

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE
Field Crops Research Branch

(NOT FOR PUBLICATION WITHOUT PERMISSION)

COMPARISON OF
WINTER WHEAT VARIETIES GROWN IN COOPERATIVE
PLOT AND NURSERY EXPERIMENTS IN THE
HARD RED WINTER WHEAT REGION
IN 1953

Agronomy Department
Nebraska Agricultural Experiment Station
Lincoln, Nebraska
309CC - May 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Field Crops Research Branch

COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND
NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION
IN 1953

By

L. P. Reitz, Agronomist, 1/

Cereal Crops and Diseases Section

Contents

	<u>Page</u>
Experiments in 1953.....	3
Cooperating Agencies, Stations, and Personnel.....	3
Accession Numbers Assigned.....	5
New Varieties	6
Uniform Varieties in Plots	6
Plot Data	7
Standard Errors.....	23
Summary of Plot Data	23
Yields by districts.....	24
Summary of agronomic data	24
Uniform Yield Nursery	31
Data Obtained	31
Standard Errors	45
Summary of Nursery Yields	45
Summary of Agronomic Data	45
Uniform Winterhardiness Nursery	50
Uniform Protein Nursery	53
Data from the Disease Nurseries	55
Data from the Quality Laboratory	55

1/ The writer expresses appreciation to Dorothy M. Wilson and Charles Pulham for their assistance in preparing this report.

•

EXPERIMENTS IN 1953

Drought and high temperatures dominated conditions in much of the hard winter wheat belt this year, especially in the High Plains of the Southwest. Eastward an excellent wheat crop was grown on subnormal rainfall. This was especially noted in eastern Texas, eastern Oklahoma, and eastern Kansas, where in many years an excess of precipitation joins with pathogens, pests, and predators of various kinds to debilitate the crop. For the most part, however, the year was a continuation of a three- or four-year drought. It was so severe in the southwest that by March 1 in many counties, two-thirds to three-fourths of the wheat acreage was abandoned and by harvest-time several counties reported 90% abandonment. Every year some winter wheat acreage is abandoned. In 1953 this was 17.9% compared with 10.6% of what was sown was not harvested for grain according to the U. S. Crop Report. In the current year the percentage abandoned by states was New Mexico 83.2, Texas 51.0, Colorado 25.9, Oklahoma 11.6, Kansas 12.4, Iowa 10.1, Nebraska 13.7, Wyoming 13.0, Montana 15.1, South Dakota 18.3, and Minnesota 6.8. On the remaining acreage below-average yields were harvested in New Mexico, Texas, Colorado, Oklahoma, Kansas, and Wyoming. In the other states of the region yields per acre were average or above.

The present drought reminds us that limited moisture is a normal condition in the Great Plains and that each crop generally exhausts all of the precipitation that can be stored or absorbed. Wheat varieties for such areas must have great capacity to endure or to escape such conditions and to make productive growth with what nature supplies. Breeders dare not lose sight of this fact when breeding for the many other objectives of improvement.

The year was one of very little leaf rust or foliar diseases. Scattered and generally light outbreaks of insects and mites were reported. Stem rust threatened the crop but caused little damage south of Nebraska; however, communities in South Dakota suffered severely from the rust. Mosaic outbreaks were locally heavy. High temperatures adversely affected grain plumpness, especially late maturing fields or varieties, and gluten quality was reduced for bread-making purposes.

Uniform experiments were planned as in previous years. This report follows the pattern that is familiar to cooperators. Dry seedbeds prevented some cooperators from getting reliable stands, and in other cases variable stands contributed heavily to experimental error. In spite of this handicap, about the usual number of experiments were carried to completion, many with high yields. One of the most complete and discerning of tests for bunt reaction was obtained this year. A new uniform protein test was initiated to determine the interaction of varietal protein and grain yield.

In this report an endeavor has been made to acknowledge those who cooperated in the regional program during the year. It is regretted that such a listing always falls short of being adequate. To the many who give a little or a lot of their time a special word of appreciation is due. Those who contributed in special ways to the planning and execution of the program are listed below:

COOPERATING AGENCIES, STATIONS, AND PERSONNEL

FIELD CROPS RESEARCH BRANCH:

Cereal Crops Section

Wheat Investigations

Hard Red Winter Wheat Coordinator

Rust, Smut, Mosaic

H. A. Rodenhiser

S. C. Salmon

L. P. Reitz

C. O. Johnston, H. H. McKinney,

W. C. Haskett, H. Fellows

Cereal Crops Section (Con't.)

Milling and Baking

J. A. Shellenberger, Karl Finney

TEXAS AGRICULTURAL EXPERIMENT STATION:

Agronomy (Corn and Small Grains)

J. E. Adams

College Station Agricultural Exp. Station E. S. McFadden, M. C. Futrell

Denton Substation No. 6

I. M. Atkins (State Leader),

D. E. Weibel

Chillicothe Substation No. 12

J. R. Quinby

Bushland Amarillo Experiment Station K. B. Porter

NEW MEXICO AGRICULTURAL EXPERIMENT STATION:

Clovis

Agr. Exp. Station

R. W. Livers

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Field Crops and Soils

H. F. Murphy

Stillwater A & M College

A. M. Schlehuber (State Leader),

Ben Jackson, H. C. Young

Cherokee Wheatland Conservation Sta.

A. A. Garrett

Woodward Panhandle Agr. Exp. Sta. R. Hunter

Goodwell Panhandle Agr. Exp. Sta. Raymond Peck

KANSAS AGRICULTURAL EXPERIMENT STATION:

Agronomy

R. V. Olson

Manhattan Kansas State College

H. H. Laude, E. G. Heyne, John

Schmidt, R. H. Painter, E. D.

Hansing, W. H. Sill

Hays Ft. Hays Branch Exp. Sta.

Wm. Ross, R. C. Bellingham,

John Miller

Colby Colby Branch Station

E. H. Coles, Ted Walter

Garden City Garden City Agr. Exp. Sta. A. E. Lowe, A. B. Erhart

COLORADO AGRICULTURAL EXPERIMENT STATION:

Agronomy

D. W. Robertson

Akron U. S. Dry Land Field Sta.

J. F. Brandon, T. E. Haus

Fort Collins State Agricultural College T. E. Haus

Hesperus Fort Lewis Substation H. O. Mann

IOWA AGRICULTURAL EXPERIMENT STATION:

Ames

Iowa State College

R. E. Atkins

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Agronomy

E. F. Frolik

Lincoln Agricultural Exp. Sta.

L. P. Reitz, V. A. Johnson

North Platte North Platte Exp. Sta.

M. Greenwood

Alliance Box Butte Experiment Farm

L. P. Reitz, Robert O'Keefe

WYOMING AGRICULTURAL EXPERIMENT STATION:

Agronomy

D. E. Bohmont

Laramie Agr. Exp. Station

R. P. Pfeifer

Sheridan U.S. Dry Land Field Sta.

O. K. Barnes

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy

W. W. Worzella

Brookings Agr. Exp. Station

Victor Dirks

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy and Plant Genetics

St. Paul	University Farm
Waseca	Southeast Exp. Sta.
Grand Rapids	

W. M. Myers
E. R. Ausemus
R. E. Hodgson
E. R. Ausemus

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Agronomy

Dickinson	Dickinson Substation
-----------	----------------------

T. E. Stoa
T. J. Conlon

MONTANA AGRICULTURAL EXPERIMENT STATION:

Agronomy

Bozeman	Montana Experiment Station
Moccasin	Judith Basin Branch Sta.
Havre	North Montana Branch Sta.
Huntley	Huntley Field Station

A. H. Post
E. R. Hehn
Ralph Williams
L. O. Baker
Stanley Brooks

CANADA DEPARTMENT OF AGRICULTURE:

Lethbridge, Alta.	Agr. Exp. Station
-------------------	-------------------

J. E. Andrews

Several major changes in personnel occurred during the year. M. C. Futrell and D. E. Weibel are new workers in the Texas area; T. H. Johnston went into rice improvement in Arkansas and was replaced in Oklahoma by Ben Jackson; Wayne Fowler became secretary of the Kansas Crop Improvement Association and was replaced at Hays, Kansas, by John Miller; C. R. Hills, who for so many years conducted the field trials at Sheridan, Wyo., moved to Mandan, N. Dak., and was replaced by O. K. Barnes; Victor Dirks has assumed the responsibilities in South Dakota formerly carried by J. E. Grafius now in Michigan. New agronomists administering the state work include R. V. Olson, Kansas; E. F. Frolik, Nebraska; D. E. Bohmont, Wyoming; and W. M. Myers, Minnesota. The passing of M. A. Bell is noted with regret. His contributions to agronomic work conducted at Havre, Mont., and Woodward, Okla., will long be felt. The death of Dr. B. B. Bayles represents an irreparable loss to the Cereal Crops Section and to wheat research.

ACCESSION NUMBERS ASSIGNED

Cereal Investigation, or C. I. numbers, were assigned to several varieties of hard winter wheat this year. When a number is assigned, seed of that variety is added to the permanent collection maintained by the Cereal Crops Section, Beltsville, Md., under the direction of D. J. Ward. C. I. numbers take precedence over state and local numbers in this report and it is hoped that they will be used whenever available when workers publish results or correspond. New numbers assigned this year are as follows:

<u>C. I. No.</u>	<u>Name</u>	<u>State No.</u>
13005	Wis. 473 (Shand's) x Cheyenne	Nebr. sel. 504312
13007	Pawnee x Cheyenne	Nebr. sel. 482548
13008	Cheyenne-Red Chief x Pawnee-Marquillo-Oro	Nebr. sel. 492303
13009	Pawnee x C. I. 12250	Nebr. sel. 521108
13010	Pawnee x C. I. 12250	Nebr. sel. 521111
13011	Pawnee x C. I. 12250	Nebr. sel. 521112
13012	Pawnee x C. I. 12250	Nebr. sel. 53465(51J5)
13013	Comanche x C. I. 12250	Nebr. sel. 521129
13014	Triticum-Ag. elongatum x Pawnee	Okla. Stw. 524448
13015	Pawnee x Nebred	Nebr. sel. 502845
13016	Cheyenne x Red Chief	Nebr. sel. 482809
13106	Frisco	Tex. 131-46-3

NEW VARIETIES

Frisco (C. I. 13106) was released to certified growers for use in the north-central Texas area. It is a soft wheat similar to Red May possessing resistance to the more common races of leaf and stem rust (except 15B). Travis and Bowie, selected from the cross Renacimiento x Kenya, are the first wheats to be released in Texas having resistance to stem rust race 15B. They are soft wheats and undoubtedly lack sufficient winterhardiness to extend into the wheat belt proper. They should be confined to central Texas.

Concho (C. I. 12517), a selection from the cross Comanche x Blackhull-Hard Federation, was named and distributed to certified growers in Oklahoma. This hard winter wheat has shown wide adaptation in regional tests, bunt resistance, leaf-rust resistance, and excellent quality. Performance records justify the prediction that Concho will become the most important commercial wheat to be released in the hard winter wheat belt since Pawnee.

Controversial opinion about the continuance of Sioux developed among members of the trade during the season. This variety has high loaf volume potentialities but has medium to short dough mixing requirements. It was released in Nebraska in 1952 as a direct response to requests from a segment of the trade for just such quality characteristics. The large volume of short mixing time wheat produced in 1953 minimizes the need, for the present, of additional short-time varieties. Sioux is being continued as a recommended variety in Nebraska but other promising selections of similar quality have been withdrawn from the present increase program.

In Kansas, a sister line of Kiowa was substituted for the original strain in the foundation and certified seed program. This is a replacement of C. I. 12133 with C. I. 12518. The latter has slightly better baking quality and longer mixing time than the former.

UNIFORM VARIETIES IN FIELD PLOTS OR IN ADVANCED NURSERIES

The uniform variety tests are set up by districts. The southern district includes Texas, New Mexico, and Oklahoma; the central district includes Kansas, Colorado, and Nebraska; the northeastern district includes Iowa, South Dakota, and Minnesota; and the northwestern district involves Wyoming and Montana. Some tests, as the bunt test, are region wide, while others involve two or three districts.

The advanced or field plot test of varieties included the following varieties in 1953 and 1954:

Variety	: C. I. : : No.	1953				1954			
		: S	: C	: NE	: NW	: S	: C	: NE	: NW
Kharkof	1442	X	X		X	X	X		X
Tenmarq	6936	X	X			X	X		
Early Blackhull	8856	X				X			
Comanche	11673	X	X			X	X		
Pawnee	11669		X				X		
Red Chief	12109	X	X			X	X		
Kiowa	12133		X						

Variety	: C. I. : : No. :	1953				1954			
		: S :	: C :	: NE :	: NW :	: S :	: C :	: NE :	: NW :
Ponca	12128	X	X			X			
Hard Federation Hyb.	12515	X				X			
Concho	12517	X	X			X	X		
Kiowa	12518						X		
Minturki	6155			X				X	
Yogo	8033				X				X
Minter	12138			X	X			X	X
Iohardi	12510			X				X	
H44-Minh. x Marmin	12704			X				X	
Mint. x Timo.-Vulg. ²	12806			X				X	

In addition to the uniform set of varieties, each station grows several varieties of local interest. All varieties reported by the various cooperators are included in the station data for plot varieties, thus giving a rather complete account of advanced testing. Permanent check varieties are Kharkof, Tenmarq, and Early Blackhull in the southern district, with Pawnee, Tenmarq, and Kharkof so designated in the central district. In the northeast Minturki and in the northwest Kharkof is used. New varieties and a few commercial varieties are included on a temporary basis.

PLOT DATA

Field plot or advanced nursery data are given in table 1. The data for each station are tabulated separately and the varieties are listed in declining order of yield for 1953. Summary tables for various data are given in tables 2 to 13.

Over the region as a whole there were some general crop growing conditions worthy of mention. Practically all of the central and southern part of the region had insufficient rainfall in the autumn of 1952 to provide adequate storage and the surface moisture needed to promote germination of seed. This condition persisted through the fall and more or less throughout the crop year in the High Plains. Locally favored areas had enough precipitation to get stands by a reasonable date. Irrigation was resorted to at College Station, Goodwell, and Manhattan to bring certain plantings up, a radical departure from the usual procedure. No stands on dry land, or unuseable ones, were obtained at Garden City, Hays, Colby, Ft. Collins, Havre, and Ames. The drought and higher temperatures brought the crop to maturity at an earlier date than expected in the central and southern districts, considering its late start at most stations. In contrast, the summer season in the northern district was rainy and cool. Leaf rust was present in southern Texas during the fall and winter but made slow spread here or elsewhere in the spring. Consequently very little rust developed until quite late in the season or not at all at stations where no artificial inoculum was scattered. Likewise stem rust made a slow start but by harvest time northern Oklahoma, Kansas, Nebraska, South Dakota, and Minnesota had light to heavy infection on most varieties. Most of the inoculum was race 15B. In general, insects were not abundant although mites of several kinds were plentiful in areas at certain times during the year. Some economic loss from mosaic in Kansas, Nebraska, and Wyoming was reported.

The specific conditions and a few comments about the experimental results at each station, as reported in table 1, will now be presented.

At Denton, Texas, an excellent crop was produced. Six varieties made 39 bushels or more to the acre. These included Triumph, Concho, Kiowa, Early Blackhull, Wichita, and one Sinvalocho x Wichita selection. The plants were very tall, ranging from 38 to 55 inches. Shattering was pronounced in the soft wheats, among which Vigo lost 33% of its grain. Stem rust came in from inoculated areas of the nursery and caused shriveling in very susceptible or late maturing varieties. One colony of stripe rust was observed. Concho has the best two-year average yield.

Yields at Chillicothe were lower than for several years. Early maturing varieties occupied the top positions. Since the standard error was high in relation to the yield level, most of the yield differences are non-significant. C. I. 12515 has the highest two-year average.

Extreme drought depressed yields at Bushland; even with irrigation the effect was still marked. There was some damage from frost (29°) that occurred May 13. Yield differences were non-significant. Red Chief has the best two-year average yield.

Drought dominated conditions at Clovis, New Mexico, where yields below 3 bushels were harvested.

A good crop was harvested at Stillwater, Oklahoma, where all varieties yielded over 25 bushels to the acre. Concho had the highest average for 1953 and for the two-year period. The three earliest varieties in the test had the highest weight per bushel but were lowest in yield of grain. These were damaged more than other varieties by a hail and sleet storm that occurred April 17.

Early varieties were best in yield and test weight at Cherokee. Late varieties exhausted their water supply before the grain was properly filled, and in consequence, had very low weight per bushel. Two-year averages point to Concho and the early varieties as being best.

At Woodward, early varieties were highest and late varieties lowest in yield. In fact, date of heading and ripening appear highly correlated (negatively) with both yield and weight per bushel. Triumph and Concho have the best two-year records.

In the Goodwell test date of heading and yield were inversely related. All varieties tended to finish at about the same time, showing a range of 4 days in ripening in contrast to a spread of 16 days for time of heading. This reflects the exhaustion of soil moisture that occurred by about June 10. Two varieties, Cheyenne and Red Chief, were slower to dry up than the other late entries. A cold period, May 12-14, with low temperatures of 28° apparently did no damage.

The Manhattan, Kansas, variety test was a nursery trial instead of field plots as previously. The test did not emerge until January 14 as a result of the extreme fall drought so yields above 25 bushels to the acre recorded for most entries represents phenomenal recovery. Kanking and Concho were especially outstanding. Triumph has the highest two-year average.

No yields were taken at Hays because of the variable stands occasioned by the fall drought. Kharkof, Sioux, and Kanking made far better stands than the other varieties.

A similar situation was encountered at Colby where Cheyenne, Sioux, and Kanking showed the best stands. No yields could be taken. Variable snow cover and drought were involved.

At Akron, Colorado, satisfactory stands were obtained but yields ranged from 10 bushels per acre down. Best stands were noted on the corn land. Considerable stem rust developed on Red Chief. Comanche and the early varieties performed best this year and have the highest two-year averages.

At Lincoln, Nebraska, good stands were obtained and the crop made rather normal growth throughout the year. Concho and three selections from a Pawnee x Cheyenne cross were the outstanding entries. Slight lodging, and menacing amounts of stem rust were recorded. Red Chief and Ponca have the best two-year averages for yield of grain.

In the North Platte test C. I. 12711, 13008, Cheyenne, and four selections from Pawnee x Cheyenne were the outstanding wheats this year. C. I. 12715 and 12711 have the best two-year records. These head and ripen at about the same time as Comanche.

The Alliance test was damaged by drifting soil during the late winter and again after growth was several inches high. In spite of this the varieties yielded well. Pawnee was highest in yield although seven other varieties exceeded 25 bushels to the acre. Four varieties have two-year averages over 32 bushels. Stem rust was abundant from about June 20 to the time of harvest and did considerable damage, not however, in direct proportion to the percentage estimate shown in the table.

Minter led all varieties both in yield and test weight at Brookings, South Dakota, where a good crop was grown. Stem rust caused considerable loss.

An excellent yielding crop was grown at Waseca, Minnesota, but the appearance of it was not appealing due to lodging and stem rust, associated with the high summer rainfall. Two unnamed selections had the best yield in 1953 and in the two-year period.

Yields and test weights were good at St. Paul where Minter seems to be about the best for general use. Some leaf and stem rust occurred and a moderate amount of blackchaff was reported. Heavy rain in June and the early part of July favored these diseases.

At Grand Rapids the crop was rather late and developed considerable leaf and stem rust. Iohardi was hard hit. Minter continues to have the best average yield.

Another Minnesota test (Westbrook) is of special interest because of the adverse effects of stem rust, lodging, and heavy rains. Only one entry had grain with a weight per bushel over 50 pounds, whereas two entries were below 40. Minter made the highest yield.

Yields in the nursery test at Sheridan, Wyoming, ranged from 18.4 to 7.0 bushels per acre. Cheyenne had the best average. Low test weights reflect the drought condition which prevailed most of the year.

At Huntley, Montana, Karmont had the highest average yield but all test weights were very low as a consequence of the drought.

In the Moccasin test, an excellent crop was grown under favorable moisture conditions. Cheyenne has the highest average at this station in the recent period in contrast to former times when Yogo and Karmont seemed to be most promising.

At Bozeman the crop was late and lodged badly, but it made very high yields and weights per bushel. It is evident from these data and those from other years at this station that lodging as such is not the cause of low grain yields.

Table 1. Yield and other data for varieties of winter wheat grown in replicated plots in cooperative experiments at 24 stations in the region in 1953, with period average yields.

Denton, Texas
Ten plots, rod rows

Variety	C.I. or Sel.No.	Date		Plant height Ins.	Shat- tering %	Stem rust %	Weight per bushel lbs.	Av. acre yield	
		Headed	Ripe					1953 bu.	1952 - 1953 bu.
Sinvalocho x Wichita	201-47-4	4/29	6/4	46	0	10	60.0	41.2	38.6
Triumph	12132	4/15	5/27	39	0	3	60.5	41.2	35.1
Concho	12517	4/28	6/2	45	3	5	60.0	40.9	39.4
Kiowa	12133	4/28	5/31	42	0	13	60.0	39.5	34.9
Early Blackhull	8856	4/15	5/26	43	0	3	61.5	39.5	34.7
Wichita	11952	4/20	5/28	41	0	T	61.0	39.0	35.9
Sv.-W. x Ho.-Chey.	208-46-32	5/2	6/2	46	0	3	59.5	38.8	35.4
Sv.-W. ² x Ho.-Chey.	237-46-26-2	4/15	5/27	38	0	10	60.5	37.6	33.3
Hd. Fed. Hybrid	12515	4/29	6/1	43	T	3	60.0	36.5	36.6
Sv.-W. ² x Ho.-Chey.	12702	4/25	5/30	41	2	T	59.5	36.4	35.6
Tenmarq	6936	5/1	6/3	48	4	11	58.3	36.4	33.8
Comanche	11673	4/27	5/31	44	T	8	59.0	36.0	34.4
Westar x Ho.-Tk.	253-48-34	4/29	6/1	45	T	10	55.0	36.0	--
Blackhull	6251	5/3	6/5	49	T	10	60.5	35.7	34.2
Ponca	12128	4/29	6/1	46	3	13	59.0	35.6	34.0
Thorne <u>1/</u>	11856	5/2	6/3	47	13	33	55.5	34.4	--
Quanah	12145	4/29	6/1	41	4	1	58.0	34.1	32.3
Wich. x Mgo.-Oro	218-48-35	5/3	6/2	43	T	11	59.0	33.9	--
Kanred	5146	5/2	6/4	44	T	5	57.0	32.8	32.1
Kharkof	1442	5/3	6/6	45	0	T	56.5	32.2	30.9
Red Chief	12109	4/30	6/2	46	0	20	61.5	32.0	29.1
Fronteira x R. May ²	131-46-8 <u>1/</u>	4/26	6/1	40	3	8	58.5	31.8	--
12701 x Wichita	237-46-23-2	4/25	6/2	42	0	3	59.5	31.3	31.1
Frisco (131-46-3) <u>1/</u>	13106	4/26	6/1	41	19	8	57.0	30.9	--
Vigo <u>1/</u>	12220	5/3	6/3	55	33	28	57.5	30.5	26.4
12701 x Wichita	12703	4/24	6/1	43	0	10	59.5	29.9	30.8
Mediterranean <u>1/</u>	10086	5/2	6/2	47	14	5	59.0	29.7	29.0
Denton <u>1/</u>	8265	5/2	6/4	50	20	23	56.7	29.5	28.9
Red May Sel. <u>1/</u>	7250-1	4/30	6/2	42	13	13	58.0	28.6	30.6

1/ Soft wheats. Standard error of a difference = 1.78 bus.

Chillicothe, Texas
Ten plots, rod rows

Variety	C. I. or Sel. No.	Av. acre yield	
		1953	1952- 1953
		Bu.	Bu.
Sv.-Wich. ² x Ho.-Chey.	237-46-26-2	16.2	19.5
Triumph	12132	15.4	15.3
Wichita	11952	14.4	18.1
Hd. Fed. Hybrid	12515	14.4	19.9
Ponca	12128	13.9	18.1
Chiefk. x Mt.-Tq.	13004	13.3	19.0
Early Blackhull	8856	12.5	15.9
Comanche	11673	12.4	18.6
Kharkof	1442	11.8	18.8
Concho	12517	11.8	--
Apache	12122	11.4	17.7
Kiowa	12133	11.3	16.8
Sv.-Wich. ² x Ho.-Chey.	12703	11.0	14.5
Tenmarq	6936	10.9	17.2
Westar x Ho.-Turkey	253-48-34	10.6	--
Sv.-Wich. x Ho.-Chey.	12702	10.5	16.7
Blue Jacket	12502	10.4	16.4
Sv. x Wichita	201-47-4	10.2	16.7
Mqo.-Oro x Wichita	218-48-35	9.8	--
Westar	12110	9.0	16.9
Quanah	12145	8.9	14.5
Red Chief	12109	8.1	14.5
Sv.-Wich. ² x Ho.-Chey.	237-46-23-2	7.5	14.2

Standard error of a difference = 2.4 bushels.

Bushland, Texas
Seven plots, rod rows; 4 irrig.

Variety	C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield			
		Head- ed	Ripe <u>1</u> / June			Dry 1953	Irrig. 1953	Av. 1953	1952- 1953
		May	June	Ins.	Lbs.	Bu.	Bu.	Bu.	Bu.
Kharkof	1442	25	18	21	55.8	4.9	21.0	14.1	13.9
Red Chief	12109	20	18	23	59.8	6.0	19.8	13.9	15.4
Concho	12517	17	15	21	56.4	6.5	18.5	13.3	14.6
Hd. Fed. Hybrid	12515	18	15	21	55.4	5.1	19.2	13.1	14.1
Ponca	12128	18	14	23	55.8	6.7	17.7	13.0	13.9
Comanche	11673	19	16	21	56.1	5.5	18.0	12.6	13.9
Tenmarq	6936	24	16	22	54.8	5.8	15.5	11.3	12.9
Early Blackhull	8856	10	12	18	60.1	4.4	16.5	11.3	13.0

Standard error of a difference - non-significant.

1/ Irrigated only.

Clovis, New Mexico
Six 1/40 acre plots

Variety	C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield	
					1953	1952- 1953
		May	Ins.	Lbs.	Bu.	Bu.
Early Blackhull	8856	9	18	59.6	3.0	--
Ponca	12128	18	17	58.5	2.8	--
Cheyenne	8885	22	17	59.1	2.6	3.4
Apache	12122	13	17	60.1	2.5	3.4
Red Chief	12109	20	19	60.7	2.3	--
Kiowa	12133	17	17	58.6	2.3	--
Chiefkan	11754	19	20	59.7	2.2	3.7
Kharkof	1442	25	18	58.0	2.2	--
Westar	12110	19	17	58.2	2.2	4.3
Tenmarq	6936	20	18	57.8	2.2	2.8
Pawnee	11669	17	17	58.3	2.1	2.6
Blackhull	6251	19	17	59.9	2.0	5.1
Wichita	11952	13	16	59.5	2.0	2.6
Concho	12517	18	16	58.4	2.0	--
Comanche	11673	19	17	58.1	1.7	2.0
Hd. Fed. Hybrid	12515	19	18	57.8	1.6	--
Turkey	1558	23	16	56.9	1.5	3.1
Triumph	12132	10	16	58.8	1.4	2.5

Standard error of a difference = 0.43 bus.

Stillwater, Oklahoma
Four 1/68 acre plots

Variety	C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
		Headed	Ripe			1953	1952- 1953
				Ins.	Lbs.	Bu.	Bu.
Concho	12517	5/4	6/3	39	59.5	37.7	31.1
Hd. Fed. Hybrid	12515	5/6	6/4	41	58.5	36.9	29.9
Com. x Chey.-Blk.	12708	5/9	6/5	38	58.2	36.6	30.0
Comanche	11673	5/5	6/4	41	57.9	35.6	27.9
Westar	12110	5/7	6/5	40	57.7	35.3	28.3
Ponca	12128	5/5	6/3	38	58.3	35.3	28.3
Oro x Bkhl.-Hd. Fed.	13001	5/5	6/4	40	59.3	35.2	--
Bkhl.-Oro x Pawnee	12516	5/6	6/3	42	59.8	35.2	29.5
Bkhl.-Oro x Pawnee	12709	5/9	6/5	38	58.8	35.0	28.5
Pawnee	11669	5/6	6/3	40	57.7	34.5	26.1
Kiowa	12133	5/4	6/3	40	58.6	34.5	27.5
Red Chief	12109	5/8	6/6	43	60.9	32.7	26.6
Cheyenne	8885	5/12	6/7	37	58.5	32.0	25.9
Tenmarq	6936	5/8	6/5	40	57.8	31.9	25.7
Kharkof	1442	5/12	6/6	40	58.1	31.8	26.5
Com. x Bkhl.-Hd. Fed.	12710	5/11	6/5	40	55.3	31.8	26.5
Clarkan	8858	5/11	6/6	45	57.6	28.3	24.2
Early Blackhull	8856	4/24	5/28	43	61.0	28.0	24.1
Triumph	12132	4/25	5/29	40	61.4	27.5	22.9
Wichita	11952	4/28	5/31	42	61.0	25.3	22.3

Standard error of a difference = 1.23 bus.

Cherokee, Oklahoma
Five plots, rod rows

Variety	C. I. No.	Plant height	Weight per bushel	Av. acre yield	
				1953	1952- 1953
		Ins.	Lbs.	Bu.	Bu.
Early Blackhull	8856	33	59.0	32.0	34.5
Triumph	12132	31	58.8	31.5	34.0
Wichita	11952	33	57.6	29.0	34.1
Concho	12517	33	54.6	25.9	34.3
Kiowa	12133	34	55.8	24.9	30.0
Bkhl.-Oro x Pawnee	12516	36	54.1	24.2	31.0
Red Chief	12109	39	57.2	23.6	28.9
Oro x Bkhl.-Hd. Fed.	13001	35	53.6	23.4	--
Com. x Chey.-Bkhl.	12708	37	52.8	23.1	29.4
Pawnee	11669	36	52.1	22.8	30.2
Ponca	12128	36	51.8	22.7	30.3
Hd. Fed. Hybrid	12515	35	52.7	21.7	28.9
Westar	12110	37	52.1	20.6	27.0
Com. x Bkhl.-Hd. Fed.	12710	36	49.0	19.8	26.0
Tenmarq	6936	37	50.8	19.0	24.3
Cheyenne	8885	34	53.5	18.7	24.9
Kharkof	1442	36	51.7	17.6	23.7
Bkhl.-Oro x Pawnee	12709	36	49.1	16.8	25.4
Comanche	11673	35	54.4	21.7	28.8

Standard error of a difference = 1.73 bus.

Woodward, Oklahoma
Five plots, rod rows

Variety	C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
		Headed	Ripe			1953	1952- 1953
		May	June	Ins.	Lbs.		
Triumph	12132	9	7	27	58.9	24.4	25.4
Early Blackhull	8856	10	8	28	57.8	22.4	22.8
Wichita	11952	12	9	28	57.4	21.5	23.8
Kiowa	12133	16	11	28	55.5	20.5	23.2
Concho	12517	16	10	28	53.2	19.8	25.1
Bkhl.-Oro x Pawnee	12516	18	12	31	53.2	18.8	23.3
Com. x Chey.-Bkhl.	12708	18	13	30	53.8	18.6	23.3
Pawnee	11669	17	12	30	51.6	18.5	22.6
Ponca	12128	17	12	29	53.5	18.4	21.5
Westar	12110	17	12	31	52.6	17.7	20.8
Oro x Bkhl.-Hd. Fed.	13001	18	12	29	55.2	17.7	--
Red Chief	12109	18	12	33	56.9	17.6	21.9
Hd. Fed. Hybrid	12515	17	11	30	52.0	17.4	24.2
Comanche	11673	17	12	29	51.7	17.1	21.8
Tenmarq	6936	18	12	31	52.0	16.5	19.7
Cheyenne	8885	21	14	28	55.6	16.5	23.2
Bkhl.-Oro x Pawnee	12709	19	13	28	52.8	16.3	21.4
Com. x Bkhl.-Hd. Fed.	12710	19	13	29	50.0	15.5	22.4
Kharkof	1442	19	14	29	54.5	15.1	18.7

Standard error of a difference = 1.28 bushels

Goodwell, Oklahoma
Five plots, rod rows; fall irrig. twice

Variety	C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
		Headed	Ripe			1953	
		May	June	Ins.	Lbs.	Bu.	
Wichita	11952	7	10	27	58.5	35.8	
Apache	12122	8	12	25	58.2	34.4	
Triumph	12132	6	10	26	58.7	33.8	
Concho	12517	11	12	26	55.4	33.1	
Early Blackhull	8856	4	10	27	58.9	32.7	
Com. x Chey.-Bkhl.	12708	13	12	27	55.9	31.2	
Hd. Fed. Hybrid	12515	11	12	28	54.0	30.5	
12701 x Wichita	12702	9	12	26	55.9	30.4	
Kiowa	12133	13	13	26	57.7	30.0	
Comanche	11673	12	12	26	54.8	29.6	
Westar	12110	12	12	29	54.6	29.2	
Pawnee	11669	12	12	26	54.2	29.0	
Ponca	12128	13	12	27	53.5	28.6	
Red Chief	12109	17	14	31	58.9	28.4	
Bkhl.-Oro x Pawnee	12709	18	13	27	55.1	25.3	
Tenmarq	6936	17	12	28	55.2	23.9	
Oro x Bkl.-Hd. Fed. Wd. 44h2-24		16	13	24	57.4	22.8	
Bkhl.-Oro x Pawnee	12516	13	12	26	56.5	22.7	
Cheyenne	8885	20	14	27	57.4	22.4	
Com. x Bkl.-Hd. Fed.	12710	17	13	27	53.8	20.5	
Kharkof	1442	19	13	27	55.5	17.7	

Standard error of a difference = 1.95 bus.

Manhattan, Kansas
Six plots, rod rows

Variety	C. I. No.	Date headed	Plant height	Hessian fly 1/	Diseases 2/			Weight per bushel	Av. acre yield	
					Rust		Bunt		1953	1952- 1953
					Leaf	Stem				
		May	Ins.	%	%	%	%	Lbs.	Bu.	Bu.
Kanking	12719	26	29	80	80	50	80	61.0	31.5	--
Concho	12517	27	27	74	5	90	2	56.0	30.8	38.1
Pawnee	11669	27	27	53	70	60	8	56.3	28.8	33.2
Kiowa	12133	27	27	70	70	50	3	57.5	28.3	34.6
Mgo.-Oro x Oro-Ten.	12406	27	27	20	T-5	20	1	56.8	28.3	34.9
Triumph	12132	23	26	78	100	80	70	58.5	28.0	41.2
Ponca	12128	28	26	16	10	40	65	57.0	27.9	35.3
Wichita	11952	25	27	56	100	60	70	58.0	27.7	29.9
Kan Queen	12762	28	33	52	80	60	85	59.5	27.5	32.8
Comanche	11673	27	27	78	60	50	3	55.0	27.5	33.9
Blue Jacket	12502	28	31	62	80	50	70	59.8	27.1	30.0
Red Chief	12109	27	30	88	80	50	90	60.5	26.1	--
Tenmarq	6936	28	29	70	70	60	60	54.8	24.8	30.2
Turkey	1558	29	27	76	80	70	50	56.8	25.0	26.4
Pawnee Sel. 33	12707	24	26	52	80	70	40	58.8	24.6	34.2
Kharkof	1442	29	29	--	90	50	60	55.8	23.8	26.3

1/ Fly at Columbia, Mo. nursery. 2/ Special disease nurseries.
Standard error of a difference = 1.60 bus.

Hays, Kansas
Four 1/50 acre plots

Variety	C. I. No.	Av. stand	Date headed	Plant height	Weight per bushel
		%	June	Ins.	Lbs.
Triumph	12132	63	1	23	53
Wichita	11952	48	5	25	53
Comanche	11673	48	7	24	52
Kiowa	12133	43	8	23	52
Pawnee	11669	60	6	24	51
Ponca	12128	58	6	23	50
Tenmarq	6936	50	6	25	51
Red Chief	12109	57	6	28	54
Blue Jacket	12502	69	6	26	55
Kharkof	1442	85	9	25	52
Turkey	1558	70	8	24	52
Mqo.-Oro x Oro-Ten.	12406	65	6	22	53
Concho	12517	63	6	23	51
Pawnee Sel. 33	12707	60	5/31	24	54
Sioux	12142	83	7	25	52
Kanking	12719	98	2	25	56

No yields of value due to variable stands

Colby, Kansas
Three 1/40 acre plots

Variety	C. I. No.	Av. stand	Weight per bushel
		%	Lbs.
Turkey	1558	13	49.5
Comanche	11673	19	55.0
Wichita	11952	17	57.0
Pawnee	11669	22	54.5
Kiowa	12133	19	55.5
Tenmarq	6936	29	52.0
Cheyenne	8885	37	53.8
Concho	12517	22	53.5
Mqo.-Oro x Oro-Ten.	12406	25	53.3
Sioux	12142	40	52.0
Red Chief	12109	17	57.0
Blue Jacket	12502	27	58.5
Kanking	12719	32	60.5
Pawnee Sel. 33	12707	11	57.8
Ponca	12128	9	53.5
Triumph	12132	15	58.0

No yields of value due to variable stands.

Akron, Colorado
Four 1/40 acre plots; 2 after corn, 2 on fallow

Variety	C. I. No.	Date head- ed	Plant height	Stem rust %	Weight per bushel	Av. acre yield	
						1953	1952-1953
		June	Ins.	1/	Lbs.	Bu.	Bu.
Comanche	11673	9	26	T	57.5	10.2	15.7
Wichita	11952	9	26	1.0	57.0	9.5	14.8
Triumph	12132	9	26	T	56.3	9.2	15.2
Kiowa	12133	10	25	1.0	54.8	9.1	14.8
Early Blackhull	8856	8	27	T	56.8	8.7	14.8
Pawnee	11669	10	26	1.0	54.8	8.6	13.7
4-way Cross	11970	12	27	1.0	53.0	8.4	12.4
Red Chief	12109	10	28	10.0	57.5	8.4	13.8
Cheyenne	8885	15	25	2.0	54.0	8.0	13.8
Ponca	12128	11	26	1.0	52.8	8.0	13.4
Tenmarq	6936	12	27	1.0	51.5	7.7	12.8
Kharkof	1442	15	25	1.0	53.3	7.5	13.3
Concho	12517	10	25	1.0	53.5	7.0	--
Alton	1438	15	26	1.0	54.0	6.1	12.0
Sioux	12142	15	25	1.0	52.5	3.8	--

Standard error of a difference = 0.62 bushels.

1/ Fallow only

Lincoln, Nebraska
Five 1/51 acre plots

Variety	C. I. No.	Date		Plant height	Lodging	Stem Rust	Weight per bushel	Av. acre yield	
		Headed	Ripe					1953	1952-1953
		May	June	Ins.	%	%	Lbs.	Bu.	Bu.
Concho	12517	26	27	37	8	T	60.2	41.7	--
Pawnee x Cheyenne	12875	28	27	36	0	5	60.7	39.4	--
Pawnee x Cheyenne	13007	28	27	34	0	T	58.8	39.1	--
Pawnee x Cheyenne	12715	29	27	37	0	5	60.4	38.4	35.0
Ponca	12128	27	26	36	2	T	60.7	37.9	36.9
Kiowa	12133	27	26	35	2	T	60.6	37.9	36.7
Red Chief	12109	29	30	41	0	5	62.7	37.8	37.0
Turkey x Cheyenne	12711	28	28	34	0	5	59.7	37.8	36.6
Chey.-R. Ch. x Ph.-Mq-Oro	13008	31	29	35	0	25	60.9	37.7	--
Comanche	11673	28	27	37	3	T	59.1	37.5	34.8
Nebred	10094	31	29	33	0	5	59.5	37.3	36.3
Cheyenne	8885	31	30	35	0	20	59.3	37.1	36.4
Pawnee x Cheyenne 483406		30	28	37	0	T	58.8	36.6	--
Sioux	12142	30	30	34	0	5	58.3	36.4	34.7
Tenmarq	6936	29	29	37	2	5	58.8	35.8	31.8
Pawnee	11669	27	26	34	2	T	59.2	35.4	35.8
Turkey	12137	31	7/1	36	3	5	58.8	34.5	32.6
Kharkof	1442	6/1	7/2	34	1	5	57.1	31.1	29.7
Blackhawk	12218	6/2	7/1	39	0	5	57.8	28.6	29.2

Standard error of a difference = 1.25 bus.

North Platte, Nebraska
Five 1/50 acre plots

Variety	C. I. No.	Plant height	Weight per bushel	Av. acre yield	
				1953	1952- 1953
		Ins.	Lbs.	Bu.	Bu.
Turkey x Cheyenne	12711	23	58	37.5	35.3
Chey.-R.Ch. x Pn.-Mgo.-Oro	13008	25	59	36.6	--
Cheyenne	8885	23	56	36.6	34.2
Pawnee x Cheyenne	13007	23	57	36.5	--
Pawnee x Chey. Sel. 483406		25	57	36.4	--
Pawnee x Cheyenne	12715	24	58	36.2	35.5
Pawnee x Cheyenne	12875	24	59	35.7	--
Tk.-Tq.-Chey. x Tk.	12523	25	56	35.7	31.0
Nebred	10094	24	56	35.5	32.1
Red Chief	12109	28	60	35.5	31.4
Pawnee	11669	24	55	35.3	34.1
Sioux	12142	24	54	34.8	31.9
Concho	12517	25	56	34.6	--
Comanche	11673	25	57	34.5	33.2
Kiowa	12133	24	59	34.2	31.7
No. Platte Turkey	12143	26	54	33.6	31.3
Tenmarq	6936	26	54	33.3	30.7
Kharkof	1442	27	54	32.5	30.1
Ponca	12128	24	54	31.6	31.7

Standard error of a difference = 1.13 bus.

Alliance, Nebraska
Six plots, rod rows

Variety	C. I. No.	Date		Plant height	Stem rust	Weight per bushel	Av. acre yield	
		Headed	Ripe				1953	1952- 1953
		June	July	Ins.	%	Lbs.	Bu.	Bu.
Pawnee	11669	8	18	34	43	56.0	30.3	36.2
Ho.-Tk. x Cheyenne N.P. 44541		12	18	36	13	56.1	29.9	30.6
Red Chief	12109	6	19	43	28	61.2	29.7	30.7
Nebred	10094	9	19	35	37	54.8	28.0	32.3
Tk. x Cheyenne	12711	8	18	37	47	54.0	27.4	--
Chey. Sel. x Tk. 461289		10	20	39	43	58.1	27.3	33.8
Sioux	12142	9	20	37	42	54.2	26.0	32.6
Tk.-Tq.-Chey. x Tk.	12523	8	19	37	42	56.3	25.5	31.7
Kiowa	12133	10	19	34	55	53.9	22.3	29.2
Comanche	11673	9	18	35	57	53.0	22.3	30.8
Tenmarq	6936	11	20	38	47	50.9	21.2	25.6
Cheyenne	8885	11	21	39	61	53.5	21.1	27.9
Kharkof	1442	11	20	39	40	51.0	20.7	27.0
Pawnee x Cheyenne	12715	10	20	36	61	53.5	20.4	--
Turkey	12137	11	21	39	48	52.5	19.3	26.9
Ponca	12128	11	20	36	67	52.5	18.4	28.0
Concho	12517	11	18	33	80	50.4	13.2	--

Standard error of a difference = 2.58 bus.

Brookings, South Dakota
Two 1/50 acre plots

Variety	C. I. No.	Date		Stem rust	Degree lodged	Weight per bushel	Av. acre yield	
		Headed	Ripe				1953	1952-1953
		June	July	%		Lbs.	Bus.	Bus.
Minter	12138	14	17	25	12	56.4	34.1	32.7
Marmin	11502	13	16	45	20	53.0	32.2	31.2
Pawnee	11669	11	15	45	10	54.2	31.9	30.3
Iowin	10017	13	16	40	15	54.5	31.8	32.1
Hopex Mint. Minn. 2784		15	18	28	12	52.5	30.5	30.5
Nebred	10094	12	16	35	15	52.6	29.2	29.9
Iohardi	12510	12	16	65	15	54.1	28.0	28.7
Minturki	6155	14	17	45	8	51.6	26.6	27.7

Standard error of a difference = 0.90 bushels.

Waseca, Minnesota
Three 1/40 acre plots

Variety	C. I. or Minn. No.	Survival %	Date		Plant height Ins.	Lodging %	Stem rust %	Weight per bushel Lbs.	Av. acre yield	
			Headed	Ripe					1953 Bu.	1952-1953 Bu.
H44-Minh. x Marmin	12704	82	12	15	44	82	60	58.5	41.6	36.2
Mint. x H44-Mint. ³	2844	88	12	14	46	80	60	61.0	40.5	36.2
Min.-Minh. x H44-Mint. ³	2856	87	13	15	42	90	35	59.8	37.5	--
Blackhawk	12218	88	13	17	47	77	70	57.3	36.1	33.2
Mint.-Io. x H44-Mint. ²	2828	82	14	17	45	80	60	60.7	36.0	31.4
Minter	12138	90	12	14	44	90	70	59.3	35.8	33.7
H44-Mint. ² x Marmin	2857	85	15	16	44	82	60	57.5	35.6	--
H44-Mint. ²	2845	90	13	15	45	83	40	59.3	31.6	30.3
Mint. x Tim-Vulg. ²	12806	87	17	22	46	80	40	58.8	31.6	30.1
Iohardi	12510	87	12	11	45	87	70	54.0	30.1	31.1
Minturki	6155	90	13	14	46	83	70	53.3	29.1	30.1
Dryland	2858	80	14	15	46	82	60	54.5	25.4	--

Standard error of a difference = 2.56 bushels.

St. Paul, Minnesota
Three 1/40 acre plots

Variety	C. I. or Minn. No.	Date		Plant height Ins.	Rust		Black Chaff	Weight per bushel Lbs.	Av. acre yield	
		Headed	Ripe		Leaf	Stem			1953	1952- 1953
		June	July		%	%			Bu.	Bu.
Minter	12138	14	13	40	5	25	0	60.8	34.5	33.5
H44-Mint. ² x Marmin	2857	15	13	41	5	25	0	61.8	34.1	--
H44-Minh. x Marmin	12704	13	14	39	40	20	0	60.7	34.0	32.7
Iohardi	12510	11	9	41	40	30	0	61.8	33.4	28.4
Mint. x H44-Mint. ³	2844	12	12	40	5	15	L	61.0	33.1	29.5
Minturki	6155	14	13	40	30	40	0	60.5	32.7	32.0
Blackhawk	12218	14	11	42	10	20	0	60.8	32.3	30.3
Mint. x Tim.-Vulg. ²	12806	18	15	41	T	15	0	62.0	31.9	29.3
Min.-Minh. x H44-Mint. ³	2856	13	10	38	10	20	L	60.5	31.9	--
Dryland	2858	14	14	41	5	30	0	61.0	31.8	--
H44 x Mint. ²	2845	14	12	41	5	15	M	61.3	31.8	27.7
Mint.-Io. x H 44-Mint. ²	2828	14	13	40	5	10	H	62.2	29.1	28.3

Standard error of a different = not significant.

Grand Rapids, Minnesota
Three 1/40 acre plots

Variety	C. I. or Minn. No.	Date		Plant height Ins.	Rust		Weight Per bushel Lbs.	Av. acre yield	
		Headed	Ripe		Leaf	Stem		1953	1952- 1953
		June	July		%	%		Bu.	Bu.
H44 x Mint. ²	2845	24	31	36	70	50	57.7	31.3	26.0
H44-Minh. x Marmin	12704	24	31	36	25	10	56.3	30.9	26.7
H44-Mint. ² x Marmin	2857	25	31	37	--	--	54.0	30.1	
Min.-Minh. x H44-Mint. ³	2856	26	8/1	34	--	--	58.0	29.9	
Mint. x H44-Mint. ³	2844	23	8/1	35	60	75	58.8	29.7	26.7
Minter	12138	23	30	33	20	50	58.3	29.4	29.9
Mint. x Tim.-Vulg. ²	12806	30	8/9	44	--	--	56.5	29.1	26.1
Blackhawk	12218	24	31	38	5	60	54.0	28.3	25.9
Mint.-Io. x H44-Mint. ²	2828	27	8/1	37	15	5	55.8	26.1	23.6
Minturki	6155	26	31	37	40	75	51.5	23.8	23.3
Iohardi	12510	22	27	36	60	95	49.2	17.4	17.7

Standard error of a difference = 2.88 bushels

Southwestern Minnesota (Westbrook)

Three 1/40 acre plots

Variety	C.I. or Minn. No.	Surviv- al %	Date ripe July	Plant height Ins.	Lodg- ing %	Stem rust 7/12 %	Weight per bushel Lbs.	Av.acre yield
								1953 Bu.
Minter	12138	96	16	43	95	70	47.8	20.2
H44 x Mint. ²	2845	87	20	45	90	83	48.7	17.0
Blackhawk	12218	96	20	47	95	93	45.3	16.8
Mint. x H44-Mint. ³	2844	95	16	41	45	87	47.0	16.7
H44-Minh. x Marmin	12704	86	15	39	75	82	44.0	15.9
Mint.-Io. x H44-Mint. ²	2828	79	22	39	90	87	49.0	13.4
H44-Mint. ² x Marmin	2857	91	19	44	45	92	42.3	12.3
Mint. x Tim.-Vulg. ²	12806	97	25	45	70	70	53.8	11.2
Minturki	6155	99	14	44	95	73	39.3	8.9
Iohardi	12510	93	12	43	95	93	38.3	7.9

Standard error of a difference = 1.69 bushels

Sheridan, Wyoming

Four plots; rod rows

Variety	C.I. or Sel. No.	Date		Plant height	Weight per bushel	Av. acre yield	
		Head- ed	Ripe			1953	1952-
							1953
		June	July	Ins.	Lbs.	Bu.	Bu.
Cheyenne	8885	22	21	36.3	54.1	18.4	19.5
Blackhull	6251	22	21	37.8	56.6	17.1	--
Turkey x Cheyenne	12711	17	21	36.8	53.8	16.5	--
Min.-Io.-H44 x Minturki ²	Minn.II-40-52	17	21	41.3	52.0	16.2	--
Oro x Marquillo-Oro	47511	17	14	37.5	53.1	15.8	--
Sioux	12142	22	21	35.3	51.8	15.0	--
Hope-Turkey x Cheyenne	12176	22	21	35.3	53.1	14.9	--
Hope x Cheyenne ²	437165	17	21	36.5	50.3	14.8	--
H44 x Mint. ⁴	Minn.-2844	22	20	37.5	56.4	14.6	--
Cheyenne-H44 x Chey.Sel-n	461529	17	19	34.8	55.1	14.5	--
H44 x Mint. ²	Minn.-2845	22	21	37.5	54.3	14.4	--
Nebred	10094	17	21	34.5	51.6	13.8	14.7
Hope x Cheynne ²	12717	17	19	37.0	50.8	13.7	--
Concho	12517	17	17	34.8	50.6	13.7	--
Kharkof	1442	22	21	34.5	50.8	13.5	14.6
Cheyenne x Turkey	N462239	17	21	34.0	51.6	13.4	--
Minturki	6155	22	21	37.3	52.0	13.3	--
Yogo	8033	17	21	37.3	53.0	13.0	13.6
Minter	12138	22	10	36.0	54.0	12.8	14.5
Yogo--"Good"	----	22	21	35.0	54.8	12.8	--
Kharkof	6938	22	21	36.8	49.3	12.5	--
Turkey x Oro	12705	21	21	35.5	50.0	11.5	13.9
Yogo - "Elite"	----	22	20	33.8	47.0	8.7	--
Mint. x Tim.-Vulg. ²	12806	22	21	31.8	--	7.0	--

Standard error of a difference = 1.70 bushels.

Huntley, Montana
Six plots, rod rows

Variety	C. I. or Sel. No.	Date headed	Plant height	Weight per bushel	Av. acre yield	
					1953	1952- 1953
		June	Ins.	Lbs.	Bu.	Bu.
Karmont	6700	23	30	49.3	13.9	14.2
Comanche	11673	17	34	47.5	13.8	13.9
Cheyenne	8885	22	31	51.3	13.7	15.1
Blackhull x Rex-Cheyenne M482296 1/		22	32	51.0	12.9	--
Newturk	6935	24	31	49.0	12.0	13.2
Kharkof	1442	24	31	50.0	11.8	13.1
Wasatch	11925	23	35	50.2	11.7	13.0
Yogo x Wasatch	Mont.8	23	31	47.5	11.5	12.5
Nebred x Com.-Med.-Hope	--	21	28	49.0	11.5	--
Tenmarq	6936	20	32	48.0	11.5	13.1
Yogo (Poor composite)	--	26	30	49.2	11.4	--
Yogo (Good composite)	--	26	30	49.8	11.4	--
Yogo x Wasatch	Mont.4	23	33	50.2	11.1	12.4
Yogo	8033	25	30	50.2	11.0	11.8
Yogo x Wasatch	Mont.6	23	31	51.1	11.0	12.4
Turkey x Oro	12705	23	31	47.1	10.9	12.4
Yogo (Elite composite)	--	26	29	49.1	10.6	--
Yogo x Wasatch	Mont.3	24	30	50.2	10.5	12.1
Sioux	12142	23	28	48.0	10.4	--
Minter	12138	25	32	49.0	10.3	12.6

Standard error of a difference = non-significant. 1/ C. I. 12933

Moccasin, Montana
Six plots, rod rows

Variety	C. I. or Sel. No.	Date headed	Plant height	Weight per bushel	Av. acre yield	
					1953	1952- 1953
		June	Ins.	Lbs.	Bu.	Bu.
Cheyenne	8885	28	41	59.5	42.6	31.1
Yogo x Wasatch	Mont.8	29	46	57.0	37.2	26.9
Tenmarq	6936	25	41	58.0	36.0	25.2
Newturk	6935	29	41	58.0	35.6	27.6
Kharkof	1442	28	41	58.5	35.1	24.9
Yogo (Good composite)		7/1	43	57.0	35.1	--
Blackhull-Rex x Cheyenne M482296		28	40	60.5	34.5	--
Comanche	11673	22	37	59.5	34.3	22.0
Yogo	8033	7/2	43	58.0	34.1	27.2
Sioux	12142	28	38	58.5	33.9	--
Minter	12138	30	43	58.5	33.7	24.9
Yogo x Wasatch	Mont.3	29	43	59.0	33.6	26.0
Yogo x Wasatch	Mont.4	29	43	59.0	33.4	26.3
Karmont	6700	30	42	59.0	33.2	24.9
Yogo x Wasatch	Mont.6	29	41	60.0	32.6	24.0
Turkey x Oro	12705	30	42	58.0	32.5	24.1
Yogo (Elite composite)		7/2	42	58.5	31.5	--
Nebred x Comanche-Med-Hope		27	39	58.5	30.4	--
Yogo (Poor composite)		7/3	43	58.0	30.4	--
Wasatch	11925	29	45	59.0	35.9	26.2

Standard error of a difference = 2.19 bushels.

Bozeman, Montana
Six plots, rod rows

Variety	C. I. or Sel. No.	Date headed	Lodg- ing 7/1	Weight per bushel	Av. acre yield	
					1953	1952- 1953
		June	%	Lbs.	Bu.	Bu.
Blackhull-Rex x Cheyenne	12933	28	11	61.2	88.0	67.5
Rio x Rex	M43096	18	32	62.0	86.9	68.2
Tenmarq	6936	24	52	61.5	85.0	--
Rio-Rex x Nebred	12930	22	23	61.9	81.5	63.8
Cheyenne	8885	27	48	62.3	81.1	62.5
Rio-Rex x Cheyenne	12925	22	7	62.6	80.5	65.6
Kharkof	1442	28	46	61.0	78.5	--
Rio-Rex x Nebred	12928	23	16	61.9	76.7	60.0
Turkey x Oro	12705	29	37	60.3	75.9	62.9
Newturk	6935	25	35	61.6	75.1	--
Rio x Rex	12926	18	30	61.7	74.3	58.1
Yogo x Wasatch	Mont.8	28	31	60.7	73.3	58.0
Karmont	6700	26	55	61.4	73.0	59.1
Comanche	11673	21	59	61.9	72.6	55.4
Sioux	12142	25	37	60.9	72.5	--
Yogo	8033	27	53	61.7	71.9	56.8
Yogo x Wasatch	Mont.4	27	42	61.3	70.9	54.3
Minter	12138	27	67	61.6	70.5	59.1
Wasatch	11925	27	59	61.7	69.9	53.2
Wich.-H44-Mint. ² x M.-T.-Kh. F.C.1197		23	87	60.3	69.7	--
Yogo x Wasatch	Mont.3	28	49	61.6	68.8	57.0
Yogo x Wasatch	Mont.6	28	28	62.6	66.8	51.3
Marq-Oro x Oro-Turkey-Florence	12939	23	69	61.3	65.4	53.4
Comanche x Oro-Turkey-Florence	12940	22	51	60.1	65.1	55.8
M.-O.-T. x Med.-Hope-Pawnee F.C.1199		22	79	60.9	64.1	--
Nebred x Com-Med.-Hope				60.2	63.6	--

Standard error of a difference = 5 bushels.
All varieties harvested Aug. 19. Near 100% lodged.

STANDARD ERRORS

Standard errors have been calculated on the yield data for the current year. A summary of these is shown in table 2 together with the number of plots and average yields at each station. A footnote indicates where nursery plots were used in place of field plots.

The analysis of variance was used on the data at each station. The square root of the mean square due to error, or the standard deviation, was divided by the square root of the number of replications of each variety to obtain the standard error of the mean. The standard error of a difference between any two variety means was obtained by multiplying the standard error of a mean by the square root of 2. Error expressed as a percentage of the mean is given also. These statistics have considerable practical value to the agronomist even though complete random arrangement of plots was not followed at all stations.

SUMMARY OF PLOT DATA

Summaries of yield data for 1953 and the recent two-year period appear in the sections which follow along with an average of other agronomic data for 1953.

Yields by Districts

There were eight varieties grown at eight stations in 1953 and three other varieties at seven of the stations in the southern district. Yields are shown in table 3. Early Blackhull and Concho were highest on the average. C. I. 12515, Ponca, and Comanche ranked next in order. Using comparable years, Triumph surpassed Early Blackhull by 0.7 bushel and Concho by 0.5 bushel. For the 1952-53 period, Concho exceeded all other varieties by 1.3 to 5.2 bushels per acre (table 4). It was highest at five of the eight stations and second in rank at two other stations. The similar line, C. I. 12515, ranked second to Concho at all stations except at Chillicothe where fully comparable yields are not available.

In the central district eight varieties were grown uniformly at five stations. Yields for 1953 are brought together in table 5. Pawnee and Red Chief averaged highest in yield, surpassing Kharkof by about 4.5 bushels and Tenmarq by about 3 bushels to the acre. Comanche and Kiowa yielded about the same, but were one bushel below Pawnee. For the two-year period, seven varieties were compared one or both years at eight stations. Pawnee averaged highest, followed closely by Kiowa, Comanche, and Ponca. These four varieties outyielded Tenmarq and Kharkof by approximately 4 bushels to the acre.

In the northeastern district only three varieties could be compared uniformly. Tables 7 and 8 show the results for 1953 and for the two-year period. In both comparisons Minter is the outstanding variety outyielding Minturki by six bushels in 1953 and about four in 1952-53. Iohardi was still lower on the average.

In table 9 are yield comparisons for varieties grown in the northwestern district at three stations. In 1953 and in the 1952-53 averages, Cheyenne ranked highest by about four bushels to the acre. Kharkof, Sioux, and Yogo yielded about the same. Minter has been only fair in this district. In the early and mid-thirties Cheyenne was tested in this district in plots and in the uniform winterhardiness nursery; hence those persons interested in this variety might consult earlier reports for additional data.

Summary of Agronomic Data

Insofar as the same kind of note was recorded on a series of varieties in a district, such data were averaged and have been placed in tables 10, 11, 12, and 13. In all cases the varieties are given in declining order of weight per bushel. Red Chief and Early Blackhull were heaviest in the southern district, Tenmarq was the lowest. In general, weights were lower than for several years. Early Blackhull headed and ripened earliest and this was a distinct advantage at most stations. Kharkof and Tenmarq were the latest to head but Red Chief was latest to ripen. Considering its time of heading, Red Chief has tended to exceed other varieties in length of fruiting period. This appears to be a part of an important physiological complex in Red Chief, favoring the production of well filled grain while other varieties lose water rapidly and ripen prematurely.

In the central district, Red Chief was again highest in weight per bushel and had a long fruiting period. Stem rust was important at three stations where Concho showed the most infection.

Survivals were comparable in the northeast and varieties headed and ripened within three days of one another. Leaf rust and stem rust infections were lowest on Minter. These diseases probably accounted for much of the spread between varieties both in yield and test weight, giving Minter an advantage.

Cheyenne was earliest and had the highest weight per bushel in the northwest. All test weights were low.

Table 2. Number of plots, average yields and standard errors for the variety tests at the cooperating stations in 1953.

State and Station	No. of plots	No. of var.	Average yield all var.	Standard error of a -----			Coefficient of variability
				Single plot	Difference in means	Mean	
			Bu.	Bu.	Bu.	Bu.	%
TEXAS							
Denton	10*	30	34.77	3.98	1.78	1.26	11.44
Bushland	7*	8	12.84	3.57	N.S.	1.35	27.80
Chillicothe	10*	23	11.55	5.38	2.40	1.70	46.53
NEW MEXICO							
Clovis	6	18	2.13	0.75	0.43	0.31	35.09
OKLAHOMA							
Stillwater	4	20	33.04	1.73	1.23	0.87	5.24
Cherokee	5*	19	23.02	2.73	1.73	1.22	11.89
Woodward	5*	19	18.44	2.02	1.28	0.90	10.97
Goodwell	5*	21	28.19	3.09	1.95	1.38	10.94
KANSAS							
Manhattan	6*	18	27.44	2.77	1.60	1.13	10.09
COLORADO							
Akron	4	15	8.00	0.87	0.62	0.44	10.90
NEBRASKA							
Lincoln	5	19	36.74	1.98	1.25	0.88	5.39
North Platte	5	19	35.10	1.78	1.13	0.79	5.07
Alliance	6*	17	23.71	4.47	2.48	1.82	18.85
WYOMING							
Sheridan	4*	24	13.81	2.40	1.70	1.20	17.38
SOUTH DAKOTA							
Brookings	2	8	30.54	0.90	0.90	0.64	2.95
MINNESOTA							
Waseca	3	12	34.24	3.14	2.56	1.81	9.17
St. Paul	3	12	32.55	2.18	N.S.	1.26	6.70
Grand Rapids	3	11	27.82	3.53	2.88	2.04	12.69
Southwest	3	10	14.03	2.06	1.69	1.19	14.68
MONTANA							
Huntley	6*	20	11.60	2.08	N.S.	0.85	17.93
Moccasin	6*	20	34.30	3.79	2.19	1.55	11.05
Bozeman	6*	26	73.91	8.61	5.00	3.52	11.65

* = Nursery plots. N.S. = non-significant at 5% level.

Table 3. Summary of average yields of varieties grown uniformly at 8 stations in the southern district in 1953.

Variety	C. I. No.	Average yield in bushels per acre at								Eight- station average
		Dent- on	Chilli- cothe	Bush- land	Clovis	Still- water	Cher- okee	Wood- ward	Good- well	
Early Blackhull	8856	39.5	12.5	11.3	3.0	28.0	32.0	22.4	32.7	23.93
Concho	12517	40.9	11.8	13.3	2.0	37.7	25.9	19.8	33.1	23.06
Hard Fed. Hybrid	12515	36.5	14.4	13.1	1.6	36.9	21.7	17.4	30.5	21.51
Ponca	12128	35.6	13.9	13.0	2.8	35.3	22.7	18.4	28.6	21.29
Comanche	11673	36.0	12.4	12.6	1.7	35.6	21.7	17.1	29.6	20.84
Red Chief	12109	32.0	8.1	13.9	2.3	32.7	23.6	17.6	28.4	19.83
Tenmarq	6936	36.4	10.9	11.3	2.2	31.9	19.0	16.5	23.9	19.01
Kharkof	1442	32.2	11.8	14.1	2.2	31.8	17.6	15.1	17.7	17.34
Triumph	12132	41.2	15.4	--	1.4	27.5	31.5	24.4	33.8	25.03 ^{1/}
Wichita	11952	39.0	14.4	--	2.0	25.3	29.0	21.5	35.8	23.86 ^{1/}
Kiowa	12133	39.5	11.3	--	2.3	34.5	24.9	20.5	30.0	23.29 ^{1/}

^{1/} Seven-station average. Comparable average for Early Blackhull is 24.3 bu., and for Concho is 24.5 bu.

Table 4. Two-year summary of varietal yields from plot tests in the southern district, 1952 and 1953.

Variety	C. I. No.	Average yield in bushels per acre at								Two- year average
		Dent- on	Chilli- cothe	Bush- land	Clovis	Still- water	Cher- okee	Wood- ward	Good- well	
Years grown.....	2	2	2	1	2	2	2	1	14	
Concho	12517	39.4	16.9 <u>1</u> / ₂	14.6	2.0	31.1	34.3	25.1	33.1	25.56
Hard Fed. Hybrid	12515	36.6	19.9	14.1	1.6	29.9	28.9	24.2	30.5	24.24
Early Blackhull	8856	34.7	15.9	13.0	3.0	24.1	34.5	22.8	32.7	23.26
Ponca	12128	34.0	18.1	13.9	2.8	28.3	30.3	21.5	28.6	23.11
Comanche	11673	34.4	18.6	13.9	1.7	27.9	28.8	21.8	29.6	23.01
Red Chief	12109	29.1	14.5	15.4	2.3	26.6	28.9	21.9	28.4	21.68
Tenmarq	6936	33.8	17.2	12.9	2.2	25.7	24.3	19.7	23.9	20.95
Kharkof	1442	30.9	18.8	13.9	2.2	26.5	23.7	18.7	17.7	20.35

^{1/} Grown only in 1953. General average used for 1952.

Table 5. Summary of average yields of the varieties grown uniformly at 5 stations in the central district in 1953.

Variety	C. I. No.	Average yield in bushels per acre at					Five- station average
		Man- hattan	Ak- ron	Lin- coln	North Platte	All- iance	
Pawnee	11669	28.8	8.6	35.4	35.3	30.3	27.68
Red Chief	12109	26.1	8.4	37.8	35.5	29.7	27.50
Comanche	11673	27.5	10.2	37.5	34.5	22.3	26.40
Kiowa	12133	28.3	9.1	37.9	34.2	22.3	26.36
Concho	12517	30.8	7.0	41.7	34.6	13.2	25.46
Ponca	12128	27.9	8.0	37.9	31.6	18.4	24.76
Tenmarq	6936	24.8	7.7	35.8	33.3	21.2	24.56
Kharkof	1442	23.8	7.5	31.1	32.5	20.7	23.12

Table 6. Two-year summary of average yields of varieties grown uniformly in the central district in 1952 and 1953.

Variety	C. I. No.	Average yield in bushels per acre at								Two- year average
		Man- hattan	Hays	Garden City	Colby	Ak- ron	Lin- coln	North Platte	All- iance	
Years grown.....		2	1	1	1	2	2	2	2	13
Pawnee	11669	33.2	32.4	23.5	44.8	13.7	35.8	34.1	36.2	31.28
Kiowa	12133	34.6	31.7	28.5	48.4	14.8	36.7	31.7	29.2	30.97
Comanche	11673	33.9	32.4	28.1	40.0	15.7	34.8	33.2	30.8	30.56
Ponca	12128	35.3	26.7	29.3	44.3	13.4	36.9	31.7	28.0	30.07
Red Chief	12109	31.8	1/27.3	26.3	36.1	13.8	37.0	31.4	30.7	29.16
Tenmarq	6936	30.2	29.5	26.6	37.7	12.8	31.8	30.7	25.6	27.38
Kharkof	1442	26.3	27.8	19.6	2/37.2	2/13.3	29.7	30.1	27.0	25.95

¹/ Not grown in 1952.

²/ Turkey.

Table 7. Summary of average yields of the varieties grown uniformly at 5 stations in the northeastern district in 1953.

Variety	C. I. No.	Average yield in bushels per acre at					Five- station average
		Brook- ings	Waseca	St. Paul	Grand Rapids	South west	
Minter	12138	34.1	35.8	34.5	29.4	20.2	30.80
Minturki	6155	26.6	29.1	32.7	23.3	8.9	24.12
Iohardi	12510	28.0	30.1	33.4	17.4	7.9	23.36

Table 8. Summary of two-year average yields of varieties grown in the northeastern district, 1952 and 1953.

Variety	C. I. No.	Average yield in bushels per acre at				Two- year average
		Brookings	Waseca	St. Paul	Grand Rapids	
Minter	12138	32.7	33.7	33.5	29.9	32.45
Minturki	6155	27.7	30.1	32.0	23.3	28.28
Iohardi	12510	28.7	31.1	28.4	17.7	26.48

Table 9. Summary of average yields of varieties grown uniformly at 3 stations in the northwestern district in 1953, and Two-year averages.

Variety	C. I. No.	Average yield in bushels per acre							
		1953 only				1952 - 53 av.			
		Sheri- dan	Hunt- ley	Mocc- asin	3-sta. Av.	Sheri- dan	Hunt- ley	Mocc- asin	2-year Av.
Cheyenne	8885	18.4	13.7	42.6	24.90	19.5	15.1	31.1	21.90
Kharkof	1442	13.5	11.8	35.1	20.13	14.6	13.1	24.9	17.53
Sioux	12142	15.0	10.4	33.9	19.77				--
Yogo -- Good	--	12.8	11.4	35.1	19.77				--
Yogo	8033	13.0	11.0	34.1	19.37	13.6	11.8	27.2	17.53
Minter	12138	12.8	10.3	33.7	18.93	14.5	12.6	24.9	17.33
Turkey x Oro	12705	11.5	10.9	32.5	18.30	13.9	12.4	24.1	16.80
Yogo -- Elite	--	8.7	10.6	31.5	16.93				--

Table 10. Agronomic data other than yield summarized from the variety test in the southern district, 1953.

Variety	C. I. No.	Average date		Average plant height Ins.	Average weight per bushel Lbs.
		Headed	Ripe		
		May	June		
Number of stations.....		6	5	7	7
Early Blackhull	8856	3	5	30	59.7
Red Chief	12109	14	14	33	59.4
Concho	12517	11	8	30	56.8
Comanche	11673	12	9	30	56.0
Ponca	12128	12	8	31	55.8
Hd. Fed. Hybrid	12515	12	8	31	55.8
Kharkof	1442	17	11	31	55.7
Tenmarq	6936	15	10	32	55.2

Table 11. Agronomic data other than yield summarized from the variety test in the central district, 1953

Variety	C. I. No.	Average date		Average plant height Ins.	Average stem rust %	Average weight per bushel Lbs.
		Headed	Ripe			
		June	July			
Number of stations.....		5	2	6	3	7
Red Chief	12109	3	10	33	15	59.0
Kiowa	12133	4	8	28	18	56.2
Comanche	11673	4	9	29	19	55.5
Pawnee	11669	3	7	28	15	55.3
Concho	12517	4	8	28	27	54.4
Ponca	12128	4	8	29	23	54.4
Tenmarq	6936	5	10	30	18	53.3
Kharkof	1442	7	11	30	15	53.2

Table 12. Average of agronomic data other than yield for uniform varieties grown in the northeastern district, 1953.

Variety	C. I. No.	Sur- viv- al	Date		Rust		Plant height	Lodg- ing	Weight per bushel
			Head- ed	Ripe	Leaf	Stem			
			% June	% July	%	%			
Number of stations.....	2	4	5	2	5	4	3	5	
Minter	12138	93	16	18	13	48	40	66	56.5
Iohardi	12510	90	14	15	50	71	41	66	51.5
Minturki	6155	95	17	18	35	61	42	67	51.2

Table 13. Average of agronomic data other than yield for uniform varieties grown in the northwestern district, 1952.

Variety	C. I. No.	Date Headed	Plant height Ins.	Weight per bushel Lbs.
		June	Ins.	Lbs.
Number of stations.....		3	3	3
Cheyenne	8885	24	36	55.0
Yogo -- Good	--	26	36	53.9
Minter	12138	26	37	53.8
Yogo	8033	25	37	53.7
Kharkof	1442	25	35	53.1
Sioux	12142	24	34	52.8
Turkey x Oro	12705	25	36	51.7
Yogo -- Elite	--	27	35	51.5

UNIFORM YIELD NURSERY

This uniform test was sown at 17 stations over a six-state area in the central and southern Plains. Kharkof, Blackhull, and Early Blackhull were retained as permanent check varieties. Ten new selections were added to the list grown in 1952 and five were discontinued giving a test of 26 varieties for 1953. The nursery at Akron, Ft. Collins, Colby, Alliance, and Ames had poor stands and were abandoned. The varieties grown in the 1953 tests were the following:

		C. I.	
	Name	No.	State No.
1	Kharkof	1442	
2	Blackhull	6251	
3	Early Blackhull	8856	
4	Pawnee	11669	
5	Comanche	11673	
6	Hd. Federation Hybrid	12515	
7	Concho	12517	
8	Com. x Blk.-Hd. Fed.	12710	
9	Com. x Chey.-Blackhull	12708	
10	Blackhull-Oro x Pawnee	12709	
11	Turkey x Cheyenne	12711	
12	Pawnee x Cheyenne	12715	
13	Hope-Turkey x Cheyenne	12716	
14*	Ea. Blk.-Teng. x Oro-Med.-Hope	12871	K. 471238
15*	Med.-Hope-Pn. x Oro-Ill. 1-Com.	12872	K. 49383
16*	Med.-Hope-Pn. x Oro-Ill. 1-Com.	12804	K. 49454
17*	Med.-Hope x Pawnee	12873	K. 50249
18*	Med.-Hope x Comanche	12874	K. 50266
19*	Pawnee x Cheyenne	12875	N. 483405
20*	Oro x Blk.-Hd. Fed.	13001	Wdw. 44h2-24
21	12701 x Wichita	12702	(Black glume comp.)
22	12701 x Wichita	12703	
23*	Kanred x Clarkan	13002	Tx.-2B, awned
24*	Kanred x Clarkan	13003	Tx.-2C, awnless
25	Pawnee sel. 33	12707	
26*	Martin-Tenmarq x Chiefkan	13004	Tx. 160-44-135

* New entries.

Among the new entries are several second cycle or backcrossed Hope derivatives which appear to have better agronomic characters than many tested previously. As will be seen later, these are very subject to drought and heat with the possible exception of C. I. 12871, a very early maturing and rather rust susceptible selection. An isogenic pair, except for awns, is represented from the Kanred x Clarkan cross. A new black glume composite of C. I. 12702 was substituted for the old mixed stock of this variety.

DATA OBTAINED

The results obtained with this nursery at the various stations is presented in table 14. Yields, test weights, and plant height are given for all stations. Certain other notes have been included when differential responses appeared among the varieties.

In most cases, the uniform yield nursery was grown on a station near the variety test. Therefore, the general conditions described earlier in this report for each station apply equally well to this nursery. There are some exceptions, however, where the distance separating the tests is rather great (10 miles at Stillwater), or where the soil conditions change markedly in a matter of a few feet. Comments about conditions in the paragraphs which follow are intended to supplement those given for the variety test. Dry seedbeds, general drought, and high temperatures during the fruiting period were the common conditions prevailing at most of the stations.

Three tests were completed in Texas. At Denton C. I. 12871, Concho, and C. I. 13004 yielded 40 or more bushels to the acre in contrast to Kharkof's yield of 29 bushels. Concho has the highest two-year average. Test weights were very good, ranging from 62 pounds down to 56.5. Stem rust from the inoculated breeding nursery spread over the test to give infections estimated at trace to 15%. Ten entries shattered 3 or 4%. At Chillicothe, C. I. numbers 12711, 12515, 13002, and Pawnee were the four highest in yield. These almost doubled the yield of the lower producing entries. Test weights were above 60 pounds for all except two entries. C. I. 12515 and C. I. 12711 have the highest two-year average yield. In the Bushland trial, a dry- and irrigated-land test was grown. Yields were quite low in both and average yield differences were barely significant. For the two-year period C. I. 12708, C. I. 12702, C. I. 12711, and Blackhull averaged 15 to 15.9 bushels to the acre.

Yields from 4.4 to 9.6 bushels per acre were recorded at Clovis, New Mexico, with Concho at the top of the list. However, the differences were not significant. The two-year averages favor Concho, C. I. 12710, Pawnee, Blackhull, and C. I. 12711. Weights per bushel were excellent in 1953. White spider mites (Paratetranychus) damaged Pawnee least and C. I. 12874 most.

Three tests in Oklahoma were completed. Early varieties were generally favored at Stillwater in contrast to their poor performance in plots at this station. Thin stands in Concho, C. I. 12715, Pawnee, and C. I. 12708 appeared to affect the yields of these varieties. Early Blackhull and C. I. 12871 were highest in yield, surpassing the lower yielding entries by 9 or 10 bushels. C. I. 12515 has the best two-year average. Lack of leaf rust at this station is unusual. At Cherokee, three early varieties exceeded 30 bushels to the acre in contrast to the fact that four of the latest varieties yielded below 20 bushels. Weight per bushel, yield, and time of maturity were correlated in this test. Two-year averages favor Early Blackhull and Concho. At Woodward, early varieties occupied three of the four top positions and had good weight per bushel. However, in the two-year averages, wheats of medium maturity show up best with C. I. 12702 and C. I. 12711 highest.

Two tests in Kansas emerged late but gave usable results at harvest-time. Concho, C. I. 12711, and Early Blackhull were the high three in yield at Manhattan. Weights per bushel generally were low. Best two-year averages were made by Early Blackhull, Concho, and C. I. 12515. Low yields and very low test weights occurred at Hays where the crop was late, thin, and subjected to extreme drought. Blackhull, Pawnee, and three unnamed selections were the five highest in yield. Five of the seven with lowest yield were Hope hybrids. Pawnee and Early Blackhull have the best two-year averages.

Tests were satisfactory (for use from) at Lincoln and North Platte, Nebraska. At the former station, Concho, C. I. 12871, Early Blackhull, and C. I. 12872 exceeded 43 bushels to the acre and had excellent test weights. Very late maturing varieties were lowest in both yield and weight per bushel. Stem rust came in at the

close of the season but did very little damage. Two-year averages above 40 bushels were made by Concho, C. I. 12711, and 12515. They exceeded Kharkof by 8 bushels to the acre. At North Platte, Concho, Pawnee, and five unnamed selections were best this year and had good test weights. Lowest yields were made by Early Blackhull and Pawnee Selection, both very early strains. Two-year average yields above 33 bushels were made by Concho, Pawnee, and C. I. numbers 12515, 12711, and 12715.

Twenty-four varieties were grown under irrigation at Hesperus, Colorado, with yields ranging from 40.4 to 25.8 bushels per acre. Nine of the eleven highest yielding entries were new in the test this year. The best two-year average was made by C. I. 12702.

Table 14. Yield and other data for varieties grown in the uniform yield nursery in cooperative experiments at 12 stations in the hard winter wheat region in 1953, and period averages.

Denton, Texas
Four plots

C. I. No.	Date		Plant height Ins.	Shatt- ering %	Stem rust %	Weight per bushel Lb.	Av. acre yield	
	Headed	Ripe					1953 Bu.	1952- 1953 Bu.
12871	4/20	5/28	37	T	3	62.0	42.3	--
12517	4/28	6/2	45	3	5	60.0	40.2	40.1
13004	5/4	6/4	47	0	8	58.0	30.0	--
13001	4/30	6/2	43	4	5	59.5	39.8	--
8856	4/15	5/26	43	0	3	61.5	39.5	35.3
11669	4/30	6/3	45	4	5	59.0	38.7	34.9
13003	5/3	6/6	49	0	13	56.5	37.7	--
12515	4/29	6/1	43	T	3	60.0	37.6	37.4
12708	4/30	6/3	47	4	13	59.5	37.1	35.5
13002	5/2	6/4	46	4	8	56.5	37.0	--
12711	4/29	6/2	41	4	15	59.5	36.6	37.1
12715	4/29	6/1	47	2	12	59.0	36.3	33.0
12702	4/25	5/30	41	2	T	59.5	36.1	36.8
12872	4/29	6/1	43	2	4	60.0	36.1	--
11673	4/27	5/31	44	T	8	59.0	35.9	35.0
12804	4/25	5/31	40	3	4	60.0	35.8	--
12873	4/29	5/30	42	0	5	60.0	35.3	--
12707	4/13	5/26	38	4	3	60.5	35.1	30.0
12709	5/1	6/4	44	T	3	61.0	35.0	34.3
12710	4/30	6/3	43	4	T	57.0	33.6	35.6
6251	5/3	6/5	49	T	10	60.5	32.0	33.8
12875	5/1	5/31	45	3	5	59.0	31.8	--
12716	5/2	6/1	45	2	3	58.0	31.3	31.6
12703	4/24	6/1	43	0	10	59.5	29.3	30.8
12874	4/28	5/30	40	0	3	59.0	29.3	--
1442	5/3	6/6	45	0	T	56.5	29.0	29.8

Standard error of a difference = 3.22 bus.

Chillicothe, Texas

Four plots

C. I. No.	Date			Growth rating 3/13	Plant height	Weight per bushel	Av. acre yield	
	First head	Full head	Ripe				1953	1952- 1953
	Apr.			%	Ins.	Lbs.	Bu.	Bu.
12711	24	5/1	6/3	70	26	62	22.2	25.0
12515	24	5/2	6/1	60	30	61	21.8	25.1
13002	27	5/2	6/1	90	30	58	21.7	--
11669	26	4/30	5/30	70	25	61	20.4	24.4
12871	9	4/16	6/1	60	30	64	20.2	--
12715	24	4/30	6/1	80	27	61	19.7	23.1
12710	24	4/30	6/1	100	27	60	19.6	23.7
12716	26	5/2	6/1	70	25	60	19.4	24.0
12517	22	4/27	5/31	80	26	63	19.3	--
12872	24	4/30	6/1	50	26	61	18.2	--
12804	22	4/28	6/1	50	25	61	18.1	--
12874	22	4/28	6/1	70	29	62	18.1	--
13003	27	5/2	6/3	90	30	59	18.0	--
12708	25	5/1	6/1	80	28	61	17.7	23.7
12709	25	4/30	5/30	70	26	60	17.4	23.1
12707	7	4/13	5/20	90	25	61	17.3	15.8
13004	26	5/1	5/31	70	22	61	16.7	--
12702	17	4/25	5/31	90	25	63	16.6	19.3
12875	26	5/2	6/1	70	27	61	16.2	--
6251	26	4/30	6/1	90	28	61	15.4	20.0
11673	24	4/30	5/31	90	30	61	15.0	22.1
8856	9	4/18	5/24	100	25	62	14.8	18.8
1442	27	5/4	6/2	80	31	60	14.5	22.1
12873	24	4/29	6/1	60	23	61	14.3	--
13001	25	5/1	6/1	80	25	60	12.8	--
12703	17	4/25	6/1	90	25	62	12.6	16.5

Standard error of a difference = 3.73 bushels.

Bushland, Texas
Seven plots, four irrigated

C. I. No.	Date		Plant height Ins.	Weight per bushel Lbs.	Av. acre yield			
	Headed	Ripe <u>1/</u>			Dry	Irrig.	Av.	1952-
	May	June			1953	1953	1953	1953
					Bu.	Bu.	Bu.	Bu.
12708	21	16	23	56.4	6.7	21.3	15.0	15.9
12702	14	13	23	58.3	6.9	20.7	14.8	15.4
1442	25	18	22	55.8	4.9	21.0	14.1	13.9
12873	18	16	18	56.8	6.6	19.7	14.1	--
12875	21	19	21	57.8	7.0	18.2	13.4	--
12517	17	15	21	56.4	6.5	18.5	13.3	14.6
12871	13	12	20	59.1	4.8	19.4	13.1	--
12515	18	15	21	55.4	5.1	19.2	13.1	14.1
12711	19	15	19	58.3	6.8	17.8	13.1	15.3
12872	20	16	22	57.4	7.1	17.1	12.8	--
12709	22	18	22	56.3	5.8	17.8	12.6	13.0
11673	19	16	21	56.1	5.5	18.0	12.6	13.9
12703	16	13	23	59.3	7.2	16.3	12.4	14.3
12804	17	16	22	55.8	6.8	16.5	12.3	--
12715	18	15	19	57.8	6.7	16.5	12.3	14.9
11669	17	13	20	56.1	5.7	16.0	11.5	13.7
8856	10	12	18	60.1	4.4	16.5	11.3	13.5
12707	7	10	21	59.3	3.3	17.3	11.3	13.3
6251	23	15	20	57.8	5.2	15.4	11.1	15.0
13001	20	17	21	57.3	6.1	14.6	10.9	--
13004	23	17	20	55.8	4.7	15.5	10.9	--
12874	20	17	19	57.8	3.8	16.2	10.9	--
12716	24	16	22	55.8	5.9	14.1	10.6	11.9
13002	24	19	20	54.9	5.8	13.9	10.4	--
13003	24	19	20	53.3	5.3	13.9	10.2	--
12710	23	17	21	54.8	4.0	14.6	10.0	12.2

1/ Irrigated plots only.

Standard error of a difference = 1.69 bus.

Clovis, New Mexico
Five Plots

C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield	
				1953	1952- 1953
	May	Ins.	Lbs.	Bu.	Bu.
12517	15	19	62.0	9.6	5.6
12710	17	21	60.2	9.0	5.3
11669	12	18	61.5	8.9	5.4
12708	14	21	61.7	8.7	4.8
12715	15	19	61.7	8.1	4.7
6251	16	20	62.6	8.0	5.1
12871	6	20	63.4	8.0	--
12711	15	17	62.7	7.9	5.0
13001	15	19	60.5	7.9	--
12515	16	21	60.9	7.7	4.7
13002	19	21	60.3	7.6	--
12709	15	18	61.9	7.5	4.4
13004	16	20	61.2	7.2	--
13003	19	21	59.8	7.1	--
12872	14	19	62.3	7.0	--
12716	19	20	60.7	7.0	4.7
12875	15	18	61.5	6.8	--
12873	13	18	59.9	6.1	--
8856	5	19	63.0	6.1	3.8
1442	22	19	60.1	6.1	3.9
12804	12	17	61.0	5.2	--
12702	9	16	60.5	5.1	3.5
12703	11	17	61.3	5.1	3.6
12707	4/30	17	61.1	4.9	2.9
11673	14	18	61.8	4.8	2.8
12874	15	18	61.7	4.4	--

Standard error of a difference = not significant.

Stillwater, Oklahoma
Four plots

C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
	Headed	Ripe			1953	1952- 1953
	May	June	Ins.	Lbs.	Bu.	Bu.
8856	8	8	33	60.5	29.4	31.8
12871	11	9	33	61.1	27.8	--
13001	17	10	37	58.8	27.3	--
13004	19	10	34	57.1	26.2	--
6251	20	12	37	59.2	26.2	30.4
12875	16	10	36	60.5	25.7	--
12515	17	11	37	57.1	25.4	33.4
12707	7	9	31	60.2	25.4	25.1
12711	18	11	35	58.9	24.4	29.9
12702	15	10	35	57.7	24.3	31.4
12804	15	9	35	57.5	24.1	--
12872	16	9	35	58.9	24.0	--
12708	18	11	36	58.1	23.9	30.1
13002	20	12	38	56.0	23.9	--
12874	16	11	32	60.0	23.8	--
12703	15	10	35	59.0	23.7	29.5
11669	18	11	34	56.9	23.0	26.8
1442	20	12	35	58.0	22.9	27.5
13003	21	13	38	55.1	22.3	--
12873	17	10	33	58.7	21.8	--
12709	20	12	36	57.8	21.8	31.9
12716	20	12	35	57.5	21.7	27.5
11673	17	11	36	56.4	21.4	29.5
12517	18	11	35	57.0	21.0	29.7
12715	20	12	36	58.2	19.9	26.4
12710	19	13	35	55.3	18.7	28.4

Standard error of a difference = 1.97 bus.

Cherokee, Oklahoma
Four plots

C. I. No.	Plant height Ins.	Weight per bushel Lbs.	Av. acre yield	
			1953 Bu.	1952- 1953 Bu.
8856	35	59.4	31.8	35.2
12707	31	59.0	31.8	32.4
12871	35	58.3	30.5	--
12804	35	54.8	27.6	--
12875	35	57.5	26.7	--
12874	34	57.8	25.9	--
12517	37	54.1	25.6	34.8
13004	37	53.1	25.6	--
12702	37	55.9	25.1	34.7
12873	33	54.5	24.4	--
12708	38	54.3	23.1	30.3
11669	36	53.6	22.9	28.9
13001	36	54.8	22.8	--
13002	39	51.8	22.8	--
12711	35	54.0	22.6	29.8
6251	39	55.5	22.5	28.8
12703	34	55.7	22.5	29.8
11673	35	55.3	22.1	30.6
13003	39	50.3	21.1	--
12515	38	52.3	20.9	29.5
12872	38	52.5	20.7	--
12715	38	55.8	20.6	29.6
1442	38	52.0	19.5	25.1
12710	36	49.8	17.9	25.7
12709	36	50.9	17.9	27.3
12716	38	53.3	17.4	25.7

Standard error of a difference = 2.03 bus.

Woodward, Oklahoma
Four plots

C. I. No.	Date		Plant height Ins.	Weight per bushel Lbs.	Av. acre yield	
	Headed May	Ripe June			1953	1952- 1953
					Bu.	Bu.
8856	11	8	30	57.9	20.7	23.1
13001	18	12	31	55.0	20.6	--
12871	15	11	29	58.2	20.1	--
12707	10	8	29	58.8	20.1	22.2
12702	17	11	32	55.2	20.0	26.9
12875	18	12	30	57.5	19.8	--
12708	19	13	31	55.1	19.5	24.6
12711	18	12	30	55.1	19.1	25.3
6251	19	13	31	55.8	18.7	23.6
12517	18	13	31	54.0	18.6	24.5
13004	19	13	31	53.1	18.1	--
12715	19	12	31	55.3	17.5	21.8
12710	20	14	31	51.2	17.4	25.0
12709	20	13	31	51.4	17.1	24.9
1442	20	14	31	54.2	16.8	21.9
11669	19	13	31	53.0	16.8	21.9
11673	18	13	31	52.5	16.8	22.5
12804	17	11	30	53.2	16.8	--
12873	18	12	29	54.2	16.8	--
12703	17	11	31	55.2	16.7	21.5
12515	18	12	32	52.0	16.7	25.5
13002	21	15	32	53.2	16.6	--
13003	20	14	31	51.5	16.6	--
12874	17	12	30	57.3	16.2	--
12872	19	12	32	52.2	15.4	--
12716	21	14	30	54.8	13.7	20.8

Standard error of a difference = 1.50 bus.

Manhattan, Kansas
Six plots

C. I. No.	Date headed	Plant height	Disease nurs.			Weight per bushel	Av. acre yield	
			Rust		bunt		1953	1952-
			leaf	stem			1953	1953
	May	Ins.	%	%	%	Lbs.	Bu.	Bu.
12517	28	27	5	90	2	55.5	30.5	38.6
12711	29	24	60	70	2	57.3	29.3	33.2
8856	25	27	80	40	80	29.0	29.2	39.1
12708	29	28	30	80	1	55.3	28.5	31.4
12715	28	25	90	60	50	56.5	28.5	30.7
12515	28	26	40	60	1	54.3	28.2	38.3
11669	28	25	70	60	8	55.3	27.0	29.8
6251	28	29	80	60	70	57.5	26.5	36.0
12702	28	27	5	10-60	60	55.5	26.5	33.8
1442	30	28	90	50	60	55.8	25.8	28.3
12873	28	24	T-5	T-5	10	55.3	25.3	--
12710	29	27	5	70	0	54.0	25.2	27.7
12707	23	25	80	70	40	57.8	25.1	33.1
13004	29	26	80	60	50	55.3	25.1	--
12872	29	27	T	T-30	80	55.5	25.0	--
12875	28	24	80	70	70	54.3	24.4	--
12871	28	25	T	60	4	58.3	23.9	--
11673	27	26	60	50	3	53.3	23.8	32.6
12804	28	26	T	T-30	30	54.3	23.6	--
12716	29	25	20	10	1	53.3	23.1	26.4
12703	28	24	5	20	80	56.3	22.7	32.5
13002	30	30	70	80	40	53.5	22.4	--
13001	29	26	40	40	40	55.3	20.6	--
12874	28	25	T	T	30	52.8	19.6	--
12709	30	28	20	50	4	53.5	17.9	30.9
13003	30	32	70	60	70	50.5	17.5	--

Standard error of a difference = 1.85 bus.

Hays, Kansas
Four plots

C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield	
				1953	1952- 1953
	June	Ins.	Lbs.	Bu.	Bu.
6251	2	21	54	12.7	22.4
12715	1	22	53	12.4	21.9
12711	3	21	53	12.3	22.7
12875	1	22	54	12.2	--
11669	1	21	50	12.1	24.1
13001	2	21	52	11.8	--
12871	1	22	54	11.7	--
12515	2	22	50	11.2	23.2
13002	4	22	51	11.2	--
11673	2	22	49	11.1	23.5
12703	1	21	53	11.1	19.7
12709	3	22	50	11.0	20.9
13004	1	21	50	11.0	--
12708	3	21	53	10.9	20.6
8856	5/31	21	55	10.9	24.0
12716	3	22	51	10.8	17.6
12517	2	21	50	10.7	21.2
12710	3	21	49	10.6	15.7
13003	4	23	49	10.6	--
12873	2	22	49	10.1	--
12804	1	22	49	9.8	--
12702	2	21	53	9.6	19.4
1442	4	21	51	9.2	16.4
12874	2	21	52	8.8	--
12872	3	23	50	8.7	--
12707	5/31	20	56	8.2	21.1

Standard error of a difference = 1.18 bus.

Lincoln, Nebraska
Five Plots

C. I. No.	Date		Plant height Ins.	Stem rust %	Weight per bushel Lbs.	Av. acre yield	
	Headed	Ripe				1953	1952- 1953
	May	June				Bu.	Bu.
12517	27	25	37	6	60.5	46.6	40.5
12871	27	25	35	2	63.0	46.3	--
8856	25	23	36	3	62.2	44.3	37.8
12872	28	26	36	4	60.9	43.3	--
12711	29	26	34	12	59.9	42.8	41.3
12708	29	27	36	8	59.7	41.7	36.8
12715	29	28	36	15	60.3	41.4	39.1
11669	28	25	36	4	60.0	40.9	38.1
6251	29	26	36	4	61.2	40.5	37.6
12515	28	25	36	4	59.7	40.5	40.7
12873	29	25	33	6	60.0	39.3	--
12707	23	23	36	1	61.2	38.7	35.5
11673	29	25	35	2	59.2	38.6	36.4
12874	27	25	33	T	60.7	38.5	--
12709	30	27	36	6	59.3	38.2	35.9
12875	29	26	34	4	61.0	38.1	--
12702	27	23	37	1	61.5	37.8	38.1
13004	30	29	35	14	58.5	36.7	--
13001	29	25	35	8	60.0	36.4	--
12804	27	27	34	3	59.3	35.6	--
12710	30	28	35	4	57.0	34.8	33.0
12716	31	28	34	4	58.5	34.6	34.1
12703	26	24	33	3	61.8	34.7	34.0
13002	31	7/1	36	15	57.6	34.3	--
1442	6/1	29	34	5	57.4	31.9	32.4
13003	6/1	7/1	37	22	56.3	31.0	--

Shattering of 2% for 12872, 12707 and 1% for 12517, 12708, 12702.
Standard error of a difference = 2.38 bus.

North Platte, Nebraska
Three plots

C. I. No.	Date		Plant height	Weight per bushel	Av. acre yield	
	Headed	Ripe			1952-	1953
	June		Ins.	Lbs.	Bu.	Bu.
12517	5/28	27	24	60.5	34.1	33.8
12702	5/28	27	26	61.0	33.9	32.0
12873	5/28	27	24	58.5	33.8	--
12515	5/29	28	25	60.0	32.9	33.1
12804	5/27	27	24	62.0	32.5	--
12871	5/27	26	25	62.5	32.3	--
11669	5/29	27	24	58.0	31.3	33.6
12874	5/27	27	24	60.5	30.6	--
11673	5/29	27	24	58.5	30.2	31.3
12872	5/28	28	25	60.0	30.2	--
12715	5/31	28	24	59.0	30.1	33.2
12716	6/1	29	23	58.0	29.5	29.8
13002	6/3	7/1	25	57.0	28.9	--
12709	5/31	28	24	58.5	28.9	27.1
6251	5/31	29	25	59.0	28.8	28.8
12711	5/29	27	23	60.0	28.8	33.6
12708	6/1	29	24	59.0	28.4	27.8
12875	5/29	27	23	60.5	27.9	--
13004	5/31	28	24	59.5	27.1	--
12710	6/2	29	24	57.0	27.0	27.1
13001	5/31	29	23	59.5	26.7	--
12703	5/28	27	25	60.0	25.9	27.7
1442	6/4	29	25	56.5	25.5	27.4
13003	6/3	7/2	27	56.5	24.4	--
12707	5/23	25	26	62.0	23.5	27.8
8856	5/25	26	26	61.5	23.0	26.8

Standard error of a difference = 2.69 bus.

Hesperus, Colorado
Five plots irrigated

C. I. No.	Date		Plant height Ins.	Weight per bushel lbs.	Av. acre yield	
	Headed	Ripe			1953	1952- 1953
	June	July			Bu.	Bu.
12871	16	26	31	61.5	40.4	--
13003	22	28	33	59.5	38.6	--
12872	18	28	31	61.0	38.1	--
12709	16	25	29	59.0	36.8	33.3
13004	20	27	31	60.0	36.6	--
13001	16	25	30	60.0	36.1	--
13002	21	28	32	60.0	36.0	--
12875	17	27	30	59.5	35.3	--
12708	16	23	29	58.0	34.3	35.0
12874	15	27	30	60.0	34.2	--
12804	15	25	30	59.0	34.0	--
12710	18	24	31	57.5	33.9	30.5
12702	13	23	30	60.5	33.7	36.7
11673	14	23	30	58.5	32.8	30.3
8856	12	21	32	58.5	32.1	31.4
11669	14	24	29	57.5	30.5	29.5
12517	13	24	29	58.0	29.5	32.9
12783	18	23	29	59.0	29.5	--
1442	21	28	32	59.0	28.3	31.0
12515	14	23	31	57.5	28.2	33.5
12707	9	20	30	58.0	26.8	28.6
12703	13	23	31	58.5	25.9	26.1
6251	15	24	31	60.0	25.8	30.6
12711	Not grown					
12715	Not grown					

Standard error of a difference = 4.0 bushels.

STANDARD ERRORS

A statistical summary of the yields produced in the various uniform nursery tests is made in table 15. Standard methods of computing the values were used as explained in connection with the plot tests. Standard deviation in percent of the general average indicates the relative variation at each of the stations. Variability was somewhat higher at most stations than in 1952.

SUMMARY OF NURSERY YIELDS

Yields at 11 stations have been brought together in table 16. This shows how each of the 26 entries performed over the region in 1953. It is of special interest that a Hope derivative (C. I. 12871) is highest in average yield. This is an early maturing variety, about equal to Wichita in this respect, but rather unsatisfactory for stem rust resistance. It ranked first in Texas, second in Oklahoma, 13th in Kansas, and second in Nebraska. Concho, Early Blackhull, C. I. 12711, and C. I. 12515 ranked second to fifth, respectively, in the 11-station averages. Pawnee was seventh. The isogenic pair from Kanred x Clarkan averaged 21.5 bushels in the case of the awned and 19.7 bushels for the awnless selection. This order of rank was consistently shown in each of the state averages. Kharkof had the lowest general average among the 26 entries.

Two-year averages of yield are summarized in table 17. Concho and the similar variety C. I. 12515 ranked highest at the ten stations followed by C. I. 12711 and 12702. Kharkof was lowest. Concho ranked first in Texas, third in Oklahoma, third in Kansas, and second in Nebraska. This variety has consistently given high yields over the region for several years. It is being increased for distribution in Oklahoma, Kansas, and Texas.

SUMMARY OF AGRONOMIC DATA

Data other than yield have been averaged and appear in table 18. Varieties are in order of declining average weight per bushel. It is obvious that C. I. 12871 and Early Blackhull averaged heaviest followed by Pawnee Selection. Many entries averaged below 58 pounds. The bearded isogenic selection was one pound heavier than the awnless one. Pawnee Selection and Early Blackhull were the earliest maturing entries with C. I. 12871 occupying a position of moderate earliness. Late maturing varieties generally ranked lowest in weight per bushel and in the regional yield averages. Seven varieties averaged over 30 inches tall but the total range was not great. Stem rust was quite variable at the stations being complicated by maturity time of the variety, host resistance and race of rust probably present. C. I. numbers 12874, 12873, and 12716 had the lowest readings.

Table 15. Number of plots, average yields, and standard errors for the uniform yield nursery at the various stations in 1953.

State and Station	No. of plots	No. of varieties	Average yield all var. Bus.	Standard error of a			Coefficient of variability %
				Single plot Bus.	Difference between means Bus.	Mean Bus.	
TEXAS							
Denton	4	26	35.69	4.55	3.22	2.27	12.74
Chillicothe	4	26	17.60	4.75	3.73	2.38	26.99
Bushland	7	26	12.24	3.17	1.69	1.20	25.88
NEW MEXICO							
Clovis	5	26	6.89	2.79	N.S.	1.25	40.49
OKLAHOMA							
Stillwater	4	26	23.84	2.78	1.97	1.39	11.66
Cherokee	4	26	23.54	2.87	2.03	1.44	12.20
Woodward	4	26	17.80	2.11	1.50	1.06	11.88
KANSAS							
Manhattan	6	26	24.88	3.20	1.85	1.31	12.84
Hays	4	26	10.80	1.66	1.18	0.83	15.41
COLORADO							
Hesperus	5	24	31.56	6.32	4.00	2.83	20.03
NEBRASKA							
Lincoln	5	26	38.75	3.77	2.38	1.69	9.73
North Platte	3	26	29.09	3.30	2.69	1.90	11.33

Rank: 11
Average: 25.1
Station: 5
Average:

19.6
19.7
19.9
20.3
20.5
20.6

Table 18. Summary of agronomic data other than yield for varieties grown in the uniform yield nursery, 1953.

Variety	C. I. No.	Date		Plant height	Stem rust	Weight per bushel
		headed	ripe			
		May	June	In.	%	Lbs.
Number of stations		10	7	11	3	11
E. Bkl.-Tenq. x Oro-Med.-Hope	12871	13	13	28	22	60.4
Early Blackhull	8856	10	9	28	15	60.2
Pawnee Sel. 33	12707	8	8	27	25	59.7
Blackhull	6251	20	14	30	25	58.6
Pawnee x Cheyenne	12875	19	14	29	26	58.6
12701 x Wichita	12703	15	12	28	11	58.5
Med.-Hope x Comanche ²	12874	17	13	28	1	58.3
12701 x Wichita	12702	15	12	29	20	58.3
Turkey x Cheyenne	12711	18	14	28	32	58.2
Pawnee x Cheyenne	12715	19	14	29	29	58.0
Comanche x Chey.-Bkl.	12708	19	14	30	33	57.6
Oro x Bkl.-Hd. Fed.	13001	19	14	29	18	57.5
Concho	12517	17	13	29	33	57.5
Med.-Hope-Pn. x Oro-Il1. I-Com.	12872	18	13	30	16	57.3
Med.-Hope-Pn. x Oro-Il1. I-Com.	12804	16	13	28	12	57.1
Med.-Hope x Pawnee ²	12873	18	13	27	5	57.1
Pawnee	11669	18	13	29	23	56.8
Hard Federation Hybrid	12515	18	13	30	22	56.6
Martin-Tenq. x Chiefkan	13004	20	14	29	27	56.6
Comanche	11673	17	13	29	20	56.6
Bkl.-Oro x Pawnee	12709	20	14	29	20	56.4
Hope-Turkey x Cheyenne	12716	21	14	29	6	56.4
Kharkof	1442	22	16	30	18	56.1
Kanred x Clarkan	13002	21	16	31	38	55.4
Kanred x Clarkan	13003	22	17	32	32	54.3
Comanche x Bkl.-Hd. Fed.	12710	20	15	29	25	55.0

UNIFORM WINTERHARDINESS NURSERY

As in previous years, two uniform hardiness nurseries were maintained. The "supplementary" unit contains new selections of interest to workers in all parts of the region. It was a single-row nursery planted in duplicate series in 1952-53 at Alliance, Akron, Brookings, St. Paul, Moccasin, and Dickinson. Some usable data this year were obtained at Alliance and Dickinson. These were summarized and sent out before harvest to breeders concerned with the entries in the test.

The "uniform" replicated nursery contains varieties of interest to workers in the more northern states, for the most part. In 1952-53, varieties were tested at eight stations. Survivals appear in table 19. Waseca was the only station where differential killing was observed and this was of doubtful value. Also shown in table 19 are yields of grain and weights per bushel from one South Dakota station and four Wyoming stations. At Brookings, both yields and test weights bear some relationship to stem rust infection although earliness was a major factor. C. I. 12716, C. I. 12717, N461529, and Concho had the highest yields and the heaviest test weights. At Sheridan, Cheyenne, Blackhull, and C. I. 12711 made the best yields but all test weights were low. At Gillette, Kharkof and N.47511 had the highest yields. Blackhull and C. I. 12711 had the heaviest weights per bushel. At Newcastle, C. I. 12711, Sioux, and Minturki came off with the best yields, and Nebred had the heaviest weight per bushel. Six varieties at Laramie yielded over 60 bushels to the acre, two of which tested over 60 pounds to the bushel. At the latter station stands were quite variable, hence most comparisons are non-significant.

Earliness, plant height, and rust reactions are indicated in table 20. Concho was earliest to head; Nebred, C. I. 12711, and N461529 had the shortest straw; however, there was considerable shifting of rank among the entries at the various stations. It is obvious that within the limits encountered in this set of varieties, two to six inches of straw length could be eliminated from the taller wheats with considerable benefit in agronomic characters at no sacrifice in yield or weight per bushel. Stem rust varied with the station, the variety, time of maturity, and race of rust. At Brookings, C. I. 12716, C. I. 12717, and Minter had the lowest readings. At Laramie, C. I. 12717 and N.461529 were lowest but even these showed 38% of rust. Leaf rust infection at Laramie gave very sharp and unusual differences. Six varieties had no leaf rust, among which were the varieties Nebred and Kharkof that are susceptible to most races.

Table 19. Summary of survivals, yields and weights per bushel recorded on entries in the uniform winter-hardiness nursery, 1953.

Variety	C. I. or Sel. No.	Survival at Waseca %	Bushels per acre at ----					Weight per bushel (lbs.) at				
			Brook- ings	Sher- idan	Gillette	New- castle	Laramie	Brook- ings	Sher- idan	Gill- ette	New- castle	Laramie
Kharkof	1442	23	32.8	13.5	22.8	22.4	64.3	56.0	50.8	56.6	59	57.9
M. C. Kharkof	6938	27	16.5	12.5	18.7	12.7	43.3	47.5	49.3	55.6	51	55.1
Nebred	10094	25	29.1	13.8	21.5	15.3	55.8	57.5	51.6	56.6	60	59.3
Minturki	6155	28	24.9	13.3	18.8	27.2	60.5	55.5	52.0	55.5	57	58.2
Minter	12138	38	32.8	12.8	15.4	16.0	40.8	59.5	54.0	55.4	56	60.4
Turkey x Oro	12705	27	30.8	11.5	20.8	23.5	58.3	57.5	50.0	56.3	58	59.9
Sioux	12142	40	32.9	15.0	20.8	28.1	61.3	57.0	51.8	56.0	58	58.4
Turkey x Cheyenne	12711	42	31.8	16.5	21.6	29.3	40.3	57.0	53.8	58.0	57	60.2
Yogo	8033	38	29.2	13.0	20.6	22.8	46.5	56.0	53.0	54.8	57	57.5
Yogo -- Elite	--	37	25.5	8.7	--	--	53.5	55.0	47.0	--	--	57.4
Yogo -- Good	--	37	26.0	12.8	--	--	32.3	55.0	54.8	--	--	58.0
Hope-Turkey x Chey.	12716	32	40.5	14.9	14.1	21.7	44.5	62.0	53.1	57.5	57	59.8
Hope x Cheyenne ²	12717	48	39.6	13.7	15.0	23.1	54.5	62.0	50.8	54.0	57	61.1
Concho	12517	45	39.6	13.7	20.8	18.8	37.0	60.0	50.6	55.8	59	60.0
Chey.-H44 x Chey. Sel.	N461529	43	36.4	14.5	--	--	46.8	60.0	55.1	--	--	59.9
Chey. Sel. x Turkey	N462239	47	29.4	13.4	--	--	52.3	56.2	51.6	--	--	59.2
H44 x Minturki ⁴	M.2844	40	--	14.6	--	--	38.5	--	56.4	--	--	60.1
H44 x Minturki ²	M.2845	28	--	14.4	--	--	18.8	--	54.3	--	--	56.0
Mint. x Tim. - Vulg. ²	12806	37	--	7.0	--	--	18.0	--	--	--	--	60.0
Oro x Mgo. - Oro	N47511	--	--	15.8	22.6	16.1	60.5	--	53.1	57.0	58	60.1
Blackhull	6251	--	--	17.1	21.7	19.5	68.3	--	56.6	58.0	59	61.1
Cheyenne	8885	--	--	18.4	19.1	20.5	66.5	--	54.1	56.3	57	58.8
L. S. D. 5%	--	--	5.8	3.4	4.8	8.9	25.2	--	--	--	--	--

Table 20. Summary of miscellaneous data recorded on entries in the uniform winterhardiness nursery, 1953.

Variety	C. I. or Sel. No.	Date headed			Plant height			Stem rust %			Leaf rust Laramie %
		Brook- ings	Sher- idan	Lar- amie	Brook- ings	Sher- idan	Lar- amie	Brook- ings	New- castle	Lar- amie	
		June	June	June	Ins.	Ins.	Ins.				
Kharkof	1442	14	21	29	36	35	40	35	14	100	0
M. C. Kharkof	6938	17	22	7/3	36	37	40	35	19	100	38
Nebred	10094	12	17	28	34	35	33	35	14	100	0
Minturki	6155	14	22	7/1	38	37	38	55	16	100	38
Minter	12138	14	22	7/1	36	36	37	20	16	100	25
Turkey x Oro	12705	14	21	29	37	36	36	30	15	100	25
Sioux	12142	12	21	29	35	35	34	35	14	100	25
Turkey x Cheyenne	12711	10	17	7/2	34	37	32	55	17	88	0
Yogo	8033	16	22	7/9	37	37	41	45	17	100	38
Yogo -- Elite	--	16	22	7/8	36	34	42	40	--	100	50
Yogo -- Good	--	15	22	7/1	37	35	37	50	--	100	25
Hope-Turkey x Cheyenne	12716	12	17	29	36	35	36	15	15	100	38
Hope x Cheyenne ²	12717	11	17	25	35	37	34	18	17	38	38
Concho	12517	9	17	25	37	35	31	35	15	80	0
Chey.-H44 x Chey. Sel.	N461529	13	17	28	34	35	35	28	--	38	63
Chey. Sel. x Turkey	N462239	13	17	28	36	34	35	25	--	98	0
H-44 x Minturki ⁴	M.2844	--	22	30	--	38	38	--	--	63	75
H44 x Minturki ²	M.2845	--	22	7/3	--	38	38	--	--	88	37
Mint. x Tim.-Vulg. ²	12806	--	22	30	--	32	45	--	--	70	58
Oro x Mgo.-Oro	N47511	--	17	28	--	38	37	--	15	80	0
Blackhull	6251	--	21	25	--	38	36	--	14	100	38
Cheyenne	8885	--	21	28	--	36	38	--	16	95	13

UNIFORM PROTEIN NURSERY

Eight varieties of wheat were grown in a replicated yield nursery at four stations in the southern district and at Pullman, Washington to determine the degree to which varieties lay down differing amounts of protein in the grain. Three varieties in southeastern U. S. trials had shown high protein content in that region, namely Atlas 66, Atlas 50, and C. I. 12461. These with five Plains varieties comprised the entries uniformly grown in the protein nursery.

Yield of grain and percentage of protein are shown in table 21. In general it may be seen that Wichita yielded highest and had the lowest protein content. This is not a perfect negative relationship however, and when the other varieties are considered, several irregularities appear. Except at Pullman, the two Atlas strains were highest in protein content and yielded almost as much grain as several of the other entries. From the analysis of variance for protein content, varietal differences were highly significant. The variety x location interaction was also highly significant but much smaller than for varietal differences.

Protein per acre was produced in the greatest amount by Wichita followed in order by Atlas 50, Atlas 66, and Quanah. The experiment is being repeated in 1954.

Table 21. Yield of grain and protein content for varieties grown in the uniform protein nursery at five stations in 1953. 1/ 2/

Variety	C. I. or Sel. No.	Yield and protein content at --									
		McGregor, Texas		Denton, Texas		Chillicothe, Texas		Stillwater, Oklahoma		Pullman, Washington	
		Yield	Protein	Yield	Protein	Yield	Protein	Yield	Protein	Yield	Protein
		Bu.	%	Bu.	%	Bu.	%	Bu.	%	Bu.	%
Atlas 66	12561	20.9	17.8	30.6	14.2	5.3	19.0	24.5	18.9	38.2	9.0
Atlas 50	12534	19.4	17.7	29.5	14.2	8.8	17.7	26.4	18.7	36.0	9.0
Trumbull x Frondoso	12461	16.4	15.9	32.4	12.5	7.4	17.5	27.9	16.4	27.8	10.7
29-34-275 D. C.	12511	22.7	16.5	32.4	12.4	10.2	16.7	24.0	16.6	35.5	10.0
Quanah	12145	23.9	15.8	33.5	12.2	9.4	16.5	25.0	16.2	38.7	9.4
Comanche	11673	23.9	15.1	35.7	11.7	8.8	17.3	22.4	16.4	42.2	8.8
Frisco	13106	18.8	15.0	30.2	12.3	5.6	17.0	30.8	15.1	26.8	12.5
Wichita	11952	27.6	13.8	37.3	10.8	15.7	15.2	29.4	14.9	42.3	8.7

1/ Four replications at each station, except three at Pullman. Four-station average (Pullman omitted):

Variety	Yield-Bu.	Protein-%
Atlas 66	20.3	17.48
Atlas 50	21.0	17.08
Tr. x Frond.	21.0	15.58
29-34-275 D. C.	22.3	15.55
Quanah	23.0	15.18
Comanche	22.7	15.13
Frisco	21.4	14.85
Wichita	27.5	13.68

2/ From co-variance analysis the following r values were calculated:

	d.f.	McGreg- or	Denton	Chilli- cothe	Still- water	Level of significance	
						5%	1%
Replications	2	-.986	-.021	-.953	-.285	.950	.990
Varieties	6	-.492	-.783	-.849	-.512	.706	.834
Within varieties	20	-.080	-.581	-.851	-.618	.422	.536
Total	30	-.467	-.717	-.844	-.468	.349	.448

DATA FROM THE DISEASE NURSERIES

The uniform bunt nursery was grown at eight stations in 1953. A separate report on this test has been prepared which is available for cooperators and other interested persons. Several of the entries were resistant to dwarf bunt. This disease has spread up and down the Rocky Mountains and has increased in Pennsylvania, New York, and Eastern Canada.

The uniform rust nursery data likewise will appear as a separate report.

DATA FROM THE QUALITY LABORATORY

Grain harvested from the uniform plots, uniform yield nursery, and uniform protein nursery along with that from promising new strains of local interest was sent by cooperators to the Federal Hard Wheat Quality Laboratory for milling and baking studies. Results on these samples will appear in a separate report prepared by laboratory workers.

Table 16. Summary of the average yields in bushels per acre made by the 26 entries grown in the uniform yield nursery at 11 stations in 1953, with state averages.

Variety	C. I. No.	Texas					Clovis,		Oklahoma				Kansas				Nebraska		
		Denton	Chilli- ccthe	Bushland	Average	Rank	New Mexico	Still- water	Cherokee	Woodward	Average	Rank	Man- hattan	Hays	Average	Rank	Lincoln	North Platte	Average
E. Bkl.-Tenq. x Oro-Med.-Hope	12871	42.3	20.2	13.1	25.2	1	8.0	27.8	30.5	20.1	26.1	2	23.9	11.7	17.8	13	46.3	32.3	39.7
Concho	12517	40.2	19.3	13.3	24.3	2	9.6	21.0	25.6	18.6	21.7	13	30.5	10.7	20.6	3	46.6	34.1	40.0
Early Blackhull	8856	39.5	14.8	11.3	21.9	14	6.1	29.4	31.8	20.7	27.3	1	29.2	10.9	20.1	5	44.3	23.0	33.0
Turkey x Cheyenne	12711	36.6	22.2	13.1	24.0	4	7.9	24.4	22.6	19.1	22.0	12	29.3	12.3	20.8	2	42.8	28.8	35.0
Hard Federation Hybrid	12515	37.6	21.8	13.1	24.2	3	7.7	25.4	20.9	16.7	21.0	15	28.2	11.2	19.7	6	40.5	32.9	36.0
Comanche x Chey.-Bkl.	12708	37.1	17.7	15.0	23.3	6	8.7	23.9	23.1	19.5	22.2	10	28.5	10.9	19.7	7	41.7	28.4	35.0
Pawnee	11669	38.7	20.4	11.5	23.5	5	8.9	23.0	22.9	16.8	20.9	18	27.0	12.1	24.6	1	40.9	31.3	36.0
12701 x Wichita	12702	36.1	16.6	14.8	22.5	10	5.1	24.3	25.1	20.0	23.1	7	26.5	9.6	18.1	10	37.8	33.9	35.0
Pawnee x Cheyenne	12715	36.3	19.7	12.3	22.8	8	8.1	19.9	20.6	17.5	19.3	23	28.5	12.4	20.5	4	41.4	30.1	35.0
Martin-Tenq. x Chiefkan	13004	40.0	16.7	10.9	22.5	9	7.2	26.2	25.6	18.1	23.3	6	25.1	11.0	18.1	9	36.7	27.1	31.0
Pawnee x Cheyenne	12875	31.8	16.2	13.4	20.5	21	6.8	25.7	26.7	19.8	24.1	4	24.4	12.2	18.3	11	38.1	27.9	31.0
Blackhull	6251	32.0	15.4	11.1	19.5	23	8.0	26.2	22.5	18.7	22.5	9	26.5	12.7	19.6	8	40.5	28.8	34.0
Med.-Hope-Pn. x Oro-Ill. I-Com.	12872	36.1	18.2	12.8	22.4	11	7.0	24.0	20.7	15.4	20.0	21	25.0	8.7	16.9	18	43.3	30.2	36.0
Med.-Hope-Pn. x Oro-Ill. I-Com.	12804	35.8	18.1	12.3	22.1	12	5.2	24.1	27.6	16.8	22.8	8	23.6	9.8	16.7	21	35.6	32.5	34.0
Pawnee Sel. 33	12707	35.1	17.3	11.3	21.2	19	4.9	25.4	31.8	20.1	25.8	3	25.1	8.2	16.7	22	38.7	23.5	31.0
Med.-Hope x Pawnee ²	12873	35.3	14.3	14.1	21.2	18	6.1	21.8	24.4	16.8	21.0	17	25.3	10.1	17.7	14	39.3	33.8	36.0
Oro x Bkl.-Hd. Fed.	13001	39.8	12.8	10.9	21.2	16	7.9	27.3	22.8	20.6	23.6	5	20.6	11.8	16.2	23	36.4	26.7	31.0
Kanred x Clarkan	13002	37.0	21.7	10.4	23.0	7	7.6	23.9	22.8	16.6	21.1	14	22.4	11.2	16.8	20	34.3	28.9	31.0
Comanche	11673	35.9	15.0	12.6	21.2	17	4.8	21.4	22.1	16.8	20.1	19	23.8	11.1	17.5	15	38.6	30.2	34.0
Med.-Hope x Comanche ²	12874	29.3	18.1	10.9	19.4	24	4.4	23.8	25.9	16.2	22.0	11	19.6	8.8	14.2	25	38.5	30.6	34.0
Bkl.-Oro x Pawnee	12709	35.0	17.4	12.6	21.7	15	7.5	21.8	17.9	17.1	18.9	24	17.9	11.0	14.5	24	38.2	28.9	33.0
Comanche x Bkl.-Hd. Fed.	12710	33.6	19.6	10.0	21.1	20	9.0	18.7	17.9	17.4	18.0	25	25.2	10.6	17.9	12	34.8	27.0	30.0
Hope-Turkey x Cheyenne	12716	31.3	19.4	10.6	20.4	22	7.0	21.7	17.4	13.7	17.6	26	23.1	10.8	17.0	17	34.6	29.5	32.0
12701 x Wichita	12703	29.3	12.6	12.4	18.1	26	5.1	23.7	22.5	16.7	21.0	16	22.7	11.1	16.9	19	34.7	25.9	30.0
Kanred x Clarkan	13003	37.7	18.0	10.2	22.0	15	7.1	22.4	21.1	16.6	20.0	20	17.5	10.6	14.1	26	31.0	24.4	27.0
Kharkof	1442	29.0	14.5	14.1	19.2	25	6.1	22.9	19.5	16.8	19.7	22	25.8	9.2	17.5	16	31.9	25.5	28.0