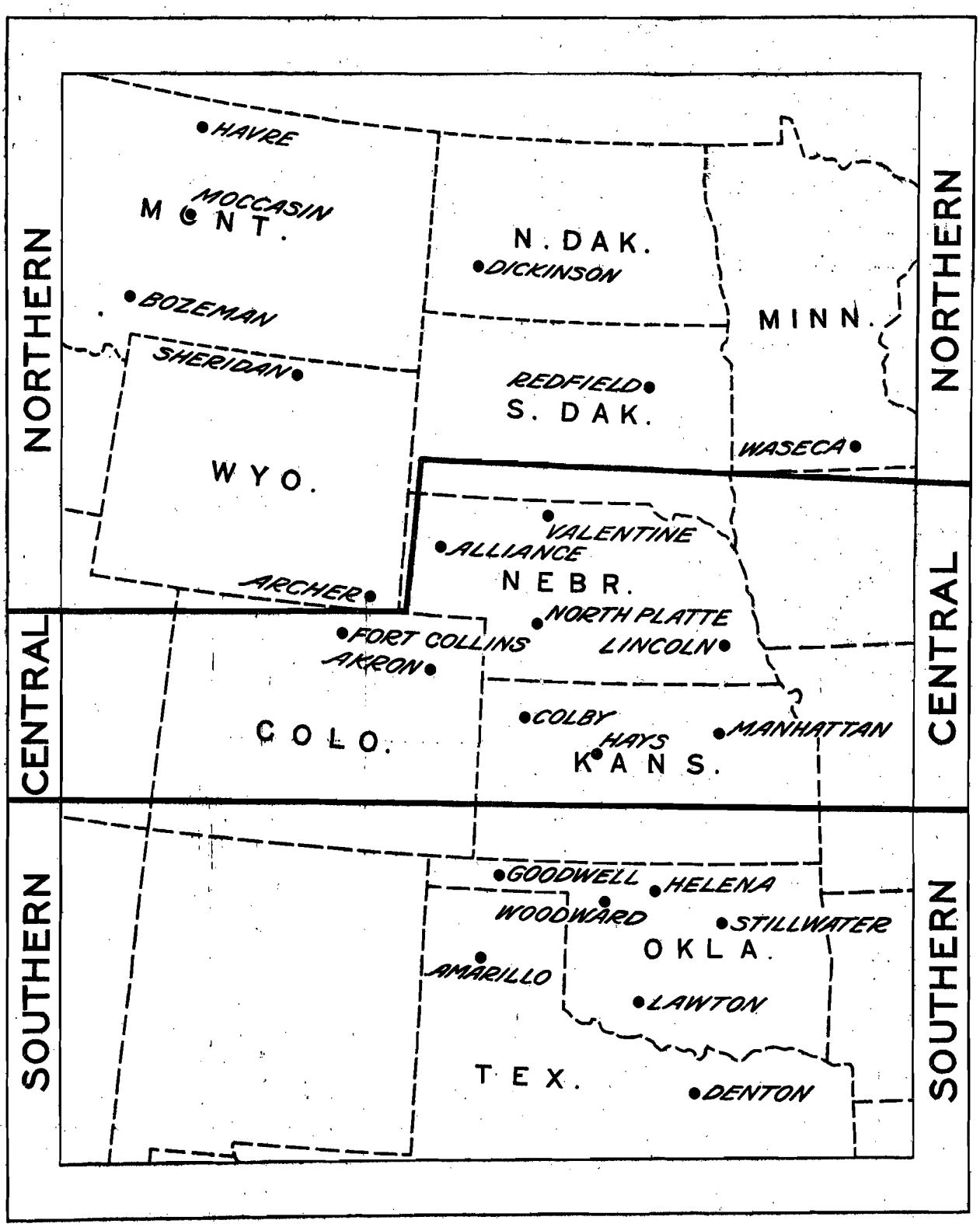
1/ C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

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

PLOT DATA

In the fall of 1935, plots were seeded at 21 experiment stations. Because of drought in the fall or in the spring, or winter-killing, or a combination of these conditions, crops were harvested at only 13 stations. Complete failures were reported from Amarillo, Tex.; Goodwell, Okla.; Colby, Kans.; Alliance and Valentine, Nebr.; Waseca, Minn.; and Moccasin and Havre, Mont. Yields only had been reported from Stillwater and Helena, Okla., at the time this summary was completed. Yield and other agronomic data for the varieties reported


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

as grown at each of the 13 stations are given in table 1. The generalized probable error for each station is also given and these are summarized in table 2.

In the interests of brevity, 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 1936 and, where possible, average yields are given for the 6-year 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. North Platte, Nebr., is an exception Kanred being used in place of Kharkof.

The data need little explanation. As for the 1935 crop the ground was dry at seeding time at several stations but for the most part good stands were obtained. The winter was so unusually cold that long-time records were broken in many cases. At the more northern stations this cold weather caused winter-killing, but farther south there was little damage because of a protective covering of snow.

Plants that had been weakened by low temperatures had little opportunity to recover because of dry weather the following spring. The dry condition of the soil kept down tillering at several stations and did not allow excessive straw growth. Rains in late May and early June were rather general in the southern Plains, causing a decided improvement in the condition of the crop. However, a few days before harvest hot winds caused some burning and shriveling. No single factor appeared to be outstanding in influencing yield throughout the area.

At Denton the spring was very dry and continued so until a short time before harvest, thus providing conditions more suited to hard wheats than to soft wheats. Hard wheats such as Kanred and Kharkof lodged rather badly and leaf rust was heavy on Nebraska No. 60, Blackhull, and Kharkof. Some stem rust was present, being heaviest on Sutton and Clarkan. Test weights were good and yields as indicated in table 1 ranged from 34.1 to 48.0 bushels per acre. Tenmarq, Blackhull, and Quivira had the highest average yields and the soft wheats produced the lowest yields. For the 6-year average yield Quivira, Tenmarq, and Kawvale rank highest.

Conditions at Lawton were much the same as at Denton, in that there was no winter-killing the weather was dry during March and dry and warm during April. Rains were received in May but so late that only the later varieties were benefited. Straw was short and weak and harvest was early. No insect or disease damage was noted. In some cases varieties were cut green so as to avoid loss. P-1066-1 x Burbank, Blackhull, and Clarkan gave the highest yields, while Early Blackhull, Kanred x Hard Federation (C. I. 11373), and Mediterranean selection (C. I. 11587) had low yields. There did not seem to be a consistent relationship between time of maturity and yield. Based on the 5-year average yields Kawvale, Quivira, and Tenmarq

have the best records, with Ioturk and Early Blackhull lowest. For the 1934-36 average Quivira ranks second and Kawvale seventh. A number of the newer hybrid strains are making good records at this station and will bear watching.

At Stillwater, yields ranged from 14.9 to 29.1 bushels per acre. Turkey selection (C. I. 10083), Nebraska No. 60, and Nittany gave the highest and the earlier wheats the lowest yields. For the 6-year period (1931-36) Penquite selection and Sibley No. 62, both Oklahoma strains, rank highest for yield. For the same period Cheyenne ranks fourth and Tenmarq sixth.

Yields at Helena, Okla., were low ranging from 6.9 to 11.5 bushels per acre. Sibley No. 62, Tenmarq, and Penquite selection had the highest average yields while Early Blackhull, Fulcaster, and a Kanred x Hard Federation strain gave the lowest average yields. On the basis of the 3-year average, Penquite selection has the highest yield, followed by Quivira and Early Blackhull. The 1936 yields are hardly in line with those of the two previous years.

Kharkof, Nebraska No. 60, and Local Turkey had the highest yields at Woodward. Tenmarq was fifth and Early Blackhull and Kanred x Hard Federation (C. I. 10091) ranked last. For the 5-year average Kharkof ranks first, followed by Cheyenne and Tenmarq. It is of interest to note that Cheyenne continues to be one of the best wheats at Woodward, while the earlier types seem to be at a disadvantage.

At Manhattan, prospects for a crop were poor early in the season but improved as harvest approached. There was some leaf rust but very little stem rust, all varieties having a trace except Turkey selection (C. I. 10094) with 2 percent and Oro and Kharkof (C. I. 1442), with 1 percent each. The highest yields were made by Turkey selection (C. I. 10094), Tenmarq, and Cheyenne. The early varieties and the soft wheats gave the lowest yields. For the 6-year period Kawvale has the highest average yield, followed by Cheyenne and Clarkan. Although grown for only 2 years Turkey selection (C. I. 10094) has the highest percentage of Kharkof of any variety in the test.

Chiefkan, Quivira, and two Kanred x Hard Federation strains had the highest yields at Hays, with the late maturing varieties giving the lowest yields. For the 5-year average Early Blackhull is still first in yield and Blackhull is second. Quivira and Tenmarq also have good yield records for the same period. Thus, the early tender wheats continue to give good results. The behavior of Chiefkan will be watched with much interest, as the originator claims the variety to be a superior, beardless, hard red winter wheat. Kanhull, another beardless type, gave a very poor record. Both probably are Blackhull derivatives and except for the beards are similar to Blackhull.

Winter-killing was reported from Akron, Colo., although it did not seem to have a great influence on yield. As a matter of fact those varieties that had been slightly thinned out seemed to stand the June drought the best. Test weights were low, as the drought became serious just before harvest. Turkey selection (C. I. 10016), Early Blackhull, and Tenmarq, all early wheats, gave the highest yields with Yogo and Alton, late varieties, lowest. For the 6-year period Early Blackhull, Blackhull, and Tenmarq have the high average yields. For the last 3 years these same varieties are well up but have been outyielded by some newer strains. Akron selection No. 7 a very stiff-strawed wheat, has the highest percentage of Kharkof of any of the strains.

Although the winter was rather cold at Lincoln very little winter-killing occurred owing to a snow covering during the coldest weather. The spring was dry and there was very little stooling and not much straw growth. Yields were fairly good and test weights very high. It seemed that because of the dry spring there was no excess straw growth and about the right number of heads for the moisture available. Turkey selection (C. I. 10094), Turkey (Crimean, C. I. 1435), and Kanred had the highest yields, with Quivira and Early Blackhull lowest. Based on a 5-year average yield (1932-36), Kawvale and Cheyenne are highest, closely followed by Turkey selection (C. I. 10094). For this same period Nebraska No. 6, Nebraska No. 60, and Quivira have the lowest average yields.

At North Platte, Nebr., winter-killing and drought injury caused the wheat to come out of the winter in poor condition. Spring rains, however, soon improved this condition but caused an excessive straw growth for the amount of moisture available later. Extremely hot, dry weather just prior to harvest caused shriveling. Cheyenne and Tenmarq had the highest average yields, while Beloglina x Hussar (C. I. 11513 was low. For a 5-year period Cheyenne ranks first in average yield, followed by local Turkey and Tenmarq. For the complete period grown Cheyenne has the highest percentage of Kanred.

At Dickinson, N. Dak., what emergence there was occurred in the spring. Straw was short, stands thin, and yields were very low. They are not included in the averages.

There was some winter-killing at Sheridan, Wyo., but there were no real differences between varieties. Yields were below average for this station. Montana No. 36 had the highest yield in 1936 as well as the highest average yield for the period 1931-36. Minturki had the lowest yield in 1936 as well as for the long-time average.

Yields at Bozeman, Mont., ranged from 68.8 bushels for Minturki x Marquis (C. I. 11502) to 97.4 bushels per acre for Cheyenne. Lodging was not so severe as usual in many years, but the stronger-strawed varieties were evident. Test weights were high, as is usual at this station. Yogo yielded 5 bushels per acre less than Cheyenne, followed by Yogo selection and Minturki. Minard x Minhardi (C. I. 11656), in the plots for the first time, gave a fairly good yield. Based on a 5-year period Yogo has the highest average yield, while for a 3-year period Cheyenne is superior.

Table 1. - Agronomic and other data for winter wheat varieties grown in replicated plots in cooperative experiments at 13 experiment stations in the winter wheat area in 1936, and average yields for 1931-36

Denton, Texas

(Four 1/55th-acre plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Loose smut	Lodging	Rust Leaf	Rust Stem	Test Weight (Per bu.)	Acre yield	Yield Average 1931-36	Yield Rank	Yield Ave. 1934-36	Yield Rank	No. years grown	Percentage of Kharkof for same years
				(In.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Tennarq	6936	Apr.28	May 29	31	0	16	24	9	60	48.0	31.1	2	26.9	2	6	124.4
Blackhull	6251	Apr.28	May 31	32	0	13	58	4	61	47.2	25.9	7	23.8	7	6	103.6
Quivira	8886	Apr.24	May 24	32	0	10	13	1	61	46.4	32.6	1	29.0	1	6	130.4
Kanred	5146	Apr.29	May 30	30	0	49	60	3	60	46.2	29.0	4	26.3	3	6	116.0
Clarkan	8858	Apr.29	May 29	34	0	0	30	25	62	45.6	-	-	25.4	5	3	112.9
Turkey selection	10016	Apr.26	May 27	29	T	0	69	3	59	44.9	-	-	22.3	10	3	99.1
Early Blackhull	8856	Apr.14	May 20	31	0	8	35	1	61	44.1	-	-	25.7	4	4	101.2
Nebraska No. 60	6250	May 1	June 2	31	T	13	60	9	58	43.0	23.1	11	20.5	17	6	92.4
Mediterranean selection	11587	Apr.29	May 30	31	T	1	T	24	61	42.8	-	-	22.1	11	3	98.2
Kharkof	1442	May 1	June 1	30	0	36	55	T	59	41.5	25.0	10	22.5	9	6	100.0
Fulcaster	6471	Apr.28	May 31	31	0	6	51	21	59	41.3	25.3	8	20.5	17	6	101.2
Denton	8265	Apr.29	May 31	33	2	13	5	6	59	40.6	27.9	5	22.1	11	6	111.6
Kawvale	8180	Apr.28	May 29	31	0	1	3	6	58	39.9	29.2	3	24.9	6	6	116.8
Sutton	10053	Apr.29	May 28	32	1	23	26	30	58	37.7	26.8	6	22.7	8	6	107.2
Mediterranean selection	10086	Apr.29	May 28	31	4	4	9	9	59	37.0	25.2	9	20.5	17	6	100.8
Do	-----	Apr.26	May 26	34	2	8	10	8	58	35.2	-	-	22.1	11	5	100.5
Do	11526	Apr.25	May 25	31	2	10	6	1	58	34.4	-	-	21.6	14	5	109.1
Do	10085	Apr.26	May 27	30	2	5	5	T	58	34.2	-	---	21.4	15	5	107.3
Do	11525	Apr.26	May 27	32	2	24	T	15	58	34.1	-	-	21.0	16	5	106.1

Probable error of a difference, 0.7 bu.; probable error of a mean, 0.5 bu., or 1.11 percent.

$SE_d = \frac{PE_d}{.6745} = X .14826$

$\rightarrow 1.04$

Table 1. - (Continued)

Lawton, Okla.

(Three 1/50th-acre plots; seeded Oct. 3, 1935; emerged Oct. 10, 1935)

Variety	C. I. No.	Date Headed	Date Ripe	Harvested	Hgt.	Test Weight (Per bu.)	Acre Yield	Yield Average 1931-34 and 1936	Rank	Yield Average 1934 and 1936	Rank	No. years grown	Percentage of Kharkof for same years
		April			(In.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
P-1066-1 x Burbank	10087	24	-	May 25	22	61.5	18.5	-	-	20.8	5	2	122.4
Blackhull	6251	26	May 28	May 28	24	63.0	18.1	23.6	7	18.6	13	5	99.2
Clarkan	8858	27	May 28	June 1	27	62.5	18.0	-	-	-	-	1	106.5
Nebraska No. 60	6250	29	June 2	June 1	23	61.5	17.9	22.1	12	16.9	22	5	92.9
Sibley No. 62	11523	27	May 27	June 1	22	61.5	17.9	-	-	17.9	16	2	105.3
Turkey (check)	1558	27	June 1	June 1	22	61.0	17.6	23.5	9	17.8	17	5	98.7
Turkey selection	10083	25	May 30	May 30	21	61.0	17.6	-	-	16.1	23	2	94.7
Cheyenne	8885	26	May 27	June 1	20	62.0	17.6	23.6	7	17.7	18	5	99.2
Kanred	5146	26	May 27	May 30	21	61.5	17.0	24.4	4	18.4	14	5	102.5
Kharkof	1442	27	May 29	June 1	21	61.5	16.9	23.8	5	17.0	21	5	100.0
Fulcaster	6471	27	May 27	June 1	24	61.0	16.5	22.4	11	17.3	20	5	94.1
Kanred x Hard Federation	10092	21	-	May 22	20	62.0	16.3	-	-	22.5	1	4	112.7
Kawvale	8180	23	-	May 25	22	60.5	16.3	25.9	1	20.0	7	5	108.8
Quivira	8886	21	-	May 22	23	62.0	16.2	25.4	2	21.4	2	5	106.7
Tenmarq	6936	24	May 28	June 1	22	62.0	16.2	24.6	3	19.0	12	5	103.4
Harvest Queen	6199	26	May 29	June 1	27	61.0	16.2	20.4	15	15.8	26	5	85.7
Eagle Chief	8868	27	May 28	June 1	22	61.5	16.1	23.8	5	17.4	19	5	100.0
Currell	3326	23	-	May 25	23	60.5	16.1	19.6	16	15.9	25	5	82.4
Ioturk	11388	29	June 2	June 1	23	61.0	15.8	22.0	13	16.0	24	5	92.4
Denton	8265	27	May 27	June 1	25	60.0	15.7	23.1	10	19.2	11	5	97.1
Kanred x Marquis	11589	23	-	May 25	23	62.5	15.6	-	-	19.4	10	2	114.1
Turkey selection	10016	24	May 27	May 29	21	61.5	15.4	-	-	15.1	27	2	88.8
Kanred x Hard Federation	10091	18	-	May 22	22	62.0	15.3	-	-	20.9	4	2	122.9
P-1066-1 x Prelude	11590	21	-	May 22	21	62.0	15.2	-	-	20.3	6	2	119.4
Mediterranean selection	11525	25	-	May 25	25	60.5	14.6	-	-	19.5	9	2	114.7
Early Blackhull	8856	15	May 18	May 18	24	64.5	14.3	21.5	14	18.2	15	5	90.3
Kanred x Hard Federation	11373	21	-	May 22	21	62.5	13.6	-	-	21.2	3	4	107.2
Mediterranean selection	11587	28	May 30	June 1	24	61.0	13.2	-	-	19.7	8	2	115.9

Probable error of a difference, 0.9 bu.; probable error of a mean, 0.7 bu.; or 4.04 percent.

Table 1. - (Continued)

Stillwater, Oklahoma

(Five 1/131st-acre plots)

Variety	C.I. No.	Acre yield	Yield		No. of years grown	Percentage of Kharkof for same years
			Average 1931 to 1936	Rank		
		(Bu.)	(Bu.)			
Turkey selection	10083	29.1	-	-	5	105.7
Nebraska No. 60	6250	28.1	28.6	6	6	99.0
Nittany	5962	26.8	-	-	5	94.7
Kharkof	1442	26.1	28.9	5	6	100.0
Sibley No. 62	11523	25.9	29.9	2	6	103.5
Cheyenne	8885	25.3	29.2	4	6	101.0
Penquite selection	11745	25.3	30.6	1	6	105.9
Ukrainka	----	25.3	-	-	1	96.9
Clarkan	8858	25.3	-	-	2	102.2
Kanred	5146	24.9	28.1	7	6	97.2
Sibley No. 81	10084	24.0	28.9	5	6	100.0
Fulcaster	6471	23.6	-	-	5	94.9
Turkey (check)	1558	23.6	28.6	6	6	99.0
Denton	8265	23.2	29.7	3	6	102.8
Blackhull	6251	22.2	-	-	5	104.2
Harvest Queen	6199	22.2	25.4	11	6	87.9
Eagle Chief	8868	21.7	29.2	4	6	101.0
Turkey selection (I-27-84)	----	21.2	-	-	1	81.2
Menno	----	19.2	-	-	1	73.6
Kawvale	8180	19.1	27.5	8	6	95.2
Tennarq	6936	18.9	28.9	5	6	100.0
Quivira	8886	18.0	26.6	9	6	92.0
Kanred x Hard Federation (III-30-38)	----	16.4	-	-	1	62.8
Kanred x Hard Federation	10092	15.9	-	-	2	84.1
Early Blackhull	8856	15.4	25.8	10	6	89.3
Kanred x Hard Federation	10091	14.9	-	-	2	78.7

Table 1. - (Continued)

Helena, Okla.

(Four 1/131st-acre plots)

Variety	C.I. No.	Acre yield	Yield: Average 1934 to 1936	Yield: Rank	No. of years grown	Percentage of Kharkof for same years
		(Bu.)	(Bu.)			
Sibley No. 62	11523	11.5	16.2	13	3	93.1
Tennarq	6936	11.3	19.2	5	3	110.3
Penquite selection	11745	10.8	21.7	1	3	124.7
Turkey selection	10083	10.7	18.9	6	3	108.6
Eagle Chief	8868	10.5	19.3	4	3	110.9
Blackhull	6251	10.5	-	-	2	116.6
Turkey (check)	1558	9.4	17.2	11	3	98.9
Cheyenne	8885	9.6	17.9	7	3	102.9
Redhull	11534	9.1	17.7	8	3	101.7
Kanred x Hard Federation (III-30-38)	----	8.4	-	-	1	102.4
Kharkof	1442	8.2	17.4	9	3	100.0
Denton	8265	8.1	17.7	8	3	101.7
Kawvale	8180	8.1	16.0	14	3	92.0
Nebraska No. 60	6250	8.0	17.3	10	3	99.4
Kanred	5146	7.9	16.2	13	3	93.1
Harvest Queen	6199	7.8	16.6	12	3	95.4
Sibley No. 81	10084	7.4	17.4	9	3	100.0
Quivira	8886	7.4	20.3	2	3	116.7
Fulcaster	6471	7.3	13.2	15	3	75.9
Kanred x Hard Federation (III-30-37)	----	7.3	-	-	1	89.0
Early Blackhull	8856	6.9	19.9	3	3	114.4

Table 1. - (Continued)

Woodward, Okla.

(Four 1/47th-acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Hgt.	Acre yield	Yield Average 1931-34 and 1936	Yield Rank	No. of years grown	Percentage of Kharkof for same years
			June	(In.)	(Bu.)	(Bu.)			
Kharkof	1442	May 6	15	22	22.5	29.0	1	5	100.0
Nebraska No. 60	6250	May 8	15	21	21.1	27.4	5	5	94.5
Local Turkey (Woodward 1008)	----	May 6	15	21	20.2	27.9	4	5	96.2
Sibley No. 62	11523	May 5	12	21	20.1	-	-	2	82.9
Kenmarq	6936	May 4	10	20	20.0	28.0	3	5	96.6
Kanred	5146	May 5	12	19	19.9	26.3	8	5	90.7
Turkey selection (Goodwell No. 102)	----	May 5	12	20	19.1	-	-	4	92.6
Kanred x Marquis	10090	May 5	11	19	19.0	26.3	8	5	90.7
Cheyenne	8885	May 5	15	20	18.3	28.1	2	5	96.9
Oro	8220	May 6	13	20	18.2	25.8	9	5	89.0
Blackhull	6251	May 4	11	18	18.0	26.6	7	5	91.7
Sibley No. 81	10084	May 5	11	19	17.6	25.1	11	5	86.6
Quivira	8886	Apr. 30	7	16	16.2	26.7	6	5	92.1
Kanred x Hard Federation	10092	Apr. 30	7	14	16.0	-	-	1	71.1
Fulcaster	6471	May 5	11	19	15.7	25.0	12	5	86.2
Denton	8265	May 6	12	19	15.3	22.5	14	5	77.6
Kawvale	8180	May 5	10	19	13.6	25.4	10	5	87.6
Turkey selection	10016	May 4	9	19	13.4	-	-	2	73.1
Kanred x Hard Federation	10091	Apr. 30	4	13	12.4	-	-	1	55.1
Early Blackhull	8856	Apr. 28	1	15	12.0	24.2	13	5	83.4

Probable error of a difference, 1.0 bu.; probable error of a mean, 0.7 bu., or 3.97 percent.

1.48

Table 1. - (Continued)

Manhattan, Kans.

(Three 1/30th-acre plots)

Variety	C.I. No.	Date Headed	Date Ripe	Hgt.	Stand culms (Per acre)	Lodging	Breaking Strength	Stem rust	Septoria	Weight of 500 kernels	Test weight	Acre yield	Yield Average 1931-36	Yield Rank	No. years grown	Percentage of Kharkof for same years
				(In.)	(1,000)	(Pct.)		(Pct.)	(Pct.)	(g)	(Lbs.)	(Bu.)	(Bu.)			
		May	June													
Turkey selection	10094	19	24	39.5	2414	T-	6.23	10.0	2+	12.88	60.9	40.9	-	-	2	114.6
Tennarq	6936	18	25	41.1	2034	7	7.95	14.0	2+	13.90	59.1	39.0	37.7	7	6	104.4
Cheyenne	8885	20	24	41.0	2201	0	7.17	43.3	T	13.05	59.2	37.2	40.0	2	6	110.8
Oro	8220	21	26	41.2	2052	1+	7.73	16.6	1+	12.76	60.1	36.1	36.9	8	6	102.2
Kharkof	1442	21	26	43.4	2170	15	7.19	18.3	2	12.54	59.2	35.9	36.1	9	6	100.0
Kanred x Marquis	11589	16	22	37.7	1995	0	7.19	12.3	3	13.38	59.9	35.4	-	-	4	101.9
Kanred	5146	19	24	41.8	2127	30	6.63	8.4	3	13.57	59.1	34.6	35.7	10	6	98.9
Kawvale	8180	16	23	40.5	1986	T	8.43	16.6	2	13.99	60.2	33.3	41.1	1	6	113.9
Turkey	1558	20	25	44.7	2100	29+	6.93	20.0	2	12.77	59.5	33.2	36.9	8	6	102.2
Quivira	8886	15	20	37.7	1920	11+	6.21	5.6	4	12.63	61.1	32.8	38.1	5	6	105.5
Turkey selection	10016	18	22	36.1	2481	T	5.47	8.3	4	11.35	60.6	31.9	-	-	3	100.3
Kanred x Hard Federation	10091	19	19	33.4	1964	0	6.19	8.3	4+	13.41	60.5	31.2	-	-	5	92.7
Prelude x Kanred	11591	15	21	37.9	2008	10	6.68	5.6	3+	12.16	60.9	31.2	-	-	3	100.0
Blackhull	6251	20	26	41.9	1995	20	6.48	8.3	3	13.51	61.0	30.9	37.8	6	6	104.7
Clarkan	8858	20	26	46.4	1578	10	10.69	36.6	1+	15.11	60.0	30.6	39.6	3	6	109.7
P-1066-1 x Prelude	11590	14	20	36.7	1780	10	6.58	4.3	3+	12.48	60.2	30.3	36.1	9	3	95.5
Nebraska No. 60	6250	22	26	44.3	2195	35	8.03	38.3	1	11.73	57.5	30.2	38.3	4	6	100.0
Fulcaster	6471	18	25	44.6	1771	15	9.67	46.6	1	15.70	60.0	28.8	37.7	7	6	106.1
Early Blackhull	8856	10	19	35.9	1887	13.3	7.48	T+	3	13.97	62.8	28.7	-	-	6	104.4
Kanred x Genesee Giant	----	19	26	45.9	1530	T	11.12	40.0	1	13.33	57.6	28.2	-	-	1	78.6
Kanred x Hard Federation	10092	13	21	33.5	1815	3+	6.13	10.0	4	13.32	58.9	26.9	-	-	5	90.7
Harvest Queen	6199	19	26	47.8	1640	10	11.24	35.0	1	13.84	58.9	26.6	32.7	11	6	90.6

Probable error of a difference, 1.3 bu.; probable error of a mean, 1.0 bu., or 2.95 percent.

1.93

Table 1. - (Continued)

Hays, Kans.

(Four 1/50th-acre plots; seeded Oct. 2, 1935; emerged Oct. 10, 1935)

Variety	C.I. No.	Date Headed	Date Ripe	Hgt.	Tillers (Per acre)	Test Weight (Per bu.)	Acre yield	Yield Average 1931-34 and 1936	Yield Rank	No. of years grown	Percentage of Kharkof for same years
				(In.)	(1,000)	(Lbs.)	(Bu.)	(Bu.)			
		May	June								
Chiefkan	11754	18	20	30	2364	63	31.8	-	-	1	133.6
Quivira	8886	15	19	29	2048	64	31.7	24.5	3	5	121.3
Kanred x Hard Federation	10091	12	19	27	2700	64	31.7	-	-	3	140.8
Do	10092	14	19	28	2652	63	31.6	-	-	2	138.3
Kanred x Marquis	11589	18	19	28	2800	63	30.6	-	-	1	128.6
Tenmarq	6936	17	20	29	2792	61	29.8	24.4	4	5	120.8
Blackhull	6251	17	20	31	2804	62	29.2	24.6	2	5	121.8
Turkey selection	10094	19	20	26	2860	62	28.6	-	-	1	120.2
Kanred	5146	19	20	32	3044	60	27.7	22.7	7	5	112.4
Cheyenne	8885	20	20	30	2876	61	27.0	24.4	4	5	120.8
Oro	8220	20	20	33	2332	60	26.9	22.7	7	5	112.4
Early Blackhull	8856	12	18	30	2048	65	26.9	25.1	1	5	124.3
Turkey selection	10016	17	20	26	3184	63	26.5	-	-	2	106.2
Turkey	1558	19	20	33	2356	60	25.1	21.9	9	5	108.4
Rupp	----	19	20	31	2692	62	25.1	-	-	1	108.5
Turkey (Norton Co.)	----	20	20	31	2920	59	25.0	-	-	2	112.3
Nebraska No. 60	6250	20	20	35	2588	58	24.5	22.9	6	5	113.4
Kanhull	----	19	20	33	2568	63	24.2	-	-	1	101.7
Kharkof	1442	20	20	34	2988	59	23.8	20.2	10	5	100.0

Probable error of a difference, 0.7 bu.; probable error of a mean, 0.5 bu., or 1.77 percent.

1.04

Table 1. - (Continued)

Lincoln, Nebr.

(Five 1/40th-acre plots; seeded Sept. 26, 1935; emerged Oct. 4, 1935)

Variety	C.I. No.	Winter survival (Pct.)	Date Headed May	Date Ripe June	Hgt. (In.)	No. culms (Per acre) (1,000)	Test weight (Per bu.) (Lbs.)	Acre yield (Bu.)	Yield Average 1932-36 (Bu.)	Yield Rank	No. years grown	Percentage of Kharkof for same years
Turkey selection	10094	99	25	25	30	3663	62.2	34.2	31.7	3	5	108.6
Turkey (Crimean)	1435	100	25	25	33	2879	61.2	33.0	27.9	16	5	95.5
Kanred	5146	100	26	25	32	2849	62.1	33.0	29.3	8	6	100.6
Kawvale x Tenmarq	11669	100	22	21	29	3263	61.3	32.7	-	-	1	107.9
Turkey	3689	98	27	25	29	3312	62.5	32.2	31.4	4	5	107.5
Cheyenne	8885	100	26	24	30	2931	62.7	31.8	33.1	2	6	111.6
Oro x Fulhard	11579	100	23	24	30	3077	61.8	31.5	-	-	2	103.9
Turkey (Nebraska No. 1)	----	98	26	25	31	3022	61.5	31.4	28.8	13	5	98.6
Nebraska No. 6	6249	98	27	25	32	3069	62.4	31.3	27.3	18	5	93.5
Cheyenne selection	11666	98	26	24	29	3719	62.6	31.2	-	-	1	103.0
Turkey (Seward Co.)	-----	99	24	25	31	3525	61.8	31.0	-	-	4	103.8
Turkey selection (Nebr. No. 312)	-----	99	26	25	31	2838	61.8	30.9	-	-	4	99.7
Turkey selection	10015	100	24	25	31	3323	62.3	30.8	29.4	7	5	100.7
Oro	8220	100	27	27	32	2543	62.0	30.6	29.1	10	6	99.1
Kharkof	1442	99	27	25	32	2490	61.9	30.3	29.2	9	6	100.0
Turkey selection	11576	99	25	25	30	3640	60.6	30.1	-	-	2	106.3
Do	11577	99	25	24	30	3711	60.6	29.6	-	-	2	104.7
Nebraska No. 60	6250	98	29	28	32	2882	61.8	29.4	27.7	17	6	95.3
Schluckebier Turkey	----	97	25	24	30	3215	62.1	29.4	-	-	1	97.0
Tenmarq	6936	97	24	24	31	2629	60.0	29.1	30.7	5	6	105.6
Turkey selection	11667	99	24	24	30	3513	62.0	29.1	-	-	1	96.0
Iowin	10017	99	26	25	33	2879	62.4	29.1	28.3	15	5	96.9
Blackhull	6251	98	25	25	32	2774	62.8	29.0	30.2	6	6	102.2
Turkey selection	10016	99	23	22	29	3435	61.6	28.8	29.1	10	5	99.7
Clarkan	8838	99	25	28	36	2121	62.7	28.4	-	-	2	105.1
Kawvale	8180	99	24	25	32	2483	60.5	27.8	33.4	1	5	114.4
Minturki	6155	100	28	25	33	2726	60.8	27.7	28.8	13	6	96.6
(Minhardi x Minturki) x Tenmarq	11668	99	21	22	27	3021	60.1	27.0	-	-	1	89.1
Quivira	8886	97	22	23	31	2270	61.8	26.3	26.6	19	6	91.9
Early Blackhull	8856	92	20	23	30	2322	63.1	24.2	29.0	12	5	99.3

Probable error of a difference, 1.3 bu.; probable error of a mean, 0.9 bu., or 2.07 percent.

1.93

Table 1. - (Continued)

North Platte, Nebr.

(Four 1/40th-acre plots; seeded Sept. 25, 1935)

Variety	C.I.No.	Winter survival	Date		Hgt.	Test weight (Per bu.)	Acre yield	Yield				No. years grown	Percentage of Kharkof for same years
			Headed	Ripe				Average 1931 and 1933-36	Rank	Average 1935 and 1936	Rank		
		(Pct.)	June		(In.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Cheyenne	8885	70	5	July 1	37	57.5	17.8	30.5	1	31.1	3	5	109.7
Tenmarq	6936	75	5	July 1	40	55.0	16.8	29.5	3	30.9	4	5	106.1
Beloglina x Hussar	11582	65	6	July 1	39	56.0	16.5	-	-	29.4	8	2	98.7
Do	11664	70	5	July 1	39	56.0	16.5	-	-	29.8	5	2	100.0
Do	11663	75	4	July 1	38	55.0	16.2	-	-	29.1	10	2	97.7
Turkey selection	10016	70	3	June 30	38	56.0	16.0	29.0	5	32.4	1	5	104.3
Kanred x Minturki	10012	73	7	July 1	39	52.5	15.9	26.4	10	27.8	13	5	95.0
Oro	8220	65	7	July 1	40	55.0	15.8	28.2	8	28.9	11	5	101.4
Cheyenne selection	11666	65	6	July 1	39	55.5	15.7	-	-	-	-	1	107.5
Blackhull	6251	68	5	July 1	39	55.0	15.4	28.8	6	29.6	7	5	103.6
Beloglina selection	8884	70	6	July 1	38	54.5	14.8	29.2	4	28.4	12	5	105.0
Local Turkey	----	65	4	July 1	39	53.0	14.8	30.2	2	31.4	2	5	108.6
Kanred	5146	73	5	July 1	39	54.5	14.6	27.8	9	29.8	5	5	100.0
Nebraska No. 60	6250	73	7	July 1	39	54.0	14.1	28.4	7	27.6	14	5	102.2
Beloglina x Hussar	11583	68	6	July 1	39	52.0	13.7	-	-	27.2	15	2	91.3
Turkey selection	10094	70	4	July 1	40	55.0	12.8	-	-	29.4	8	4	106.7
Beloglina x Hussar	11513	68	7	July 2	38	54.5	11.3	-	-	-	-	1	87.7

Probable error of a difference, 1.3 bu.; probable error of a mean, 0.9 bu., or 6.10 percent.

1.93

Table 1. - (Continued)

Akron, Colo.

(Four 1/41st-acre plots; seeded Sept. 16, 1935; emerged Sept. 22, 1935)

Variety	C. I. No.	Winter survi-	Date		Hgt.	Lodg- ing	Test weight (Per bu.)	Acre yield	Yield				No. years grown	Percentage of Kharkof for same years
			Headed	Ripe					Average 1931-36	Rank	Average 1934-36	Rank		
		(Pct.)			(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
				July										
Turkey selection	10016	84	May 25	2	36	5	54.0	25.8	-	-	16.2	3	5	134.8
Early Blackhull	8856	65	May 21	2	33	4	57.0	25.2	14.1	1	16.1	4	6	130.6
Tennarq	6936	78	May 25	2	39	2	50.0	24.9	13.4	3	15.3	5	6	124.1
Turkey x Marquis	11747	73	May 26	5	36	5	53.5	24.8	-	-	17.4	1	1	127.2
Akron selection No. 7	11660	76	May 27	6	37	0	52.0	24.1	-	-	-	-	3	141.5
Turkey selection	10094	88	May 27	3	34	1	53.0	24.1	-	-	-	-	1	123.6
Turkey selection	10098	83	May 25	3	34	6	53.0	23.8	-	-	16.4	2	3	133.3
Cheyenne	8885	89	May 29	6	37	0	52.5	22.7	12.4	5	14.9	6	6	114.8
Blackhull	6251	73	May 25	3	38	16	53.5	22.3	13.8	2	14.6	7	6	127.8
Kanred	5146	90	May 28	5	38	25	51.5	21.1	12.5	4	14.1	8	6	115.7
Kanred x Marquis	11746	80	May 27	5	38	25	52.0	20.7	-	-	-	-	1	106.2
Kharkof	1442	90	May 29	6	38	12	51.0	19.5	10.8	9	12.3	12	6	100.0
Nebraska No. 60	6250	92	May 30	7	39	8	49.5	19.3	11.0	7	12.8	10	6	101.9
Kharkof	1583	91	May 29	6	39	19	49.0	19.1	10.9	8	12.7	11	6	100.9
Minturki	6155	91	May 30	6	37	33	50.0	19.1	9.3	10	11.9	14	6	86.1
Oro	8220	86	May 29	6	40	8	50.5	19.0	12.0	6	14.0	9	6	111.1
Turkey selection	11375	86	May 29	6	38	16	51.5	18.3	-	-	12.1	13	3	98.4
Yogo	8033	95	June 1	7	42	0	48.5	16.7	-	-	11.3	15	3	91.9
Alton	1438	92	May 30	7	41	1	49.0	13.1	8.9	11	9.6	16	6	82.4

Probable error of a difference, 1.4 bu.; probable error of a mean, 1.0 bu., or 4.78 percent.

2.08

Table 1. - (Continued)

Dickinson, N. Dak.

(Two 1/40th-acre plots; seeded Sept. 17, 1935; emerged Apr. 7, 1936)

Variety	C.I. No.	Date Headed	Date Ripe	Hgt.	Stand (Per acre)	Acre yield 1/	Yield Average 1932-33 and 1935	Yield Rank	No. years grown	Percentage of Kharkof for same years
				(In.)	(1,000)	(Bu.)	(Bu.)			
		June	July							
Minturki	6155	19	13	16	213	0.8	10.0	5	3	113.6
Kharkof	1442	22	14	16	232	0.2	8.8	8	3	100.0
Beloglina	1543	19	14	14	262	0.1	10.5	3	3	119.3
Turkey	1571	20	14	16	299	0.1	10.6	2	3	120.5
Karmont	6700	22	14	12	195	0.1	9.0	7	3	102.3
Nebraska No. 60	6250	19	13	13	298	0.1	10.2	4	3	115.9
Kanred x Buffum	8030	19	14	14	344	0.1	8.6	9	3	97.7
Yogo	8033	19	14	15	372	0.1	10.9	1	3	123.9
Turkey selection	10016	17	13	16	215	0.1	-	-	1	233.3
Minard x Minhardi	11656	22	15	13	233	0.1	-	-	-	-

1/ Both plots of each variety threshed together and hence calculating of probable errors was not possible. Not used in average because of very low yields.

Sheridan, Wyo.

(Three 1/55th-acre plots; seeded Sept. 11, 1935; emerged Oct. 1, 1935)

Variety	C.I. No.	Winter survival	Date Headed	Date Ripe	Hgt.	Test weight (Per bu.)	Acre yield	Yield Average 1931-36	Yield Rank	No. years grown	Percentage of Kharkof for same years
		(Pct.)			(In.)	(Lbs.)	(Bu.)	(Bu.)			
			June	July							
Montana No. 36	5549	75	6	5	25	53	11.3	24.1	1	6	111.1
Nebraska No. 60	6250	75	6	5	26	52	11.0	22.8	4	6	105.1
Yogo	8033	77	7	5	27	52	10.7	23.2	3	6	106.9
Karmont	6700	75	6	5	27	55	9.3	22.7	5	6	104.6
Turkey selection	10016	77	5	4	24	53	9.0	-	-	3	102.7
Cheyenne	8885	74	5	5	25	54	8.6	-	-	2	144.8
Kanred	5146	75	5	5	25	56	8.6	23.9	2	6	110.1
Minturki x Marquis	11502	77	5	5	27	54	7.6	-	-	1	110.1
Minard x Minhardi	11656	75	6	5	24	52	7.0	-	-	1	101.4
Kharkof	1442	75	6	6	25	54	6.9	21.7	6	6	100.0
Minturki	6155	70	7	5	27	51	6.5	20.1	7	6	92.6

Probable error of a difference, 0.7 bu.; probable error of a mean, 0.5 bu., or 5.05 percent.

1.04

Table 1. - (Continued)

Bozeman, Mont.

(Three 1/56th-acre plots; seeded Sept. 9, 1935; emerged Sept. 19, 1935)

Variety	C.I.No.	Date Headed	Date Ripe	Hgt.	Lodging	Test weight (Per bu.)	Acre yield	Yield: Average 1934-36	Rank	Yield: Average 1931 and 1933-36	Rank	No. years grown	Percentage of Kharkof for same years
		June		(In.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Cheyenne	8885	18	July 28	47	15	62.1	97.4	85.3	1	-	-	3	105.7
Yogo	8033	22	July 31	44	17	61.3	92.1	83.7	2	71.2	1	5	104.1
Yogo selection No. 2	----	22	Aug. 3	45	37	61.4	87.4	-	-	-	-	2	102.6
Minturki	6155	19	Aug. 1	46	20	60.4	87.1	73.6	7	62.1	6	5	90.8
Kharkof	1442	18	Aug. 2	42	40	61.2	85.9	80.7	3	68.4	3	5	100.0
Montana No. 36	5549	18	Aug. 1	43	23	61.8	85.5	78.1	5	65.1	5	5	95.2
Minard x Minhardi	11656	14	July 28	39	2	62.0	84.3	-	-	-	-	1	98.1
Turkey selection	10016	12	July 25	42	8	61.4	84.3	66.7	10	-	-	3	82.7
Nebraska No. 60	6250	18	Aug. 1	44	43	61.4	84.0	79.5	4	68.6	2	5	100.3
Oro	8220	15	July 30	44	15	62.3	79.7	70.0	9	-	-	3	86.7
Minard x Minhardi	8889	17	July 29	40	8	60.5	78.7	75.1	6	65.4	4	5	95.6
Newturk	6935	18	July 28	44	15	61.3	77.8	70.8	8	60.3	7	5	88.2
Minturki x Marquis	11502	14	July 28	40	8	60.2	68.8	-	-	-	-	1	80.1

Probable error of a difference, 1.3 bu.; probable error of a mean, 0.9 bu., or 1.58 percent.

1.93

PROBABLE ERRORS

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

$$\text{Probable error of a difference} = \pm 0.6745 \sqrt{\frac{2M(\sigma_T^2 - \sigma_V^2 - \sigma_R^2)}{(M-1)\quad(N-1)}}$$

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

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

where a, b, c, -- n = the separate probable errors and N = the number of separate averages. The probable 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 probable errors is shown in table 2, together with the number of plots and average yields at each station.

It is gratifying to note that the probable errors for the season for all stations, as a whole, are the lowest whether expressed in bushels or as a percent of the mean yield since the cooperative uniform experiments were begun in 1931. This perhaps is due in part to the complete failure and the consequent lack of data at those stations where the variability is usually high; but it seems also to be due in some measure to the more careful selection of land and greater care on the part of field men and cooperators in the management of the plots.

Table 2. - Average yield, probable error of a difference, and probable error of the mean for plot tests at each cooperating station, 1936

Station	No. of plots	Average yield of varieties (Bu.)	Probable error of a difference (Bu.)	Probable error of a mean	
				Bushels	Percent
Texas:					
Denton	4	41.3	0.7	0.5	1.11
Oklahoma:					
Lawton	3	16.3	0.9	0.7	4.04
Stillwater	5	22.4	---	---	----
Helena	4	8.9	---	---	----
Woodward	4	17.4	1.0	0.7	3.97
Kansas:					
Manhattan	3	32.3	1.3	1.0	2.95
Hays	4	27.8	0.7	0.5	1.77
Colorado:					
Akron	4	21.2	1.4	1.0	4.78
Nebraska:					
Lincoln	5	30.0	1.3	0.9	2.07
North Platte	6	15.3	1.3	0.9	6.10
Wyoming:					
Sheridan	3	9.6	0.7	0.5	5.05
North Dakota:					
Dickinson	2	0.2	---	---	----
Montana:					
Bozeman	3	84.1	1.3	0.9	1.58

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. In previous reports a summary for the entire area was included. This has been omitted from the present report since it seems questionable whether such a summary is of much value.

Districts

Summaries of the yield data for the uniform varieties grown in 1936 and the 1931-36 averages where available are presented in tables 3 to 7.

In the southern district yields were reported from five stations. Ten varieties were grown uniformly at these stations and the data are presented in table 3. It is surprising to find Nebraska No. 60, a late wheat, at the top of the list. This is probably due to a late rain that benefited the late varieties most. Kanred and Blackhull had the same average yields and below these varieties ranked Kharkof and Tenmarq. Quivira had a lower average yield than usual, and Early Blackhull was again at the bottom of the list. For the period 1931-36 weighted averages are shown for nine varieties (table 4). The varieties are listed in the order of the weighted average yield based on the results of 34 station years. Blackhull and Tenmarq are at the top of the list, Quivira in fourth place, and Fulcaster and Denton last. Nebraska No. 60 was third from the last, showing that the results for 1936 are a bit out of line for this variety.

Table 3. - Summary of average yields of the uniform winter wheat varieties grown in plot tests at 5 stations in the southern district, 1936

Variety	C.I. No.	Average yield in bushels per acre at:					Average
		Denton	Lawton	Stillwater	Helena	Woodward	
Nebraska No. 60	6250	43.0	17.9	28.1	8.0	21.1	23.6
Kanred	5146	46.2	17.0	24.9	7.9	19.9	23.2
Blackhull	6251	47.2	18.1	22.2	10.5	18.0	23.2
Kharkof	1442	41.5	16.9	26.1	8.2	22.5	23.0
Tenmarq	6936	48.0	16.2	18.9	11.3	20.0	22.9
Fulcaster	6471	41.3	16.5	23.6	7.3	15.7	20.9
Quivira	8886	46.4	16.2	18.0	7.4	16.2	20.8
Denton	8265	40.6	15.7	23.2	8.1	15.3	20.6
Kawvale	8180	39.9	16.3	19.1	8.1	13.6	19.4
Early Blackhull	8856	44.1	14.3	15.4	6.9	12.0	18.5
Probable error of a mean (Bu.)		0.5	0.7	----	----	0.7	----
Probable error of a mean (Pct.)		1.11	4.04	----	----	3.97	----

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 the period 1931-36

Variety	C. I. No.	Average yield in bushels per acre at:								Weighted average
		Denton	Amarillo	Lawton	Stillwater	Carrier	Helena	Woodward	Goodwell	
Number of years grown		6	2	5	6	3	3	5	4	
Blackhull	6251	25.9	14.4	23.6	32.1 1/	26.9	28.9 1/	26.6	27.3	26.4
Tenmarq	6936	31.1	15.5	24.6	28.9	27.8	19.2	28.0	25.1	26.3
Kharkof	1442	25.0	13.7	23.8	28.9	27.3	17.4	29.0	29.3	25.5
Quivira	8886	32.6	13.2	25.4	26.6	22.5	20.3	26.7	22.7	25.3
Kanred	5146	29.0	14.4	24.4	28.1	25.8	16.2	26.3	27.6	25.3
Kawvale	8180	29.2	12.4	25.9	27.5	25.5	16.0	25.4	21.0	24.4
Nebraska No. 60	6250	23.1	12.0	22.1	28.6	26.4	17.3	27.4	28.6	24.3
Denton	8265	27.9	12.6	23.1	29.7 1/	25.0	17.7	22.5	21.7	23.9
Fulcaster	6471	25.3	11.3	22.4	29.0	21.5	13.2	25.0	20.1	22.5

1/ Grown 1 year less than indicated.

Data were reported from five stations in the central district in 1936 (table 5). Turkey selection (C. I. 10094) again had the highest average, although it was only slightly higher than Tenmarq and Cheyenne. Nebraska No. 60 had the lowest average yield of any of the varieties that were grown at all stations. Had the North Platte yields been left out of the average in order to include Kharkof and Early Blackhull, the order would have been the same, except that both these varieties would have ranked above Nebraska No. 60. For the long-time average (table 6) the varieties remain in the same order as last year, with Cheyenne still having nearly a bushel advantage in average yield.

For the northern district a summary table for 1936 is not included because data are available from only two stations, viz., Bozeman and Sheridan. Since the Bozeman yields were many times greater than those at Sheridan an average would mean little. For the same reasons a summary table for the entire period of testing has not been prepared. For reference, the summary for the period 1931-35 for the northern district is repeated from the 1935 report. These data are presented as table 7.

Table 5. - Summary of average yields of 9 winter wheat varieties grown in uniform plot tests at 5 stations in the central district in 1936

Variety	C.I. No.	Average yield in bushels per acre at:					Average
		Manhattan	Hays	Lincoln	North Platte	Akron	
Turkey selection	10094	40.9	28.6	34.2	12.8	24.1	28.1
Tenmarq	6936	39.0	29.8	29.1	16.8	24.9	27.9
Cheyenne	8885	37.2	27.0	31.8	17.8	22.7	27.3
Kanred	5146	34.6	27.7	33.0	14.6	21.1	26.2
Oro	8220	36.1	26.9	30.6	15.8	19.0	25.7
Blackhull	6251	30.9	29.2	29.0	15.4	22.3	25.4
Nebraska No. 60	6250	30.2	24.5	29.4	14.1	19.3	23.5
Kharkof	1442	35.9	23.8	30.3	----	19.5	----
Early Blackhull	8856	28.7	26.9	24.2	----	25.2	----
Probable error of a mean (bushels)		1.0	0.5	0.9	0.9	1.0	0.4
Probable error of a mean (percent)		2.95	1.77	2.07	6.10	4.78	1.75

Table 6. - Summary of average yields of 7 uniform winter wheat varieties grown in plot tests at 8 stations in the central district, 1931-36

Variety	C.I. No.	Average yield in bushels per acre at:								Average
		Manhattan	Hays	Colby	Akron	Lincoln	North Platte	Alliance	Valentine	
Number of years grown		6	5	3	6	6	5	2	1	
Cheyenne	8885	40.0	24.4	32.8	12.4	33.1	30.5	17.8	9.8	27.4
Blackhull	6251	37.8	24.6	32.7	13.8	30.2	28.8	17.8	9.1	26.5
Tenmarq	6936	37.7	24.4	30.5	13.4	30.7	29.5	17.3	8.4	26.3
Nebraska No. 60	6250	38.3	22.9	1/36.0	11.0	27.7	28.4	17.1	8.8	25.4
Oro	8220	36.9	22.7	29.7	12.0	29.1	28.2	18.4	7.1	25.2
Kanred	5146	35.7	22.7	28.7	12.5	29.3	27.8	16.5	7.9	24.8
Kharkof	1442	36.1	20.2	1/38.8	10.8	29.2	----	16.8	9.6	----

1/ Grown 1 year less than indicated.

Table 7. - Summary of average yields of 10 uniform winter wheat varieties grown in plot tests at 9 stations in the northern district during all or a part of the period 1931-35

Variety	C. I.	Average yield in bushels per acre at:									Weighted average 7 sta.1/	Weighted average all sta.	Percent Kharkof same tests
		Waseca	Red-field	Dick-inson	Archer	Sheri-dan	Boze-man	Hunt-ley	Mocca-sin	Havre			
Number of years grown		4	2	3	3	4	4	2	5	4			
Yogo	8033	38.1	24.1	10.9	----	25.6	66.0	----	16.6	8.6	27.6	27.6	109.1
Minhardi x Minturki	6034	----	18.6	9.3	11.4	23.4	----	----	15.6	7.1	----	14.3	104.4
Nebraska No. 60	6250	35.6	18.5	10.2	10.4	25.2	64.8	----	15.6	----	----	27.2	101.9
Minhard x Minhardi	8889	----	22.1	----	----	23.9	62.1	----	15.2	6.9	----	25.9	101.6
Kharkof	1442	37.1	15.9	8.8	11.1	24.6	64.0	21.3	14.7	6.0	25.3	23.7	100.0
Kanred	5146	34.8	15.6	---	9.8	26.9	----	19.6	----	7.1	----	19.7	99.0
Karmont	6700	33.9	17.6	9.0	11.7	25.3	63.1	17.4	14.7	7.5	25.2	23.4	98.7
Minturki	6155	37.1	16.3	10.0	----	22.8	58.4	----	14.4	7.8	24.6	24.6	97.2
Minhardi x Minturki	8215	----	19.1	----	----	22.8	55.9	----	15.8	7.1	----	24.2	94.9
Newturk	6935	35.0	16.9	----	----	----	56.0	21.0	14.7	7.1	----	25.8	94.2

1/ Excluding Dickinson and Archer.

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 1936, only one station reported yields in each of the following States: Texas, Colorado, Wyoming, and North Dakota, and hence no summary for these is needed.

In Oklahoma, 12 varieties were grown uniformly at the 4 stations in 1936. The yields of these have been averaged and are shown in table 8. Sibley No. 62 had the highest average, closely followed by Nebraska No. 60 and Kharkof. Quivira and Early Blackhull were at the bottom of the list. It should be noted that the later varieties on the whole, gave better yields than the early varieties. For the long-time average, based on 26 station-years, Blackhull has the highest yield, followed closely by Kharkof and Tenmarq. The soft wheats have the lowest average yields for this long-time period.

Fourteen varieties were grown at both Kansas stations (table 9). Turkey selection (C. I. 10094) had the highest average yield, being 0.4 of a bushel higher than Tenmarq. A Kanred x Marquis strain had a very good average, being slightly better than Quivira and Cheyenne. Early Blackhull and Nebraska No. 60 had the lowest averages. For the period 1931-36 Cheyenne still has a slight advantage, although no variety is particularly good or poor for the period.

Table 8. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Oklahoma in 1936 and weighted average for 1931-36

Variety	C. I. No.	Acre yield in bushels	
		1936 4 stations	1931-36 26 station years
Sibley No. 62	11523	18.9	----
Nebraska No. 60	6250	18.8	25.6
Kharkof	1442	18.4	26.5
Cheyenne	8885	17.7	----
Kanred	5146	17.4	25.3
Blackhull	6251	17.2	27.5
Tenmarq	6936	16.6	26.1
Fulcaster	6471	15.8	22.7
Denton	8265	15.6	23.9
Kawvale	8180	14.7	24.2
Quivira	8886	14.5	24.6
Early Blackhull	8856	12.2	----

In Nebraska, yields were reported from Lincoln and North Platte. These are averaged in table 10. Cheyenne is at the top of the list, followed by Kanred and Turkey selection (C. I. 10094). Cheyenne selection, being tested in plots for the first time, was more than a bushel lower than Cheyenne. The early wheats Tenmarq, Turkey selection (C. I. 10016), and Blackhull

were low although not so low as Nebraska No. 60. For the 14 station-year average, based on all available yields for the period 1931-36, Cheyenne was nearly 2 bushels higher than Blackhull and Tenmarq. Nebraska No. 60 had the lowest average yield for this period.

Table 9. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Kansas in 1936 and weighted average for 1931-36

Variety	C. I. No.	Acre yield in bushels	
		1936 2 stations	1931-36 14 station years
Turkey selection	10094	34.8	----
Tenmarq	6936	34.4	31.4
Kanred x Marquis	11589	33.0	----
Quivira	8886	32.3	31.2
Cheyenne	8885	32.1	32.9
Oro	8220	31.5	30.3
Kanred x Hard Federation	10091	31.5	----
Kanred	5146	31.2	29.6
Blackhull	6251	30.1	32.0
Kharkof	1442	29.9	30.4
Kanred x Hard Federation	10092	29.3	----
Turkey	1558	29.2	----
Turkey selection	10016	29.2	----
Early Blackhull	8856	27.8	----
Nebraska No. 60	6250	27.4	32.3
Probable error of a mean (bushels)		0.6	----
Probable error of a mean (percent)		1.67	----

Table 10. - Average yield in bushels per acre of winter wheat varieties grown in plot tests in Nebraska in 1936 and weighted average for 1931-36

Variety	C. I. No.	Acre yield in bushels	
		1936 2 stations	1931-36 14 station years
Cheyenne	8885	24.8	28.3
Kanred	5146	23.8	25.4
Turkey selection	10094	23.5	----
Cheyenne selection	11666	23.5	----
Oro	8220	23.2	25.7
Tenmarq	6936	23.0	26.3
Turkey selection	10016	22.4	----
Blackhull	6251	22.2	26.4
Nebraska No. 60	6250	21.8	25.1
Probable error of a mean (bushels)		0.6	----
Probable error of a mean (percent)		3.22	----

SUMMARY OF AGRONOMIC DATA

The agronomic data other than yield have been summarized for each district in tables 11 and 12. In each case the data are averaged for as many varieties as possible. The number of stations entering the average is shown at the top of each column.

For the varieties grown in the southern district the data are shown in table 11. In this district data other than yield were reported from only three stations. Average heading dates varied from April 19 for Early Blackhull to May 3, for Nebraska No. 60. Ripening dates were in the same order but the spread was not as great. Test weights were all high with Early Blackhull and Blackhull having the highest average test weights.

In table 12 the data from the central district are summarized. Those for winter survival are out of line with data at other stations since Kanred has the highest average survival and Nebraska No. 60 the lowest. Turkey selection (C. I. 10016) had the earliest average data of heading and ripening. Turkey selection (C. I. 10094) slightly exceeded the others in number of culms per acre. Cheyenne did not lodge whereas Kanred and Nebraska No. 60 were the poorest in this respect. Test weights were not high but Turkey selection (C. I. 10016) and Blackhull gave the highest averages.

The data were not summarized for the northern district because of so few reports.

Table 11. - Summary of agronomic data other than yield for varieties of winter wheat grown at the cooperating stations in the southern district in 1936

Variety	C. I. No.	Average			
		Date headed	Date ripe	Height (In.)	Test weight per bushel (Lbs.)
Number of stations		3	3	3	2
Kharkof	1442	May 1	June 5	24.3	60.3
Nebraska No. 60	6250	May 3	June 6	25.0	59.8
Kanred	5146	Apr. 30	June 2	23.3	60.8
Tenmarq	6936	Apr. 29	June 2	24.3	61.0
Blackhull	6251	Apr. 29	June 3	25.0	62.0
Quivira	8886	Apr. 25	May 31	23.6	61.5
Early Blackhull	8856	Apr. 19	May 31	23.3	62.8
Kawvale	8180	Apr. 29	June 5	24.0	59.3
Denton	8265	May 1	June 3	26.0	59.5
Fulcaster	6471	Apr. 30	June 2	25.0	60.0

Table 12. - Summary of agronomic data other than yield for varieties of winter wheat grown at cooperating stations in the central district in 1936

Variety	C. I. No.	Average							
		Winter survival	Date Headed	Date Ripe	No. culms per acre	Height		Lodging	Test weight per bushel
Number of stations		2	5	5	2	5		2	5
		(Pct.)	May	June	(1,000)	(In.)		(Pct.)	(Lbs.)
Kanred	5146	87.7	26	27	2.488	37		27.5	57.4
Nebraska No. 60	6250	75.0	28	28	2.539	38		21.5	56.2
Turkey selection	10016	84.3	23	25	2.958	33		2.5	59.0
Turkey selection	10094	85.0	27	27	3.039	40		0.5	58.5
Cheyenne	8885	86.4	26	27	2.566	35		0.0	58.6
Oro	8220	83.7	27	28	2.298	38		4.5	57.5
Tenmarq	6936	83.3	24	26	2.332	36		4.5	57.0
Blackhull	6251	79.7	25	27	2.385	36		18.0	58.9

SUMMARY OF PLOT DATA

Hard wheats outyielded soft wheats at Denton, Tex., due for the most part to the dry spring.

Early-maturing wheats yielded lowest at Stillwater and Manhattan.

At Woodward, early-maturing wheats, based on a long-time average, are lower in yield than are later wheats.

Early strains continue to yield well at Akron, Colo. This is hardly to be expected but probably is due to a series of years with no severe winter-killing, followed by hot, dry summers.

Among the uniform varieties, Nebraska No. 60 had the highest average yield in the southern district and lowest in the central district.

Turkey selection (C. I. 10094) continues to give very good yields at stations in the central area, and seems to be decidedly superior in yielding ability to Turkey selection (C. I. 10016). The latter is the earlier of the two strains.

Cheyenne continues to give good yields in Kansas and Nebraska based on the long-time averages.

In general, it seems that Early Blackhull is too early and too "winter-tender" to be of agronomic value.

In the northern area too few data were obtained to draw any conclusions.

It would seem that varieties such as Nebraska No. 60 and possibly Turkey selection (C. I.10016) might be dropped from the uniform tests.

There is a decided need for superior new strains to be tested throughout the different districts.

The question of seed of certain strains grown in the northern district will be acute if another failure is encountered.

UNIFORM YIELD NURSERY

In the fall of 1935, the uniform yield nursery was seeded at the following stations: Denton, Amarillo, Stillwater, Woodward, Manhattan, Hays, Akron, Fort Collins, Lincoln, North Platte, and Alliance. The nursery was limited to 30 varieties and strains and all material was seeded in replicated 3-row plots. The number of plots of each variety at a station varied from 3 to 5. The varieties making up the 1936 nursery, together with the State and C. I. numbers, are shown in table 13.

A comparison of the 1936 seeding list with that of 1935 will show some changes in the nursery. Six strains which seemed to be lacking in agronomic value and which were not needed for ecological studies, were replaced by newer material. It is the purpose of the nursery to

test new material as rapidly as possible, yet care must be exercised or the turn-over will be so rapid as to defeat any attempts to study correlation from year to year or over a period of years. It is felt that while it may take only 1 year to prove that a variety is poor, it takes much longer to prove that it is good.

Table 13. - Varieties of winter wheat grown as a uniform yield nursery, 1936.

Variety	C. I. No.	State or hybrid number
Kharkof	1442	-----
Blackhull	6251	-----
Nebraska No. 60	6250	-----
Early Blackhull	8856	-----
Turkey selection	10083	Okla. No. 1
Sibley No. 62	11523	Oklahoma
Penquite selection	11745	Oklahoma
Kanred x Marquis	11589	Kans. No. 2690
Turkey selection	11667	Nebr. No. 1088
Minturki x Blackhull	11671	Nebr. No. 1089
Beloglina x Hussar	11513	No. Platte No. 126
P-1066-1 x Prelude	11590	Kans. No. 2695
Fulhard	8257	-----
Prelude x Kanred	11591	Kans. No. 2689
Cheyenne selection	11666	Nebr. No. 1087
Kanred x Hard Federation	10091	Kans. No. 2672
Do	10092	Kans. No. 2673
Kanred x (Kanred-Marquis)	11592	Kans. sel. No. 303942
Turkey selection	10015	Nebr. No. 1062
Do	10016	Nebr. No. 1069
Do	10094	Nebr. No. 1063
Do	11576	Nebr. No. 1082
Kanred x Marquis	11746	Akron sel. No. 46
Turkey x Marquis	11747	Akron sel. No. 49
Turkey selection	11375	Colo. No. 351
Do	11577	Nebr. No. 1081
Oro x Fulhard	11579	Nebr. No. 1083
(Minhardi x Minturki C. I. 8034) x Tenmarq	11668	Nebr. No. 1085
Kawvale x Tenmarq	11669	Nebr. No. 1086
Akron selection	11660	Akron sel. No. 7

DATA OBTAINED

In table 14 are presented the data from nine of the nurseries. No data were obtained from Amarillo and Alliance, owing to drought. For each station the varieties are listed in the order of yield in 1936. The average yields and ranks for the 5-year period, 1932-36, and the 2-year period, 1935-36, are shown where possible. A percentage of Kharkof (C. I. 1442) is also shown for each variety. Data other than yield are given only when the character seemed to be related to yield, or when they demonstrated differences believed to be of interest.

For the most part the data need little explanation. It must be remembered that in general the fall was dry and that at some stations severe winter weather caused killing, while at other stations a heavy covering of snow protected the crop. The spring was dry at most stations, with no heavy rain until late in May. In most cases the varieties matured before the extremely hot weather started.

At Denton, 10 new hybrid strains outyielded Blackhull, the highest yielding standard variety. Here leaf rust was rather heavy on most strains and there was considerable lodging. The later strains and the Turkey-type varieties were at the bottom of the list. In general, the 1936 results seem to be in line with the 4-year average.

The later varieties gave higher yields as a group than did the early varieties at Stillwater. A number of Turkey selections yielded rather well here. From the 5-year average it would seem that the 1936 yields are not in line with those of previous years.

At Woodward, some lodging and shattering were recorded; test weights were between 58 and 61 pounds per bushel, and yields ranged from 17.3 to 24.1 bushels per acre. Some of the later varieties gave the higher yields while the very early types gave the lower yields. For the 5-year period, Kanred x Hard Federation (C. I. 10092) has the highest average yield.

Lodging and leaf rust were recorded for the Manhattan nursery, the readings for leaf rust ranging from 2 to 72 percent. The midseason varieties seemed to yield better than the very early or very late types. Turkey selection (C. I. 10094) was second for yield in 1936 and ranks first for the 5-year average. Turkey selection (C. I. 10016) and Kanred x Hard Federation (C. I. 10092) rank second in yield for the 5-year period.

At Hays, there seems to be no close relation between time of maturity and yield. Some shattering was recorded although in no case was it serious. Seventeen new strains ranked above Blackhull for yield. For the 4-year average, Kanred x Hard Federation (C. I. 10091), Turkey selection (C. I. 10094), Kanred x Hard Federation (C. I. 10092), and Blackhull have the highest averages.

Winter-killing was heavy at Akron, Colo., and undoubtedly had an influence on yield. Dates of heading, ripening, and height were the other data recorded at this station. Six hybrid strains had yields above that of Early Blackhull. For the 3-year period Blackhull is first and Turkey selection (C. I. 10094) second for yield. For the period the nursery has been grown at Akron, the midseason or early varieties have the advantage.

Yields at Fort Collins ranged from 48.6 to 72.6 bushels per acre, thus giving an opportunity to observe the varieties under optimum conditions. Very good data were also reported on lodging, only five strains having readings of less than 5 percent. Only five new strains yielded higher than Nebraska No. 60 in 1936. For the 3-year average, P-1066-1 x Prelude (C. I. 11590) ranks first and Prelude x Kanred (C. I. 11591) is second.

At Lincoln, no data other than time of heading and maturity and height were obtained. Yields were the highest since 1932 and test weights unusually high. Akron selection No. 7 gave the highest yield for 1936, followed by Nebraska No. 60 and Turkey selection (C. I. 10094). For the 5-year period Fulhard ranks first and Early Blackhull second.

Winter-killing was heavy although not entirely consistent between varieties at North Platte. Stands were rather variable and straw growth heavy, causing some shriveling when the moisture supply became limited. All of the standard varieties in the nursery gave very poor yields. Kawvale x Tenmarq (C. I. 11669) had the highest yield in 1936, followed by Turkey selection (C. I. 11667) and Akron selection No. 7. For the 3-year average, Turkey selection (C. I. 11375) from Colorado ranks first and Kanred x Hard Federation (C. I. 10091) second for yield. Early Blackhull has the lowest long-time average.

Table 14. - Agronomic and other data for the uniform winter wheat varieties grown in replicated nursery plots in cooperative experiments at 9 stations in the winter wheat area, 1936

Denton, Tex.

(Five plots)

Variety	C.I. No.	Date		Hgt.	Rust		Lodging	Shattering rating	Acre yield	Yield		No. years grown	Percentage of Kharkof for same years
		Headed	Ripe		Leaf	Stem				Average 1932-34 and 1936	Rank		
				(In.)	(Pct.)	(Pct.)	(Pct.)		(Bu.)	(Bu.)			
Prelude x Kanred	11591	Apr. 23	May 23	34	2	0	5	6	41.5	----	-	2	151.9
Kanred x Hard Federation	10092	Apr. 24	May 24	30	14	0	6	2	40.7	33.0	2	4	141.0
P-1066-1 x Prelude	11590	Apr. 23	May 23	32	2	0	16	7	40.6	----	-	2	148.4
Kawvale x Tenmarq	11669	Apr. 25	May 27	32	18	T	19	6	40.3	----	-	1	108.3
Kanred x (Kanred-Marquis)	11592	Apr. 28	May 27	31	55	T	31	4	40.3	----	-	2	97.7
Kanred x Hard Federation	10091	Apr. 22	May 23	31	4	0	7	6	39.8	33.4	1	4	142.7
Kanred x Marquis	11589	Apr. 27	May 28	33	34	0	15	5	39.3	----	-	2	133.3
Akron selection No. 7	11660	Apr. 27	May 27	32	71	1	12	5	37.9	----	-	1	101.9
Minturki x Blackhull	11671	Apr. 28	May 30	35	42	2	19	1	37.7	----	-	1	101.3
Kanred x Marquis	11746	Apr. 28	May 30	33	22	T	54	2	37.6	----	-	1	101.1
Blackhull	6251	Apr. 28	May 29	33	59	2	38	2	37.6	24.9	5	4	106.4
Turkey selection	10083	Apr. 29	May 29	32	70	1	23	1	37.6	28.2	4	4	120.5
Kharkof	1442	Apr. 30	May 29	33	72	5	50	2	37.2	23.4	7	4	100.0
Early Blackhull	8856	Apr. 15	May 18	34	12	0	3	2	36.3	30.7	3	4	131.2
Cheyenne selection	11666	Apr. 30	May 30	30	74	0	7	1	36.3	----	-	1	97.6
Sibley No. 62	11523	Apr. 30	May 30	32	67	1	27	2	36.1	----	-	2	124.0
Turkey selection	10094	Apr. 29	May 30	30	80	T	5	2	36.1	20.8	10	4	88.9
(Minhardi-Minturki) x Tenmarq	11668	Apr. 25	May 27	31	57	T	6	-	35.7	----	-	1	96.0
Turkey selection	11577	Apr. 29	May 30	32	79	T	47	3	35.5	----	-	1	95.4
Turkey x Marquis	11747	Apr. 28	May 30	34	59	T	16	-	35.4	----	-	1	95.2
Oro x Fulhard	11579	Apr. 28	May 30	32	56	2	24	3	34.8	----	-	1	93.5
Fulhard	8257	Apr. 27	May 29	32	52	7	12	6	34.6	24.8	6	4	102.1
Turkey selection	10016	Apr. 28	May 30	30	79	2	20	7	34.6	21.3	8	4	91.0
Penquite selection	11745	Apr. 28	May 30	32	73	3	40	5	34.3	----	-	1	92.2
Beloglina x Hussar	11513	May 1	June 1	34	66	13	58	2	34.1	----	-	2	88.0
Turkey selection	11576	Apr. 29	May 30	31	77	T	18	4	32.8	----	-	2	76.0
Do	11375	Apr. 29	May 31	31	79	T	28	1	32.3	19.5	11	4	83.3
Nebraska No. 60	6250	Apr. 30	May 30	33	76	2	34	T	31.5	21.3	8	4	91.0
Turkey selection	10015	Apr. 28	May 29	30	77	T	19	4	30.1	16.7	12	4	71.4
Do	11667	Apr. 28	May 29	31	80	T	52	3	30.1	----	-	1	80.9

Probable error of a difference, 1.7 bu.; probable error of a mean, 1.2 bu., or 3.26 percent.

Table 14. - (Continued)

Stillwater, Okla.

(Four plots)

Variety	C. I. No.	Acre yield (Per acre) (Bu.)	Yield Average 1932-36 (Bu.)	Yield Rank	No. years grown	Percentage of Kharkof for same years
Sibley No. 62	11523	31.5	----	-	3	126.4
Kanred x (Kanred-Marquis)	11592	30.3	----	-	3	103.5
Beloglina x Hussar	11513	29.4	----	-	3	119.0
Blackhull	6251	29.1	29.8	8	5	98.3
Turkey selection	10094	27.9	31.7	4	5	104.6
Do	11577	27.9	----	-	2	89.7
Do	11576	27.7	----	-	3	89.9
Do	11375	27.3	30.2	7	5	99.7
Nebraska No. 60	6250	26.7	30.9	5	5	102.0
Kharkof	1442	26.3	30.3	6	5	100.0
Minturki x Blackhull	11671	25.5	----	-	1	97.0
Turkey selection	10083	24.8	32.1	3	5	105.9
Turkey x Marquis	11747	24.1	----	-	1	91.6
Kanred x Marquis	11746	24.0	----	-	1	91.3
Do	11589	23.6	----	-	3	111.6
Prelude x Kanred	11591	23.6	----	-	3	127.5
Fulhard	8257	23.3	28.3	10	5	93.4
Cheyenne selection	11666	23.3	----	-	1	88.6
Akron selection No. 7	11660	20.9	----	-	2	70.8
Turkey selection	10015	20.6	27.6	11	5	91.1
Penquite selection	11745	20.6	----	-	1	78.3
Oro x Fulhard	11579	20.5	----	-	2	81.0
P-1066-1 x Prelude	11590	20.5	----	-	3	118.6
Turkey selection	10016	19.9	29.1	9	5	96.0
Do	11667	19.6	----	-	1	74.5
Kawvale x Tenmarq	11669	18.9	----	-	2	105.1
Kanred x Hard Federation	10092	18.4	34.3	1	5	113.2
Early Blackhull	8856	18.2	27.1	12	5	89.4
Kanred x Hard Federation	10091	16.6	32.2	3	5	106.3
(Minhardi-Minturki) x Tenmarq	11668	15.1	----	-	2	87.0

Table 14. - (Continued)

Woodward, Okla.

(Four plots; seeded Oct. 15, 1935; emerged Oct. 23, 1935)

Variety	C.I. No.	Date Headed	Date Ripe	Hgt.	Lodging	Shattering	Test weight (Per bu.)	Acre yield	Yield Average 1932-36	Rank	Yield Average 1935-36	Rank	No. years grown	Percentage of Kharkof for same years
				(In.)	(Pct.)	(Pct.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
		May	June											
Turkey selection	11576	6	9	26	0	16	59	24.1	-----	-	19.4	6	3	104.0
Oro x Fulhard	11579	5	11	27	4	3	60	23.6	----	-	21.0	3	2	118.0
Turkey selection	10083	5	9	26	15	1	60	22.9	22.6	2	19.4	6	5	102.7
Do	10094	6	9	25	0	T	60	22.9	21.6	4	17.4	14	5	98.2
Beloglina x Hussar	11513	7	15	30	14	58	59	22.9	----	-	18.3	8	3	101.1
Kanred x (Kanred-Marquis)	11592	5	9	25	1	9	61	22.7	----	-	22.2	1	3	116.9
Turkey selection	11375	5	10	26	T	1	60	22.6	20.7	9	17.3	16	5	94.1
Kharkof	1442	6	12	26	14	2	60	22.6	22.0	3	17.8	12	5	100.0
Kawvale x Tenmarq	11669	2	5	24	1	T	60	22.5	----	-	20.7	4	2	116.3
Fulhard	8257	4	9	27	T	13	60	22.2	21.5	6	19.7	5	5	97.7
Kanred x Hard Federation	10092	2	11	24	7	0	61	22.0	23.7	1	17.7	13	5	107.7
Minturki x Blackhull	11671	5	12	28	7	3	61	22.0	----	-	----	-	1	97.3
Cheyenne selection	11666	6	11	25	0	0	60	21.9	----	-	----	-	1	96.9
Blackhull	6251	4	10	25	1	0	61	21.8	21.6	4	21.3	2	5	98.2
Turkey selection	11577	5	19	25	0	11	58	21.8	----	-	17.9	11	2	100.6
Akron selection No. 7	11660	5	10	25	T	15	58	21.8	----	-	18.3	8	2	102.8
Nebraska No. 60	6250	7	14	27	4	1	59	21.5	21.1	8	16.9	17	5	95.9
Turkey selection	11667	4	9	25	1	12	60	21.2	----	-	----	-	1	93.8
P-1066-1 x Prelude	11590	1	4	24	29	T	59	20.6	----	-	16.6	18	3	101.1
Sibley No. 62	11523	5	9	25	16	2	60	20.5	----	-	16.4	19	3	89.3
Prelude x Kanred	11591	1	6	25	28	4	61	20.5	----	-	16.2	20	3	100.6
Turkey x Marquis	11747	5	9	27	T	2	59	20.4	----	-	----	-	1	90.3
Turkey selection	10015	5	9	26	T	19	60	19.3	20.1	11	14.6	24	5	91.4
Kanred x Marquis	11589	4	9	26	1	4	60	19.2	----	-	17.4	14	3	105.6
Penquite selection	11745	6	10	26	6	2	59	19.0	----	-	----	-	1	84.1
Kanred x Marquis	11746	4	11	26	9	11	60	18.7	----	-	----	-	1	82.7
Turkey selection	10016	4	8	25	0	8	58	18.4	21.3	7	15.5	23	5	96.8
Early Blackhull	8856	Apr. 28	4	24	T	0	60	17.9	19.3	12	16.1	21	5	87.7
(Minhardi-Minturki) x Tenmarq	11668	May 2	9	23	0	1	59	17.9	----	-	18.1	10	2	101.7
Kanred x Hard Federation	10091	Apr. 30	10	22	0	T	60	17.3	20.6	10	15.8	22	5	93.6

Probable error of a difference, 1.3 bu.; probable error of a mean, 0.9 bu., or 4.38 percent.

Table 14. - (Continued)

Manhattan, Kans.

(Three plots)

Variety	C.I. No.	Date headed	Hgt.	Lodging	Leaf rust	Test weight (Per bu.)	Kernel plumpness	Protein	Acre yield	Yield				No. years grown	Percentage of Kharkof for same years
										Average 1932-36	Rank	Average 1935-36	Rank		
		May	(In.)	(Pct.)	(Pct.)	(Lbs.)	(Pct.)	(Pct.)	(Bu.)	(Bu.)		(Bu.)			
Oro x Fulhard	11579	19	42	25	58	60.2	87	14.75	40.7	----	-	34.6	3	2	121.4
Turkey selection	10094	21	41	32	72	59.5	87	14.95	37.5	39.1	1	37.2	2	5	135.8
Kanred x (Kanred-Marquis)	11592	20	39	13	10	59.0	85	14.40	37.4	----	-	32.3	8	3	124.3
Kawvale x Tenmarq	11669	16	37	2	2	61.4	87	14.20	37.4	----	-	38.7	1	2	135.8
Turkey selection	10015	20	41	38	73	60.7	87	-----	36.9	35.5	4	32.4	7	5	123.3
Beloglinn x Hussar	11513	22	45	35	7-45	57.4	82	-----	36.2	----	-	32.2	9	3	121.7
Turkey selection	11577	21	40	41	65	57.7	84	15.65	36.2	----	-	33.4	5	2	117.2
Cheyenne selection	11666	21	40	15	68	59.6	87	14.60	35.4	----	-	----	-	1	117.6
Turkey selection	11576	21	41	50	72	57.7	83	15.60	35.2	----	-	33.0	6	3	122.1
Minturki x Blackhull	11671	21	42	3	10-63	60.4	83	15.00	34.4	----	-	----	-	1	114.3
Kanred x Marquis	11746	19	43	3	5	58.5	84	15.45	34.1	----	-	----	-	1	113.3
Turkey selection	10083	20	40	40	23	58.0	84	-----	33.3	33.8	7	31.2	12	5	117.4
Do.	11375	22	42	28	65	59.0	84	-----	33.0	31.8	10	31.2	12	5	110.4
Kanred x Marquis	11589	17	38	2	7	59.5	84	14.75	32.7	----	-	31.4	11	3	115.2
(Minhardi-Minturki) x Tenmarq	11668	16	35	0	10	60.1	85	14.50	32.7	----	-	28.8	14	2	101.1
Sibley No. 62	11523	21	39	38	15	57.7	86	-----	32.4	----	-	31.6	10	3	123.6
Turkey selection	10016	18	39	25	42	58.7	85	14.75	32.0	36.2	2	33.7	4	5	125.7
Akron selection No. 7	11660	20	38	0	5-45	59.2	85	-----	30.5	----	-	27.6	19	2	96.8
Kharkof	1442	22	42	40	10-60	58.8	85	-----	30.1	28.8	12	28.5	18	5	100.0
Fulhard	8257	18	40	5	18	61.2	86	-----	29.5	32.0	9	28.7	16	5	111.1
Penquite	11745	21	41	35	10-65	60.0	86	15.75	29.3	----	-	----	-	1	97.3
Turkey selection	11667	19	40	37	65	60.2	85	15.35	27.9	----	-	----	-	1	92.7
Nebraska No. 60	6250	24	45	48	45	56.5	83	-----	27.5	31.2	11	27.1	21	5	108.3
P-1066-1 x Prelude	11590	17	38	15	2	59.3	82	14.55	27.4	----	-	27.3	20	3	105.3
Turkey x Marquis	11747	20	39	5	5-60	58.5	82	14.50	27.0	----	-	----	-	1	89.7
Kanred x Hard Federation	10091	13	35	0	2	58.0	83	13.85	25.8	33.9	6	22.7	24	5	117.7
Blackhull	6251	21	43	35	23	60.5	86	14.90	25.5	34.1	5	28.7	16	5	118.4
Kanred x Hard Federation	10092	16	36	0	8	58.0	86	13.70	25.2	36.2	2	26.8	22	5	125.7
Early Blackhull	8856	13	36	3	7	62.4	87	14.25	24.0	33.4	8	24.1	23	5	116.0
Prelude x Kanred	11591	17	38	2	7	60.2	83	14.80	23.6	----	-	28.8	14	3	121.3

Probable error of the difference, 1.6 bu.; probable error of a mean, 1.1 bu., or 3.53 percent.

Table 14.-(Continued)

Hays, Kans.

(Three plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Shattering	Acre yield	Yield Average 1932-34 and 1936	Yield Rank	No. years grown	Percentage of Kharkof for same years
		May	June	(In.)	(Pct.)	(Bu.)	(Bu.)			
Kawvale x Tenmarq	11669	14	18	25	T	36.5	----	-	1	131.8
Prelude x Kanred	11591	14	17	27	10.0	35.3	----	-	2	144.1
(Minhardi-Minturki) x Tenmarq	11668	14	18	25	0.5	35.8	----	-	1	129.2
Cheyenne selection	11666	17	19	26	0.5	35.6	----	-	1	128.5
Akron selection No. 7	11660	16	19	26	0.5	34.4	----	-	1	124.2
Kanred x Hard Federation	10091	9	18	26	1.0	34.1	29.4	1	4	130.7
Kanred x Marquis	11589	16	18	27	3.0	33.7	----	-	2	151.6
Turkey selection	11577	18	19	27	0.5	33.6	----	-	1	121.3
Do	10016	16	19	25	0.5	33.6	25.1	8	4	111.6
Oro x Fulhard	11579	16	19	26	0.5	33.5	----	-	1	120.9
Turkey selection	10094	17	19	23	0.5	33.4	29.1	2	4	129.3
P-1066-1 x Prelude	11590	13	16	26	10.0	33.1	----	-	2	138.7
Kanred x Hard Federation	10092	12	18	26	0.5	32.2	27.8	3	4	123.6
Turkey selection	11576	18	19	27	T	31.9	----	-	2	146.8
Sibley No. 62	11523	18	19	27	2.0	31.5	----	-	2	154.8
Turkey selection	11667	16	19	26	2.0	31.4	----	-	1	113.4
Kanred x Marquis	11746	17	19	28	T	31.0	----	-	1	111.9
Blackhull	6251	16	19	28	1.0	30.7	27.8	3	4	123.6
Kanred x (Kanred-Marquis)	11592	18	19	26	2.0	30.5	----	-	2	122.6
Minturki x Blackhull	11671	18	19	30	3.0	30.2	----	-	1	109.0
Turkey x Marquis	11747	16	19	27	T	30.2	----	-	1	109.0
Turkey selection	10083	18	19	27	T	30.0	26.0	7	4	115.6
Do	10015	17	19	27	0.5	29.3	21.1	12	4	93.8
Do	11375	19	19	28	0.5	29.2	24.5	9	4	108.9
Beloglina x Hussar	11513	18	19	29	10.0	28.7	----	-	2	138.2
Early Blackhull	8856	9	16	28	4.0	28.3	27.7	5	4	123.1
Fulhard	8257	15	19	25	3.0	27.8	27.6	6	4	122.7
Kharkof	1442	18	19	30	2.0	27.7	22.5	10	4	100.0
Penquite selection	11745	17	19	28	2.0	27.3	22.0	-	1	98.6
Nebraska No. 60	6250	18	20	31	3.0	26.2	22.0	11	4	97.8

Probable error of a difference, 1.5 bu.; probable error of a mean, 1.0 bu., or 3.29 percent.

Table 14. - (Continued)

Akron, Colo.

(Five plots; seeded Sept. 11, 1935; emerged Sept. 17, 1935)

Variety	C. I. No.	Winter survival	Date		Hgt.	Acre yield	Yield				No. years grown	Percentage of Kharkof for same years
			Headed	Ripe			Average 1933-34 and 1936	Rank	Average 1934-36	Rank		
		(Pct.)	May	July	(In.)	(Bu.)	(Bu.)		(Bu.)			
Kanred x Marquis	11589	46	24	1	33	36.3	----	-	24.2	1	2	149.4
Prelude x Kanred	11591	32	22	1	33	35.3	----	-	23.7	2	2	146.3
P-1066-1 x Prelude	11590	33	21	1	32	34.1	----	-	22.6	3	2	139.5
Kanred x Hard Federation	10092	28	22	1	28	33.3	16.8	3	21.3	4	3	124.4
Do	10091	24	18	1	28	33.2	16.5	4	20.3	7	3	122.2
Kawvale x Tenmarq	11669	28	22	1	29	32.8	----	-	----	-	1	129.1
Early Blackhull	8856	19	19	1	31	32.0	16.1	5	20.3	7	3	119.3
Blackhull	6251	27	26	3	37	30.7	18.0	1	21.3	4	3	133.3
Cheyenne selection	11666	21	28	2	34	30.5	----	-	----	-	1	120.1
Turkey selection	11667	39	26	2	35	30.0	----	-	----	-	1	118.1
Do	10094	32	27	2	34	29.8	17.0	2	20.4	6	3	125.9
Oro x Fulhard	11579	28	26	2	35	29.6	----	-	----	-	1	116.5
Turkey selection	10083	40	28	2	36	29.1	13.0	11	16.2	15	3	96.3
Kanred x (Kanred-Marquis)	11592	35	27	2	34	28.8	----	-	19.0	10	2	117.3
Turkey selection	10016	26	25	2	34	28.7	15.4	6	19.6	9	3	114.1
Akron selection No. 7	11660	24	27	2	36	28.6	----	-	----	-	1	112.6
Sibley No. 62	11523	39	27	2	37	27.8	----	-	15.9	18	2	98.1
Kanred x Marquis	11746	31	26	2	37	27.2	----	-	----	-	1	107.1
Turkey selection	11576	30	27	2	35	26.8	----	-	17.4	11	2	107.4
(Minhardi-Minturki) x Tenmarq	11668	31	23	1	28	26.7	----	-	----	-	1	105.1
Beloglina x Hussar	11513	32	29	3	38	26.3	----	-	16.8	14	2	103.7
Turkey selection	10015	29	26	2	36	26.1	12.8	12	15.2	19	3	94.8
Fulhard	8257	18	26	3	35	25.8	14.4	8	17.3	12	3	106.7
Nebraska No. 60	6250	37	29	4	38	25.7	13.7	9	16.2	15	3	101.5
Penquite selection	11745	33	27	2	37	25.6	----	-	----	-	1	100.8
Minturki x Blackhull	11671	30	29	3	38	25.6	----	-	----	-	1	100.8
Turkey selection	11375	26	28	2	37	25.5	14.5	7	17.0	13	3	107.4
Kharkof	1442	36	29	2	38	25.4	13.5	10	16.2	15	3	100.0
Turkey selection	11577	28	27	2	35	25.0	----	-	----	-	1	98.4
Turkey x Marquis	11747	25	25	2	36	24.4	----	-	----	-	1	96.1

Probable error of a difference, 2.0 bu.; probable error of a mean, 1.4 bu., or 5.01 percent.

Table 14. - (Continued)

Fort Collins, Colo.

(Five plots)

Variety	C. I. No.	Date Headed	Date Ripe	Hgt.	Lodging	Acre yield	Yield Average 1934-36	Yield Rank	No. years grown	Percentage of Kharkof for same years
				(In.)	(Pct.)	(Bu.)	(Bu.)			
			July							
P-1066-1 x Prelude	11590	May 28	10	46	16	72.6	67.6	1	3	139.7
Kawvale x Tenmarq	11669	May 29	11	42	28	70.3	----	-	2	117.0
Prelude x Kanred	11591	May 28	10	46	19	68.6	60.4	2	3	124.8
Turkey selection	10094	June 1	15	44	51	66.4	55.3	5	3	114.3
Kanred x Marquis	11589	May 30	10	44	2	65.4	57.0	3	3	117.8
Sibley No. 62	11523	June 1	15	45	63	63.6	51.8	7	3	107.0
Nebraska No. 60	6250	June 4	16	49	51	63.6	49.7	14	3	102.7
Turkey selection	11577	June 1	15	45	77	63.0	----	-	2	118.3
Turkey x Marquis	11747	May 31	12	45	11	62.8	----	-	1	109.4
Turkey selection	11576	June 1	15	44	68	62.6	53.1	6	3	109.7
Akron selection No. 7	11660	June 1	15	46	5	58.2	----	-	2	106.6
Kanred x (Kanred-Marquis)	11592	June 1	15	43	25	58.2	51.6	8	3	106.6
Kharkof	1442	June 3	15	46	50	57.4	48.4	17	3	100.0
Beloglina x Hussar	11513	June 3	15	48	52	57.1	56.6	4	3	116.9
Blackhull	6251	May 31	13	45	56	57.1	50.8	10	3	105.0
Turkey selection	10083	June 2	14	45	76	57.0	51.3	9	3	106.0
Kanred x Hard Federation	10091	May 26	11	39	3	56.7	50.0	13	3	103.3
Turkey selection	10016	May 30	14	44	52	56.2	49.6	15	3	102.5
Oro x Fulhard	11579	June 1	15	45	37	55.7	----	-	2	103.3
Minturki x Blackhull	11671	June 2	13	46	22	55.1	----	-	1	96.0
Kanred x Hard Federation	10092	May 27	12	39	4	54.4	50.5	11	3	104.3
Cheyenne selection	11666	June 2	15	45	52	54.3	----	-	1	94.6
Kanred x Marquis	11746	June 1	14	46	37	54.2	----	-	1	94.4
Turkey selection	10015	June 1	15	44	72	54.2	49.4	16	3	102.1
(Minhardi-Minturki) x Tenmarq	11668	May 29	13	39	3	53.4	----	-	2	86.6
Fulhard	8257	May 31	14	44	44	53.2	46.8	18	3	96.7
Turkey selection	11667	June 1	15	44	75	53.2	----	-	1	92.7
Early Blackhull	8856	May 25	8	43	32	51.5	50.2	12	3	103.7
Turkey selection	11375	June 2	15	45	54	50.2	45.3	19	3	93.6
Penquite selection	11745	June 2	14	46	76	48.6	----	-	1	84.7

Probable error of a difference, 3.0 bu.; probable error of a mean, 2.1 bu., or 3.57 percent.

Table 14. - (Continued)

Lincoln, Nebr.

(Five plots; seeded Sept. 27, 1935; emerged Oct. 4, 1935)

Variety	C.I. No.	Date		Hgt.	Test weight (Per bu.)	Acre yield	Yield		No. years grown	Percentage of Kharkof for same years
		First headed	Ripe				Average 1932-36	Rank		
		May	June	(In.)	(Lbs.)	(Bu.)	(Bu.)			
Akron selection No. 7	11660	21	20	32	62	35.9	----	-	2	128.2
Nebraska No. 60	6250	22	23	34	63	35.1	21.3	11	5	97.3
Turkey selection	10094	22	20	30	63	34.8	26.8	4	5	122.4
Do	11375	22	21	33	62	34.5	26.0	6	5	118.7
Blackhull	6251	20	20	34	63	34.3	28.2	3	5	128.8
Fulhard	8257	19	20	35	63	33.3	28.8	1	5	131.5
Kanred x Hard Federation	10092	16	18	32	61	33.2	22.3	9	5	101.8
Prelude x Kanred	11591	17	17	36	63	33.1	----	-	3	111.5
Kharkof	1442	22	20	33	62	33.0	21.9	10	5	100.0
Kanred x (Kanred-Marquis)	11592	21	21	30	63	32.9	----	-	3	98.2
Turkey selection	11576	21	21	33	62	32.9	----	-	3	99.6
Early Blackhull	8856	14	16	37	64	32.7	28.4	2	5	129.7
Turkey x Marquis	11747	22	21	33	63	32.5	----	-	1	98.5
Kanred x Marquis	11746	21	20	33	62	31.8	----	-	1	96.4
Kanred x Hard Federation	10091	19	19	32	61	31.8	23.3	8	5	106.4
Turkey selection	10015	21	21	33	62	31.7	24.7	7	5	112.8
Minturki x Blackhull	11671	22	20	34	63	31.5	----	-	1	95.5
P-1066-1 x Prelude	11590	18	18	34	63	31.5	----	-	3	108.8
Turkey selection	10016	20	20	30	62	31.0	26.2	5	5	119.6
Sibley No. 62	11523	22	21	33	61	30.5	----	-	3	78.9
Kanred x Marquis	11589	20	19	33	60	30.3	----	-	3	93.4
Turkey selection	11667	20	19	32	62	30.2	----	-	1	91.5
Kawvale x Tenmarq	11669	16	18	32	61	30.1	----	-	2	134.8
(Minhardi-Minturki) x Tenmarq	11668	18	19	32	61	29.8	----	-	2	96.9
Cheyenne selection	11666	22	20	30	62	29.5	----	-	1	89.4
Turkey selection	11577	21	21	32	62	29.4	----	-	2	93.7
Oro x Fulhard	11579	19	19	31	61	29.1	----	-	2	90.6
Penquite selection	11745	21	20	33	63	28.9	----	-	1	87.6
Turkey selection	10083	21	20	33	61	27.8	20.5	12	5	93.6
Beloglina x Hussar	11513	23	22	34	61	27.7	----	-	3	80.2

Probable error of a difference, 0.9 bu.; probable error of a mean, 0.7 bu., or 2.53 percent.

Table 14. - (Continued)

North Platte, Nebr.

(Four plots)

Variety	C.I No.	Winter survival	Date Headed	Date Ripe	Hgt.	Test weight (Per bu.)	Acre yield	Yield Average 1933, 1935-36	Yield Rank	Yield Average 1935-36	Yield Rank	No. years grown	Percentage of Kharkof for same years
		(Pct.)		July	(In.)	(Lbs.)	(Bu.)	(Bu.)		(Bu.)			
Kawvale x Tenmarq	11669	63	May 30	2	36	58.0	32.5	----	-	37.9	1	2	131.6
Turkey selection	11667	73	June 2	3	39	58.5	29.5	----	-	----	-	1	141.1
Akron selection No. 7	11660	64	June 4	1	35	55.0	29.4	----	-	34.5	2	2	119.8
(Minhardi-Minturki) x Tenmarq	11668	63	May 30	3	36	57.5	28.6	----	-	34.0	3	2	118.1
Turkey selection	10083	75	June 8	2	40	57.0	27.9	31.0	4	32.4	5	3	101.0
Kanred x Marquis	11589	61	June 3	2	38	58.6	27.8	----	-	34.0	3	2	118.1
Penquite selection	11745	70	June 6	2	40	57.0	27.7	----	-	----	-	1	132.5
Kanred x Hard Federation	10092	55	May 28	3	37	59.0	27.3	31.4	3	31.1	13	3	102.3
P-1066-1 x Prelude	11590	64	May 27	2	37	58.0	27.2	----	-	31.3	10	2	108.7
Turkey selection	10034	70	May 31	3	39	59.0	27.1	28.9	10	28.9	19	3	94.1
Kanred x Hard Federation	10091	64	May 26	3	33	59.5	26.7	31.8	2	31.2	12	3	103.6
Turkey selection	11375	68	June 5	3	41	57.0	26.7	32.5	1	32.1	7	3	105.9
Do	10015	65	May 31	3	41	56.5	26.3	30.9	5	31.3	10	3	100.7
Sibley No. 62	11523	73	June 7	2	41	56.5	25.8	----	-	30.7	16	2	106.6
Kanred x (Kanred-Marquis)	11592	66	June 2	3	40	57.0	25.6	----	-	31.0	14	2	107.6
Turkey x Marquis	11747	71	June 2	3	40	57.0	25.6	----	-	----	-	1	125.5
Turkey selection	11577	69	June 5	4	41	54.0	25.5	----	-	32.1	7	2	111.5
Oro x Fulhard	11579	63	June 3	3	39	57.5	25.4	----	-	31.0	14	2	107.6
Turkey selection	11576	60	June 1	3	39	55.0	25.3	----	-	29.1	18	2	101.0
Do	10016	65	May 30	2	40	56.5	24.9	30.3	8	31.6	9	3	98.7
Prelude x Kanred	11591	55	May 28	2	38	58.5	24.8	----	-	32.3	6	2	112.2
Cheyenne selection	11666	68	June 4	3	39	57.5	24.2	----	-	----	-	1	115.8
Minturki x Blackhull	11671	64	June 7	3	43	56.0	24.2	----	-	----	-	1	115.8
Nebraska No. 60	6250	69	June 8	6	41	55.5	23.4	29.5	9	26.6	23	3	96.1
Beloglina x Hussar	11513	68	June 7	3	42	55.5	22.5	----	-	28.9	19	2	100.3
Early Blackhull	8856	44	May 26	3	37	61.0	21.9	26.3	12	27.4	22	3	85.7
Kanred x Marquis	11746	63	June 2	4	42	57.0	21.5	----	-	----	-	1	102.9
Fulhard	8257	50	June 3	4	42	58.0	21.4	30.7	6	29.6	17	3	100.0
Kharkof	1442	66	June 8	6	41	56.0	20.9	30.7	6	28.8	20	3	100.0
Blackhull	6251	41	June 3	6	41	56.0	18.7	27.0	11	25.7	24	3	87.9

Probable error of a difference, 2.1 bu.; probable error of a mean, 1.5 bu., or 5.80 percent.

PROBABLE ERRORS

Probable errors were calculated by "Student's" generalized formula as outlined on page 21 of this report. In table 15 the number of plots, average yields, and probable errors for the uniform nursery grown at each station are given. For the most part the probable errors are fairly low.

Table 15. - Average yield, probable error of a difference, and probable error of the mean for the uniform yield nursery at each cooperating station, 1936

Station	No. of plots	Average yield of varieties	Probable error of a difference	Probable error of a mean	
		(Bu.)	(Bu.)	Bushels	Percent
Texas:					
Denton	5	36.3	1.7	1.2	3.26
Oklahoma:					
Stillwater	4	23.5	---	---	----
Woodward	4	21.1	1.3	0.9	4.38
Kansas:					
Manhattan	3	31.7	1.6	1.1	3.53
Hays	3	31.6	1.5	1.0	3.29
Colorado:					
Akron	5	28.9	2.0	1.4	5.01
Fort Collins	5	58.5	3.0	2.1	3.57
Nebraska:					
Lincoln	5	26.4	0.9	0.7	2.53
North Platte	4	25.5	2.1	1.5	5.80

SUMMARY OF NURSERY YIELDS

The yields of the 30 varieties of winter wheat grown at 9 stations are summarized in table 16. In this table the varieties are listed in the order of the 9-station average. These averages are of interest only in-so-far 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.

The strain having the highest average for 1936 is Kawvale x Tenmarq (C. I. 11669). Its performance was fairly consistent in that it ranked well in all States except Oklahoma where it was twenty-first. Turkey selection (C. I. 10094) ranked second, having an average only 0.6 bushels lower. This strain made its poorest showing at Denton, Tex. Following these two there are four winter x spring hybrids, each involving Kanred or a Kanred relative as one parent, which have about the same average yield. Akron selection No. 7, characterized by a very stiff straw, was ninth in average yield and Cheyenne selection twelfth. The Kanred x Hard Federation strains were lower in yield than they have been in the past years. Turkey selection (C. I. 10016), an early strain well up in rank last year, ranked twenty-third this year. The lowest average yields were made by Fulhard, Early Blackhull, and Penquite selection. Sixteen new strains had yields equal to or above Blackhull, the highest yielding standard variety.

Table 16. - 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, 1936

Variety	C. I. No.	Texas		Oklahoma				Kansas				Nebraska				Colorado				Average bushels per acre 9 stations
		Bushels per acre		Bushels per acre				Bushels per acre				Bushels per acre				Bushels per acre				
		Denton	Rank	Still-water	Woodward	Av.	Rank	Manhattan	Hays	Av.	Rank	Lincoln	North Platte	Av.	Rank	Akron	Fort Collins	Av.	Rank	
Kawvale x Tenmarq	11669	40.3	4	18.9	22.5	20.7	21	37.4	36.5	37.0	2	30.1	32.5	31.3	2	32.8	70.3	51.6	3	35.7
Turkey selection	10094	36.1	16	27.9	22.9	25.4	6	37.5	33.4	35.5	3	34.8	27.1	31.0	3	29.8	66.4	48.1	5	35.1
Kanred x Marquis	11589	39.3	7	23.6	19.2	21.4	18	32.7	33.7	33.2	9	30.3	27.8	29.1	12	36.3	65.4	50.9	4	34.3
P-1066-1 x Prelude	11590	40.6	3	20.5	20.6	20.6	22	27.4	33.1	30.3	19	31.5	27.2	29.4	7	34.1	72.6	53.4	1	34.2
Kanred x (Kanred-Marquis)	11592	40.3	4	30.3	22.7	26.5	1	37.4	30.5	34.0	7	32.9	25.6	29.3	8	28.8	58.2	43.5	14	34.1
Prelude x Kanred	11591	41.5	1	23.6	20.5	22.1	16	23.6	35.9	29.8	21	33.1	24.8	29.0	15	35.3	68.6	52.0	2	34.1
Sibley No. 62	11523	36.1	16	31.5	20.5	26.0	3	32.4	31.5	32.0	16	30.5	25.8	28.2	18	27.8	63.6	45.7	6	33.3
Turkey selection	11576	32.8	26	27.7	24.1	25.9	4	35.2	31.9	33.6	8	32.9	25.3	29.1	12	26.8	62.6	44.7	8	33.3
Akron selection No. 7	11660	37.9	8	20.9	21.8	21.4	18	30.5	34.4	32.5	13	35.9	29.4	32.7	1	28.6	58.2	43.4	15	33.1
Turkey selection	11577	35.5	19	27.9	21.8	24.9	8	36.2	33.6	34.9	5	29.4	25.5	27.5	22	25.0	63.0	44.0	10	33.1
Oro x Fulhard	11579	34.8	21	20.5	23.6	22.1	16	40.7	33.5	37.1	1	29.1	25.4	27.3	24	29.6	55.7	42.7	17	32.5
Cheyenne selection	11666	36.3	14	23.3	21.9	22.6	14	35.4	35.6	35.5	3	29.5	24.2	26.9	27	30.5	54.3	42.4	19	32.3
Turkey selection	10083	37.6	10	24.8	22.9	23.9	11	33.3	30.0	31.7	17	27.8	27.9	27.9	20	29.1	57.0	43.1	16	32.3
Kanred x Hard Federation	10092	40.7	2	18.4	22.0	20.2	24	25.2	32.2	28.7	24	33.2	27.3	30.3	5	33.3	54.4	43.9	11	31.9
Minturki x Blackhull	11671	37.7	9	25.5	22.0	23.8	12	34.4	30.2	32.3	15	31.5	24.2	27.9	20	25.6	55.1	40.4	25	31.8
Beloglina x Hussar	11513	34.1	25	29.4	22.9	26.2	2	36.2	28.7	32.5	13	27.7	22.5	25.1	30	26.3	57.1	41.7	21	31.7
Blackhull	6251	37.6	10	29.1	21.8	25.5	5	25.5	30.7	28.1	28	34.3	18.7	26.5	29	30.7	57.1	43.9	11	31.7
Turkey x Marquis	11747	35.4	20	24.1	20.4	22.3	15	27.0	30.2	28.6	26	32.5	25.6	29.1	12	24.4	62.8	43.6	13	31.4
Turkey selection	11375	32.3	27	27.3	22.6	25.0	7	33.0	29.2	31.1	18	34.5	26.7	30.6	4	25.5	50.2	37.9	29	31.3
Kanred x Hard Federation	10091	39.8	6	16.6	17.3	17.0	29	25.8	34.1	30.0	20	31.8	26.7	29.3	8	33.2	56.7	45.0	7	31.3
Nebraska No. 60	6250	31.5	28	26.7	21.5	24.1	10	27.5	26.2	26.9	29	35.1	23.4	29.3	8	25.7	63.6	44.7	8	31.2
Kharkof	1442	37.2	13	26.3	22.6	24.5	9	30.1	27.7	28.9	23	33.0	20.9	27.0	26	25.4	57.4	41.4	23	31.2
Kanred x Marquis	11746	37.6	10	24.0	18.7	21.4	18	34.1	31.0	32.6	12	31.8	21.5	26.7	28	27.2	54.2	40.7	24	31.1
Turkey selection	10016	34.6	22	19.9	18.4	19.2	27	32.0	33.6	32.8	11	31.0	24.9	28.0	19	28.7	56.2	42.5	18	31.0
(Minhardi-Minturki) x Tenmarq	11668	35.7	18	15.1	17.9	16.5	30	32.7	35.8	34.3	6	29.8	28.6	29.2	11	26.7	53.4	40.1	27	30.6
Turkey selection	10015	30.1	29	20.6	19.3	20.0	25	36.9	29.3	33.1	10	31.7	26.3	29.0	15	26.1	54.2	40.2	26	30.5
Do	11667	30.1	29	19.6	21.2	20.4	23	27.9	31.4	29.7	22	30.2	29.5	29.9	6	30.0	53.2	41.6	22	30.3
Fulhard	8257	34.6	22	23.3	22.2	22.8	13	29.5	27.8	28.7	24	33.3	21.4	27.4	23	25.8	53.2	39.5	28	30.1
Early Blackhull	8856	36.3	14	18.2	17.9	18.1	28	24.0	28.3	26.2	30	32.7	21.9	27.3	24	32.0	51.5	41.8	20	29.2
Penquite selection	11745	34.3	24	20.6	19.0	19.8	26	29.3	27.3	28.3	27	28.9	27.7	28.3	17	25.6	48.6	37.1	30	29.0
Probable error of a mean (bushels)		1.2	-	-	0.9	-	-	1.1	1.0	-	-	0.7	1.5	-	-	1.4	2.1	-	-	-
Probable error of a mean (percent)		3.26	-	-	4.38	-	-	3.53	3.29	-	-	2.53	5.80	-	-	5.01	3.57	-	-	-

In table 17 the yields for the 2-year period, 1935-36, are summarized. A total of 24 varieties have been grown at 6 stations during the 2-year period; the varieties are listed in order of average yield. Kawvale x Tenmarq (C. I. 11669), with a rather substantial margin, is at the top of the list. This strain yielded well at most stations in 1936 and had the highest average yield in 1935. In both years it made its poorest comparative yield at Fort Collins. In second position is Turkey selection (C. I. 10094), one of the bunt-resistant Turkeys from Nebraska. This selection now appears to be the best of this group of wheats, as it has also done very well in plot tests. Seven hybrid strains or selections are equal to or higher than Blackhull, the highest yielding standard sort. Turkey selection C. I. 10016 continues to give an average yield slightly less than C. I. 10094. Of the two Kanred x Hard Federation strains C. I. 10092 has an average advantage of 1 bushel over C. I. 10091. Minhardi-Minturki x Tenmarq and Early Blackhull are at the bottom of the list.

Twelve varieties have been grown in the yield nursery for the period 1932-36. The yields of these varieties at 11 stations for all or a part of this period are presented in table 18. In this table the varieties are ranked in order of the weighted average based on 41 station-year data. Kanred x Hard Federation (C. I. 10092) has the highest average. Its record is very good at all but the Nebraska stations. Probably the lack of winter-hardiness accounts in part for the latter. The second highest-yielding variety is Turkey selection (C. I. 10094), which has a very good record in all States except Texas. Kanred x Hard Federation C. I. 10091 is slightly lower in yield than C. I. 10092. Three bunt-resistant Turkey selections (C. I. 10015, 10016, and 10094) have been in the nursery for the full period. Of these, C. I. 10094 has the highest yield; C. I. 10016, the early one, is second; and C. I. 10015, the later, hardy type, the lowest. Three strains have higher average yields than Blackhull, and all but one of the newer selections are higher in yield than Kharkof and Nebraska No. 60.

It would seem desirable to test some of the higher-yielding strains more thoroughly in plots. Also, it probably will be desirable to discontinue from the nursery a number of strains grown in both plots and nursery, thus making room for more new material.

Table 17. - Summary of average yields of 24 winter wheats grown in uniform yield nurseries at 6 stations in the hard red winter wheat region, 1935-36

Variety	C.I. No.	Oklahoma				Kansas		Nebraska				Colorado		Av. bu. per acre 6 sta.
		Still-water	Wood-ward	Av.	Rank	Man-hattan	Rank	Lin-coln	North Platte	Av.	Rank	Fort Collins	Rank	
Kawvale x Tenmarq	11669	26.6	20.7	23.7	3	38.7	1	38.7	37.9	38.3	1	53.1	7	36.0
Turkey selection	10094	25.5	17.4	21.5	14	37.2	2	33.1	28.9	31.0	5	53.4	6	32.6
P-1066-1 x Prelude	11590	27.4	16.6	22.0	8	27.3	20	25.8	31.3	28.6	19	66.5	1	32.5
Prelude x Kanred	11591	29.8	16.2	23.0	5	28.8	14	27.6	32.3	30.0	8	58.7	2	32.2
Kanred x Marquis	11589	26.6	17.4	22.0	8	31.4	11	25.1	34.0	29.6	9	57.9	3	32.1
Kanred x (Kanred-Marquis)	11592	26.2	22.2	24.2	1	32.3	8	27.5	31.0	29.3	13	49.0	16	31.4
Turkey selection	11577	22.7	17.9	20.3	18	33.4	5	26.9	32.1	29.5	11	53.7	5	31.1
Blackhull	6251	26.1	21.3	23.7	3	28.7	16	33.2	25.7	29.5	11	50.8	12	31.0
Turkey selection	11576	23.1	19.4	21.3	15	33.0	6	28.5	29.1	28.8	15	52.5	9	30.9
Beloglina x Hussar	11513	29.8	18.3	24.1	2	32.2	9	21.7	28.9	25.3	24	53.9	4	30.8
Akron selection No. 7	11660	17.9	18.3	18.1	23	27.6	19	36.8	34.5	35.7	2	48.4	18	30.6
Sibley No. 62	11523	29.3	16.4	22.9	7	31.6	10	22.7	30.7	26.7	22	52.0	10	30.5
Turkey selection	10016	21.8	15.5	18.7	21	33.7	4	32.9	31.6	32.3	3	47.1	19	30.4
Do	10083	26.5	19.4	23.0	5	31.2	12	22.0	32.4	27.2	21	50.2	13	30.3
Oro x Fulhard	11579	20.5	21.0	20.8	16	34.6	3	26.0	31.0	28.5	20	46.9	20	30.0
Kanred x Hard Federation	10092	26.3	17.7	22.0	8	26.8	22	26.4	31.0	28.7	18	51.4	11	29.9
Fulhard	8257	23.6	19.7	21.7	11	28.7	16	31.6	29.6	30.6	7	45.5	21	29.8
Turkey selection	10015	18.8	14.6	16.7	24	32.4	7	31.9	31.3	31.6	4	49.2	14	29.7
Do	11375	23.6	17.3	20.5	17	31.2	12	27.1	32.1	29.6	9	44.0	23	29.2
Kharkof	1442	25.3	17.8	21.6	13	28.5	18	28.7	28.8	28.8	15	45.4	22	29.1
Kanred x Hard Federation	10091	24.2	15.8	20.0	20	22.7	24	26.4	31.2	28.8	15	52.8	8	28.9
Nebraska No. 60	6250	26.4	16.9	21.7	11	27.1	21	25.1	26.6	25.9	23	49.2	14	28.6
(Minhardi-Minturki) x Tenmarq	11668	22.0	18.1	20.1	19	28.8	14	27.8	34.0	30.9	6	39.3	24	28.3
Early Blackhull	8856	21.3	16.1	18.7	21	24.1	23	30.7	27.4	29.1	14	48.8	17	28.1

Table 18. - Summary of average yields of 12 winter wheat varieties grown in uniform yield nurseries at 11 stations in the hard red winter wheat region for all or a part of the 5-year period, 1932-36

Variety	C. I. No.	Texas		Oklahoma				Kansas					Colorado				Nebraska					Yield at all sta. Weighted average
		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	Colby	Av.	Rank	Akron	Fort Collins	Av.	Rank	Lin-coln	North Platte	Alli-ance	Av.	Rank	
Number of years grown		4		5	5			5	4	1			3	3			5	3	3			
Kanred x Hard Federation	10092	33.0	2	34.3	23.7	29.0	1	36.2	27.8	36.8	32.9	2	16.8	50.5	33.7	3	22.3	31.4	15.0	22.8	9	29.4
Turkey selection	10094	20.8	10	31.7	21.6	26.7	3	39.1	29.1	36.7	34.9	1	17.0	55.3	36.2	1	26.8	28.9	16.4	24.5	3	28.9
Kanred x Hard Federation	10091	33.4	1	32.2	20.6	26.4	4	35.9	29.4	38.4	31.8	3	16.5	50.0	33.3	4	23.3	31.8	14.7	23.3	8	28.6
Blackhull	6251	24.9	5	29.8	21.6	25.7	7	34.1	27.8	32.5	31.5	4	18.0	50.8	34.4	2	28.2	27.0	13.6	23.9	6	27.8
Turkey selection	10083	28.2	4	32.1	22.6	27.4	2	33.8	26.0	38.8	31.2	6	13.0	51.3	32.2	7	20.5	31.0	15.3	21.9	11	27.6
Early Blackhull	8856	30.7	3	27.1	19.3	23.2	12	33.4	27.7	20.3	29.8	8	16.1	50.2	33.2	5	28.4	26.3	13.8	23.8	7	27.2
Turkey selection	10016	21.3	8	29.1	21.3	25.2	9	36.2	25.1	32.6	31.4	5	15.4	49.6	32.5	6	26.2	30.3	15.7	24.5	3	27.2
Fulhard	8257	21.4	7	28.3	21.5	24.9	10	32.0	27.6	27.0	29.7	9	14.4	46.8	30.6	11	28.8	30.7	15.3	25.6	1	26.8
Turkey selection	11375	19.5	11	30.2	20.7	25.5	8	31.8	24.5	35.1	29.2	10	14.5	45.3	29.9	12	26.0	32.5	17.8	25.5	2	26.5
Kharkof	1442	23.4	6	30.3	22.0	26.2	5	28.8	22.5	40.2	27.4	12	13.5	48.4	31.0	10	21.9	30.7	15.9	22.7	10	26.0
Turkey selection	10015	16.7	12	27.6	20.1	23.9	11	35.5	21.1	38.1	30.0	7	12.8	49.4	31.1	9	24.7	30.9	16.3	24.1	5	25.8
Nebraska No. 60	6250	21.3	8	30.9	21.1	26.0	6	31.2	22.0	34.9	27.9	11	13.7	49.7	31.7	8	21.3	29.5	12.8	21.2	12	25.6

SUMMARY OF AGRONOMIC DATA

Table 19 shows the averages for data on characters other than yield. The number of stations entering the averages for a given character also is shown.

Two stations reported winter-killing, but when the data are averaged there is not a very wide range between the hardy and tender types. Early Blackhull had the lowest average survival and Turkey selection (C. I. 10083) the highest.

Average heading dates, based on reports from eight stations, ranged from May 11 for Early Blackhull to May 22 for Nebraska No. 60 and Beloglina x Hussar. None of the early hybrid strains was as early as Early Blackhull, but several were equal to or earlier than Blackhull. Dates of ripening agree very well with heading dates although the spread is not so great.

Average height ranged from 30.8 inches for Kanred x Hard Federation (C. I. 10091) to 37.5 inches for Beloglina x Hussar. In general, the later wheats were the taller.

Lodging was reported from four stations. Varieties with the least lodging were (Minhardi-Minturki) x Tenmarq, Akron selection No. 7, Kanred x Hard Federation (C. I. 10091 and 10092), and Kanred x Marquis (C. I. 11589). Several Turkey selections had very weak straw.

Shattering was reported from three stations. No variety had an especially high average except Beloglina x Hussar (C. I. 11513).

Leaf rust readings were obtained at two stations. Some strains for example, P-1066-1 x Prelude (C. I. 11590), Kanred x Hard Federation (C. I. 10091), and Prelude x Kanred (C. I. 11591), were fairly resistant. Most of the other strains in the nursery had high averages, especially the Turkey selections.

Test weights, reported from four stations, averaged 58 pounes per bushel or higher for all varieties. Early Blackhull had the highest average (61.9 pounds per bushel). Eight other strains had averages above 60 pounds per bushel.

Table 19. - Summary of agronomic data other than yield for 30 varieties of winter wheat grown as uniform yield nurseries at 9 stations in the hard red winter wheat region, 1936

Variety	C.I. No.	Average							
		Winter survival	Date headed	Date ripe	Height	Lodging	Shattering	Leaf rust	Test weight (Per bu.)
Number of stations		2	8	7	8	4	3	2	4
		(Pct.)	May	June	(In.)	(Pct.)	(Pct.)	(Pct.)	(Lbs.)
Kharkof	1442	51.0	21	23	36.1	38.5	2.0	53.5	59.2
Blackhull	6251	34.0	19	23	35.8	32.5	1.0	41.0	60.1
Nebraska No. 60	6250	53.0	22	25	37.3	34.3	1.3	60.5	58.5
Early Blackhull	8856	31.5	11	18	33.8	9.5	2.0	9.5	61.9
Turkey selection	10083	57.5	20	22	34.9	38.5	0.7	46.5	59.0
Sibley No. 62	11523	56.0	20	22	34.9	36.0	2.0	41.0	58.8
Penquite selection	11745	51.5	20	22	35.4	39.3	3.0	55.5	59.8
Kanred x Marquis	11589	53.5	18	21	34.0	5.0	4.0	20.5	59.5
Turkey selection	11667	56.0	19	22	34.0	41.3	5.7	72.5	60.2
Minturki x Blackhull	11671	47.0	21	23	37.0	12.8	2.3	37.0	60.1
Beloglina x Hussar	11513	50.0	22	24	37.5	39.8	23.3	46.0	58.2
P-1066-1 x Prelude	11590	48.5	15	19	33.6	19.0	5.7	2.0	59.8
Fulhard	8257	34.0	18	22	35.0	15.3	7.3	35.0	60.6
Prelude x Kanred	11591	43.5	15	19	34.6	13.5	6.7	4.5	60.7
Cheyenne selection	11666	46.0	20	23	33.6	18.5	0.5	71.0	59.8
Kanred x Hard Federation	10091	44.0	13	21	30.8	2.5	2.3	3.0	59.6
Do	10092	41.5	15	21	31.5	4.3	0.8	11.0	59.8
Kanred x (Kanred-Marquis)	11592	50.5	19	22	33.5	17.5	5.0	32.5	60.0
Turkey selection	10015	47.0	19	22	34.8	32.3	7.8	75.0	59.8
Do	10016	45.5	18	22	33.4	24.3	5.2	60.5	58.8
Do	10094	51.0	19	22	33.3	22.0	0.8	76.0	60.4
Do	11576	45.0	20	23	34.5	34.0	6.7	74.5	58.4
Kanred x Marquis	11746	47.0	19	23	36.0	25.8	4.3	13.5	59.4
Turkey x Marquis	11747	48.0	19	22	35.1	8.0	0.7	46.0	59.4
Turkey selection	11375	47.0	21	23	35.4	27.5	0.8	72.0	59.5
Do	11577	48.5	20	24	34.6	41.3	4.8	72.0	57.9
Oro x Fulhard	11579	45.5	19	23	34.6	22.6	2.2	57.0	59.7
(Minhardi-Minturki) x Tenmarq	11668	47.0	16	21	31.1	2.3	0.5	33.5	59.4
Kawvale x Tenmarq	11669	45.5	16	20	32.1	12.5	2.0	10.0	60.1
Akron selection No. 7	11660	44.0	19	22	33.8	4.3	6.8	48.0	58.6

DATA FROM THE DISEASE NURSERIES

BUNT NURSERY

For convenience a copy of the data from the uniform winter wheat bunt nursery is included in the report. The data are presented in table 20.

SUMMARY OF UNIFORM WINTER WHEAT BUNT NURSERY, GREAT PLAINS AREA 1935-36[2/]

The uniform winter wheat bunt nursery in the Great Plains area was continued in 1935-36, in the same manner as in previous years. This report is a summary of the data obtained in 1936, together with averages for the 2-year period 1935 and 1936 and for the 5-year period from 1932 to 1936.

In the fall of 1935, 50 varieties and strains of winter wheat were seeded in duplicate 8-foot rows at 10 stations in the Great Plains and at Kearneysville, W. Va. The nursery was made up of strains that had shown resistance in previous years and new strains of interest from various 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 nursery, the seed was inoculated with a composite made up of inoculum from all the other nurseries. The smut used in all these tests was Tilletia levis, the smooth-spored species.

Data obtained from 9 nurseries are recorded in table 20. Nurseries were seeded at St. Paul, Minn., and Moccasin, Mont., but no counts could be taken at these stations owing to winter-killing and drought.

The varieties are listed in the accompanying table in the order of average infection at the 9 stations. It will be seen that no strain was smut free at all stations. Average infections ranged from 0.2 to 50.0 percent. A total of 20 strains had average infections as low as, or lower than, Minturki. The two Beloglina x Hussar strains had low infections at all stations, while several Oro x Tenmarq strains were either smut free or highly resistant at all stations except Bozeman. Cheyenne selection, resistant in the 1935 nursery, was also resistant this year. In 1935, Minturki had a rather high average infection but this year the infection was nearer normal for the variety.

Because of the constant turn-over in the nursery only 10 varieties have been grown for the 5-year period from 1935 to 1936, and three of these are susceptible checks. For the long-time average Hussar has the lowest average infection, followed by Turkey selection (C. I. 10016), Yogo, and Turkey selection (C. I. 10094).

There are definite indications of the presence of different physiologic races in these tests. Certain varieties seem to react differently at Bozeman than at other stations. Here the Oro type of resistance does not seem to be as effective as the Hussar type. In addition to the Hussar strains, H-44 x Minturki and Turkey selection (C. I. 11576) were very resistant.

2/ By H. A. Rodenhiser, pathologist, and K. S. Quisenberry, agronomist, Wheat Investigations, Division of Cereal Crops and Diseases.

Table 1.—Summary of bunt infection on 50 varieties and strains of wheat grown in the uniform winter-wheat bunt nursery at 9 stations in the Great Plains area, 1935-36, and average bunt infection for 1932 to 1936.

Variety	C.I.No.	Average percentage of bunt at —									Average		
		Amarillo, Texas	Stillwater, Okla.	Woodward, Okla.	Manhattan, Kans.	Lincoln, Nebr.	Akron, Colo.	Fort Collins, Colo.	Bozeman, Mont.	Kearneysville, W. Va.	9 Stations 1936	1935 and 1936 (Weighted)	1932 to 1936 (Weighted)
Beloglina x Hussar	11583	0.0	0.6	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.2	0.4	—
Do.	11513	0	0	1.1	0.6	0.3	0	0.4	0.4	0	0.3	0.7	---
Martin x Blackhull x Blackhull	11572	0	0	0.3	0.6	0	0	0	2.6	0.4	0.4	0.3	---
Turkey selection	11576	0	0	1.1	0.3	1.3	0.9	0	1.3	0	0.5	0.7	---
Cheyenne selection	11666	0	0	0	0.8	0	0	0	3.8	0	0.5	0.9	—
Oro x Tenmarq	11729	0	0	0	0	0	0	0	5.0	0	0.6	---	—
"Tiflis"	11730	0	0	0.4	0.1	0.7	0	0	2.8	1.2	0.6	—	—
Oro x Tenmarq	11674	0	0	0	0	0	0	0	5.0	1.9	0.8	0.6	---
Ridit x Nebraska No. 6	11670	0	0	2.0	0	1.4	0	0	1.5	4.9	1.1	0.8	—
Hussar	4843	0	0	3.9	2.1	3.3	1.0	0.3	1.3	0	1.3	0.8	0.6
Oro x Tenmarq	11677	0	1.6	0	0	0	0	0	9.8	0	1.3	0.8	---
Fulhard x Oro	11732	0.9	0	0	0	0.3	0.3	0	9.0	0.9	1.3	---	---
Bulk Hybrid selection	11744	0	0	0.6	8.1	0.2	2.1	0	0.3	0	1.3	---	---
Ridit	6703	0	0	2.3	0.2	3.9	0.2	1.6	2.8	2.8	1.5	4.1	3.7
Relief	10082	0	3.0	1.8	0	0.3	0	0.3	7.3	1.8	1.6	---	---
Minturki x Blackhull	11671	0	0	1.5	1.3	1.5	1.2	0.4	7.8	0.6	1.6	1.5	—
Oro x Tenmarq	11673	0	0	0	0.3	1.3	0.2	0.6	7.6	6.2	1.8	1.5	—
Do.	11731	0	0.3	0.6	0.4	0	0.2	0.6	12.5	1.7	1.8	—	—
Oro x Fulhard	11733	0	0	1.1	0	0.7	0.5	0.5	8.8	5.2	1.9	---	---
Minturki	6155	0	0.7	1.2	2.3	6.1	0.7	0.5	6.0	0.9	2.0	9.0	6.0
Oro x Tenmarq	11727	0	0	0	0	0	0	0	17.5	0.5	2.0	---	---
Turkey selection	10094	1.3	0	3.2	1.9	2.1	0.4	2.3	4.8	2.8	2.1	2.5	1.9
Oro x Tenmarq	11728	0	0	1.0	0.1	0	0	0	16.7	1.8	2.2	—	—
Bulk Hybrid selection	11743	3.4	0.7	5.0	4.5	1.9	1.6	1.9	0.5	0	2.2	—	—
Yogo	8033	1.5	0	3.4	0.3	6.3	0.2	0.2	7.8	0.7	2.3	2.3	1.7
Turkey selection	11667	0	0	3.4	0.7	1.3	1.4	0.9	13.8	0	2.4	2.8	—
Minturki x Beloglina-Buffum	11661	0.9	0	2.6	1.3	1.8	1.5	0.3	9.2	5.5	2.6	2.8	—
Oro x Tenmarq	11672	3.2	0	0	0.2	0.3	0.5	0.4	17.0	1.5	2.6	2.6	—
H-44 x Minhardi	11738	1.4	3.0	7.9	1.9	0.6	1.9	2.5	0	4.6	2.6	---	---
Wheat x rye (Meister)	11403	0	0	7.1	1.0	6.4	1.5	3.1	1.1	4.1	2.7	2.8	—
Turkey selection	10016	0	0	2.7	0.1	1.8	0.4	0.6	19.7	0	2.8	2.2	1.4
Ioturk	11388	0	0.4	6.8	1.4	0.9	0.4	0.7	17.5	1.1	3.2	2.9	---
Oro	8220	0.7	1.0	6.5	1.1	2.2	0.5	1.1	12.3	4.0	3.3	3.2	4.2
Turkey	11376	0	0	2.8	1.1	3.4	0.2	0.4	18.3	4.8	3.4	3.0	—
Minturki x Marquis	11658	2.0	1.0	5.5	1.4	4.5	2.1	1.0	10.3	3.5	3.5	2.7	—
Oro x Fulhard	11579	1.6	0.6	4.6	1.3	2.0	1.0	0.7	17.3	5.9	3.9	4.1	—
Tenmarq x Minturki	11580	0	0.3	10.5	2.6	3.9	2.7	3.7	5.8	12.3	4.6	4.1	—
Minturki x Marquis	11502	0	1.6	10.8	1.5	16.4	3.1	0.5	2.5	5.5	4.7	5.6	—
Turkey x Minturki	11662	1.1	0	8.4	2.3	12.5	1.2	4.2	10.5	4.1	4.9	—	—
Oro x Tenmarq	11736	0	0.3	4.8	0.5	1.4	1.5	0.7	37.5	3.9	5.6	—	—
Turkey selection	11734	1.6	3.8	45.1	20.5	34.8	14.8	13.9	18.0	4.2	17.4	—	—
Turkey 144 x Buffum	11741	7.5	14.8	38.8	32.6	41.4	23.8	22.3	39.5	16.7	26.4	—	—
Turkey selection	11735	9.2	9.3	55.7	33.4	35.4	19.7	26.7	18.7	30.3	26.5	---	---
Cheyenne	8885	16.2	14.3	72.6	24.5	44.1	34.6	46.0	32.7	31.8	35.2	43.9	40.6
Kharkof	1442	20.0	20.5	57.8	31.9	60.0	23.3	22.4	43.3	48.4	36.4	44.7	45.0
Quivira	8886	11.0	13.5	78.1	40.8	67.8	31.6	34.6	13.8	72.4	40.4	50.7	39.7
Turkey 144 x Buffum	11739	20.7	16.3	72.6	71.6	57.8	43.3	46.0	41.3	63.5	48.1	---	---
Turkey 144 x Minhardi	11742	27.9	18.0	77.1	41.5	71.4	64.7	29.4	61.2	43.7	48.3	---	---
Turkey 144 x Buffum	11740	17.6	30.1	84.1	42.9	66.2	50.5	55.0	28.9	67.7	49.2	—	—
Blackhull selection	11737	41.8	26.5	84.2	0	49.3	47.6	58.5	9.7	79.5	50.0	—	—

DISEASE GARDEN

Table 21 is a summary of the data obtained in the disease garden conducted by C. O. Johnston at Manhattan, Kans., and the data are presented through his kind cooperation. In 1936, readings were obtained for leaf rust and stem rust, and bunt, blackchaff, Septoria, and mildew.

A number of the strains in the garden showed resistance to leaf rust. In the case of stem rust the only real resistance was shown by Mediterranean x Hope. In the case of bunt, blackchaff, and mildew strains that carry resistance are available. The data rather boldly paint the unfortunate situation in regard to stem rust resistance. In this entire list of strains, supposedly containing the most generally promising in the area, only one has resistance to stem rust. Steps are being taken to place more emphasis on stem rust resistance.

Table 21. - Reaction of varieties of winter wheat in the disease garden at Manhattan, Kans., to leaf rust, stem rust, bunt, blackchaff, Septoria leaf blotch, and mildew, 1936

Variety	C.I. No.	Percent of infection			Coefficient of infection 1/		
		Leaf rust	Stem rust	Bunt	Black-chaff	Septoria leaf blotch	Mildew
Kharkof	1442	65	60	33.4	3	2-	3+
Kanred x Hard Federation	10091	5	55	13.6	4	3+	4
Do	10092	5	55	43.5	4	3	3+
Blackhull	6251	45	60	16.0	3	2	3+
Cheyenne	8885	70	65	14.3	4	2	3
Cheyenne selection	11666	70	60	0	3	2+	4+
Minturki	6155	65	70	5.5	0	2-	4+
Nebraska No. 60	6250	70	70	27.6	1	2-	4+
Turkey selection	10016	70	65	0.3	4	2	3
Do	10094	70	70	0.4	4	2	2+
Do	11576	70	70	0.2	3	2	3
Do	11577	80	65	0	1	2	4+
Do	11667	70	70	0.5	1	2	3
Mediterranean selection	11587	5	70	45.6	3	2	3
Beloglina x Hussar	11513	20	70	0.7	1	3	1
Kanred x Marquis	11589	5	55	47.7	3	3+	1
P-1066-1 x Prelude	11590	5	55	43.9	1	4	0
Prelude x Kanred	11591	5	55	42.7	3	4	1+
Kanred x (Kanred-Marquis) 2/	11592	25	55	0	4	3+	4
Oro x Fulhard	11579	65	70	6.5	4	2	3+
Akron selection No. 7	11660	70	70	11.2	1	2+	3
Minturki x Blackhull	11671	45	70	1.6	0	3	4+
Oro x Temarq	11672	5	75	0	4	2+	3
Do	11673	15	70	0	4	2+	1+
Do	11674	10	70	0	4	2+	3
Do	11729	5	75	0.5	3	2+	3
Do	11731	5	65	42.2	4	2+	2+
Do	11677	60	70	0	1	2+	2+
Oro x Fulhard	11733	70	70	0.3	1	2+	2+
Mediterranean x Hope	11763	T	T	23.8	3	2	2+
Beloglina x Hussar	11583	70	65	0	4	2	4
Wheat x rye (Meister)	11403	65	40	1.1	0	2	1
Minard x Minhardi	11656	65	65	11.1	0	2+	2+
Minhardi x Marquis	11657	35	65	12.0	3	2	3+
Minturki x Marquis	11658	70	60	0.6	3	2	3+
Do	11659	35	70	8.0	3	2	3+
Do	11501	35	70	0.7	3	3	3+
Do	11502	45	65	7.1	4	3	4
Penquite selection	11745	45	70	48.9	4	2	4
Kanred x Marquis	11746	10	70	55.4	1	3	3
Turkey x Marquis	11747	60	75	12.2	1	2	1
Ashkof x Minturki	11724	45	65	30.1	0	2	2
Turkey x Kanred	11725	65	60	40.2	0	2	2
Kanred x Minhardi	11726	25	60	43.0	0	2	2+
H-44 x Minhardi	11738	25	45	2.4	0	2+	1+
Turkey 144 x Buffum	11739	60	55	66.4	0	2	2+
Turkey 144 x Minhardi	11742	70	70	53.4	0	2	3+
"Tiflis"	11730	45	75	1.3	0	2	3
Chiefkan	11754	5	65	61.3	0	2	2+

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

2/ Apparently not inoculated for bunt.