UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Field Crops Research Branch

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE PLOT AND NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1954

Agronomy Department
Nebraska Agricultural Experiment Station
Lincoln, Nebraska
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By

L. P. Reitz and V. A. Johnson 1/

CONTENTS

1/ The writers express appreciation to Dorothy Wilson, Erick Nilson, and Charles F. Pulham for their assistance in preparing this report.

EXPERIMENTS IN 1954

In 1954 there were many of the same hazards encountered in 1952 and 1953. Drought and high temperatures dominated conditions in much of the hard winter wheat belt again this year, especially in the high Plains. Stand establishment was slow and erratic over wide areas. 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 4-or 5-year drought. Wheat acreage abandoned by harvesttime was 18 percent for the United States as a whole. In 1953 this was 17.9 percent compared with 1952 when 10.6 percent of what was sown was not harvested for grain according to the United States Crop Report. In the current year, the percentage abandoned by states was New Mexico 87.8, Texas 34.1, Colorado 47.5, Oklahoma 16.4, Kansas 18.2 Iowa 10.3, Nebraska 14.8, Wyoming 23.9, Montana 10.6, South Dakota 21.3, and Minnesota 24.0. On the remaining acreage, below-average yields were harvested in New Mexico, Texas, Colorado, and Wyoming. In the other states of the region, yields per acre were average or above.

The present drought emphasizes the fact that limited moisture is a usual condition in the Great Plains and that each crop generally exhausts all of the moisture 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. When breeding for the many other objectives of improvement, drought hardiness must be kept in mind.

The year was one of light leaf rust and septoria except in the eastern part of the region. Scattered and generally light outbreaks of insects were reported. The wheat curl mite was widespread and the yellow streak mosaic was abundant and caused extensive losses. Soil-borne mosaic in Kansas and Oklahoma did some damage. Stem rust threatened the crop and caused severe losses in some communities in Nebraska and South Dakota but caused light damage only south of Nebraska. High temperatures adversely affected grain plumpness, especially late-maturing fields or varieties, and gluten quality was reduced for bread-making purposes in some instances.

Uniform experiments were planned and carried out as in previous years. This report follows the pattern that is familiar to cooperators. Dry seed-beds prevented some cooperators from getting reliable stands, and in other cases variable stands contributed heavily to experimental error. In spite of this handicap, a number of experiments were carried to completion, many with high yields. The uniform variety-protein test was continued 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. 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:	
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Havre, North Montana Branch Station	L. O. Baker*
Huntley, Huntley Field Station	Stanley Brooks
CANADA DEPARTMENT OF AGRICULTURE:	
Lethbridge, Alta., Agriculture Experiment Station	J. E. Andrews

* Denotes federal employees, full-time or part-time.

Major changes in personnel included the advancement of S. C. Salmon to Assistant Head of the Cereal Crops Section, Field Crops Research Branch, of L. P. Reitz, who was placed in charge of the wheat project, and of V. A. Johnson, who assumed the duties of Coordinator in this Region.

ACCESSION NUMBERS ASSIGNED

Cereal Investigation numbers (C.I.) 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, Maryland, under the direction of D. J. Ward. Cereal Investigation numbers take precedence over state and local numbers in this report and it is hoped that they will be used whenever available in published reports and in correspondance. New numbers assigned this year are as follows:

C.I. No.	Name	State No.
13006	Pawnee x Nebred	Nebr. Sel. 51A801
13017	Pawnee x Cheyenne	Nebr. Sel. 47NP1642
13018	Ponca x Cheyenne	Nebr. Sel. 521630
13019	Ponca x Cheyenne	Nebr. Sel. 521632
13020	Triticum-A. elongatum x Pawnee	Okla. Stw. 524467
13021	Pawnee x Nebred	Nebr. Sel. 51A823
13022	Cimarron x Hope - Cheyenne	Tex. 256-50-7
13023	(Kanred-Hard Federation-Tenmarq x Mediterranean-Hope) x Cimarron	Tex. 274-51-A7
13024	(Cimarron x Hope-Mediterranean) x Comanche	Tex. 275-51-A26
13025	Comanche x C.I. 12250	Nebr. Sel. 532101
13112	Mediterranean-Hope x Pawnee[3]	Kans. Sel. 51348
13113	(Chinese[2] x A. elongatum) x Pawnee	Kans. Sel. 526365
13114	(Wheat-Rye x A. elongatum) x Cheyenne	Kans. Sel. 52452
13115	(Cheyenne x Chiefkan) x H44-Minturki,[2] II-36-1	Minn. II-44-8
13146	Bowie	Tex. 3708-22
13147	Travis	Tex. 3708-32

NEW VARIETIES

In Texas, two selections of the hybrid (Sinvalocho-Wichita x Hope-Cheyenne) x Wichita were given initial increase. These are C.I. 12702 and C.I. 12703.

Concho (C.I. 12517), a selection from the cross Comanche x Blackhull-Hard Federation, was further increased in Oklahoma. This hard winter wheat has shown wide adaptation in regional tests, bunt resistance, soilborne mosaic resistance, tolerance to streak mosaic virus, leaf rust resistance, and excellent quality.

In Kansas, C.I. 12518 the sister line of Kiowa mentioned last year was further increased. Final decision as to whether C. I. 12518 will be substituted for Kiowa in the foundation and certified seed program or be given a new name has not been made. The former has better quality and longer mixing time than the latter.

UNIFORM VARIETIES IN PLOTS OR IN ADVANCED NURSERIES

The uniform variety tests were set up by districts as in past years. 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 includes Wyoming and Montana. Some special trials such as the bunt test are region wide, while others involve two or three districts.

The advanced or field plot variety test included the following varieties in 1954 and 1955:

Variety	C.I. No.	1954				1955			
		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		
(Sinvalocho-Wichita x Hope-Cheyenne) x Wichita	12702	X				X			
Ponca	12128	X							
Hard Federation Hybrid	12515	X							
Concho	12517	X	X			X	X		
Kiowa 12133 or	12518		X				X		
Minturki	6155			X				X	
Yogo	8033				X				X
Minter	12138			X	X			X	X
Iohardi	12510			X				X	
H44-Minn. 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 1954. Summary tables for various data are given in Tables 2 to 8.

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 1953 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 several stations to bring certain plantings up. Poor stands and drought contributed to failures at Clovis, Hays, and North Platte; hail destroyed the crop at Alliance. Drought and high 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. Leaf rust was present in southern Texas during the fall and winter, but made slow spread here and elsewhere in the spring. Consequently, very little rust developed until late in the season or not at all at stations where no artificial inoculum was scattered. 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. Extensive 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.

High yields and test weights were common this year at Denton. Wichita, Triumph, C.I. 12702, Knox, and Ponca exceeded 40 bushels to the acre; Vigo and Denton yielded less than 31 bushels. Red Chief had a test weight of 64 pounds, Concho and Blackhull averaged 63 pounds. Differences in shattering were marked as were infections from leaf rust. Low stem rust readings on most varieties reflect the late start of the disease this year. Early ripening wheats such as Wichita and Triumph have the best 2-and 5-year averages although among varieties grown 10 or more years Comanche ranks highest in relative yield.

In the Chillicothe test yields were about average. Late varieties gave the highest yields this year. All varieties got off to a good start but subsoil moisture was not adequate and as spring wore on much deterioration occurred during periods of above-normal temperatures. General rains in mid-April brought remarkable recovery to most varieties although early maturing ones were not able to tiller sufficiently to equal midseason varieties in yield. Quality of grain was excellent. Concho, Westar, Comanche, and Apache are among the best yielding varieties at this station.

Concho gave the highest average yield at Bushland this year and it has the best period averages. Early varieties have not had much advantage at this station.

Concho was highest in yield at Stillwater and has an outstanding record at this station. The heading dates are earlier than usual but ripening is about average for the location. Early varieties suffered more from drought than midseason ones.

At Cherokee a severe storm just before harvest brought about extensive lodging. Leaf and stem rust were abundant and good readings were obtained. In spite of the adversities, good yields were obtained with midseason to late varieties occupying all of the positions with yields above 25 bushels to the acre. Concho has the best record.

The unfavorable season at Woodward held yields at or below 20 bushels except for Concho which yielded 22.9. Shattering in Kharkof was unusually high for this variety in comparison with the other varieties.

At Goodwell two fall irrigations got the crop off to a good start, but during much of the spring period drought conditions adversely affected plant development. It is not possible to explain why Early Blackhull and Apache ranked so high in view of the medium to low rank of Triumph and Wichita. Some shattering occurred in Wichita, but this was not seen in Triumph. Apache and Concho have the best period averages.

The Manhattan data show that Ponca, Comache, and Concho made the highest average yields, but the results are actually very difficult to interpret since varietal performance in the plots grown at the Agronomy Farm was quite different from that observed in the Cereal Nursery. Although not calculated, the variety x location interaction surely would have been significant. Concho has the highest 2-year average yield and Ponca excells in the 5-year averages. All varieties surpass Kharkof in relative yield.

Drifting soil at Hays caused great variability in stand survival so no yields were taken. Grain quality varied from excellent to very poor.

At Garden City yields were very low. Kiowa and Kanking surpassed 5 bushels to the acre in contrast to Concho and Ponca with yields below 2 bushels. The latter varieties survived with very poor stands. This test was planted late and was damaged by soil drifting.

Modest yields were obtained at Colby but the rank of the varieties is not significant in many cases and is difficult to explain in others. The crop was under drought stress all year and this with winter loss probably account for such varietal differences that exist. In a later date of planting (October 19) Kanking yielded 18 bushels in contrast to 5 bushels from an adjacent Comache plot, illustrating the great varietal differences that may exist under such conditions.

At Akron low yields were recorded. Late varieties tended to rank low while early varieties gave better yields. Comanche and Kiowa have the best 5-year average yields followed by Wichita.

At Fort Collins very good yields were harvested. At this station the crop benefits from the effects of irrigation. Kiowa, Cheyenne, Tenmarq, and Concho yielded over 60 bushels to the acre. All varieties tested above 60 pounds to the bushel. Kiowa and Pawnee have done well at this station. Stem rust developed on several varieties but did not damage any to a marked degree.

Excellent yields at Lincoln were produced from land irrigated once in the fall. The crop grew with limited rainfall all season. Late varieties were damag-

ed by rust and drought. Moderately early sorts produced the best yields and the highest test weights. Leaf and stem rust were abundant, coming in from general spore showers. A rainy period in mid-June enabled stem rust to develop rapidly. Concho and the Pawnee x Cheyenne selections have the best 2-year averages with Pawnee ahead for periods longer than 5 years.

Late emergence in dry soil at Ames resulted in poor stands. Stem and leaf rust were quite severe. Consequently, test weights were very low. Minter with the best stand gave the highest yield.

Rather good yields were produced at Havre but all test weights were below 60 pounds. Newturk and Kharkof ranked highest, closely followed by Cheyenee and three hybrid selections.

Table 1. Yield and other data for varieties of winter wheat grown in replicated plots in cooperative experiments at 16 stations in the region in 1954, with period average yields.

Denton, Texas
Ten plots, rod rows

Variety	C. I. or Sel. No.	Date Headed	Date Ripe	Plant height	Shattering	Rust Leaf	Rust Stem	Weight per bushel	Av. Acre yield 1954	Av. Acre yield 1953-1954	Av. Acre yield 1948-1954 2/	No. years grown	Percent of Kharkof
		April	May	In.		%	%	Lbs.	Bus.	Bus.	Bus.		
Wichita	11952	9	13	30	M	50	10	62.0	40.9	40.0	29.4	10	109.3
Triumph	12132	7	10	29	O	60	T	62.0	40.7	41.0	28.6	7	107.4
12701 x Wichita	12702 Bl.	13	17	36	M	10	T	62.5	40.6	38.5	--	4	117.3
Knox 1/	12798	4	5	34	VH	E	T	60.5	40.6	--	--	1	---
Ponca	12128	13	17	31	H	25	T	61.0	40.5	38.1	28.6	5	109.2
12701 x Wichita	237-46-26-2	6	7	30	H	E	T	60.5	39.6	38.6	--	4	108.6
Early Blackhull	8856	7	11	34	M	50	T	62.5	39.3	39.4	27.9	19	120.9
Tenmarq	6936	16	22	36	L	60	T	61.5	38.8	37.6	28.0	21	117.6
Comanche	11673	14	19	36	T	50	T	60.5	38.5	37.3	28.0	14	129.4
Blackhull	6251	18	23	36	O	70	5	63.0	38.4	37.1	28.3	21	109.5
Concho	12517	14	19	26	M	T	T	63.0	38.3	39.6	--	3	121.1
Red Chief	12109	16	22	36	O	70	10	64.0	37.1	34.6	25.7	10	102.7
Westar x Hope - Turkey	253-48-34	14	20	31	T	T	20	58.0	36.6	36.3	--	2	108.4
Fultz-Trumb.x Wab-Minh-Purp-M.A. 1/	12748	5	6	32	VH	E	T	60.5	36.4	--	--	1	---
Marquillo - Oro x Wichita	218-48-35	17	21	29	T	T	T	61.5	36.1	35.0	--	2	104.5
Kanred	5146	19	25	28	L	25	T	61.0	35.8	34.3	27.1	21	111.8
Quanah	12145	13	19	33	L	5	T	61.0	35.2	34.7	26.7	6	104.7
Kharkof	1442	19	25	28	L	25	5	60.5	34.7	33.5	26.2	21	100.0
Frisco 1/	13106	9	14	26	VH	5	T	61.0	34.6	32.8	--	2	97.9
Frondosa x Trumb.-Hope-Hussar 1/	12658	14	21	27	L	5	20	58.5	34.1	--	--	1	---
Red May 1/	7250-1	14	17	28	H	5	5	60.0	34.0	31.3	--	11	108.2
Mediterranean 1/	10086	14	17	27	H	5-50	20	61.0	33.4	31.6	24.5	21	103.2
12701 x Wichita	12703	11	18	32	L	T-30	T	61.0	32.4	31.2	--	4	98.5
Frondosa x Trumb.-Hope-Hussar 1/	12659	18	23	31	L	5	30	58.5	32.2	--	--	1	---
Vigo 1/	12220	17	22	29	H	50	20	59.0	30.6	30.6	--	3	86.3
Denton 1/	8265	18	22	32	M	5-50	20	58.0	29.2	29.4	24.3	21	105.0

1/ Soft wheats.
2/ Average of five years, no data in 1949 and 1951.
Standard error of a difference = 2.47 bushels.

Chillicothe, Texas
Ten plots, rod rows

Variety	C. I. or Sel. No.	Date Headed	Date Ripe	Plant height	Fall grazing	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
		April		Ins.	%	Lbs.	Bus.	Bus.	Bus.		
Kanred	5146	19	6/3	28	110	62	30.6	--	--	16	103.3
Concho	12517	18	6/1	29	110	64	29.9	20.9	--	3	107.6
Kharkof	1442	21	6/5	29	110	62	28.2	20.0	23.7	17	100.0
Westar	12110	19	6/1	31	120	63	26.4	17.7	--	10	116.5
Wester x Hope-Turkey	253-48-34	15	5/29	29	90	61	25.6	18.1	--	2	90.5
Tenmarq	6936	16	5/31	28	110	63	25.4	18.2	22.0	17	104.9
Ci. 12701 x Wichita	12702W	16	5/26	28	120	63	25.4	--	--	1	---
Martin-Tenq. x Chiefkan	13004	20	6/2	27	130	62	25.3	19.3	--	4	98.6
Martin-Tenq. x Chiefkan	160-49-A8	20	6/2	31	90	63	25.1	--	--	1	---
Blackhull	6251	12	6/2	28	100	63	24.8	--	--	16	103.8
Blue Jacket	12502	19	6/3	29	110	64	24.7	17.6	--	3	87.7
Martin-Tenq. x Chiefkan	160-49-A13	18	5/31	31	100	63	24.2	--	--	1	---
Ci. 12701 x Wichita	12702 Bl.	17	5/25	30	90	63	24.1	17.3	23.2	6	107.9
Apache	12122	14	5/25	28	110	63	24.0	17.7	--	7	124.1
Mqo.-Oro x Wichita	218-48-35	19	6/3	30	110	63	23.5	16.7	--	2	83.5
Kiowa	12133	15	5/26	26	90	63	23.3	17.3	22.4	7	100.0
Ponca	12128	17	5/31	27	110	63	22.3	18.1	21.7	7	102.8
Comanche	11673	18	5/30	28	100	62	21.6	17.0	21.8	17	110.7
Ea. Bkhl.-Tenq.x Oro-Med.-Hope	12871	10	5/26	23	90	64	20.3	--	--	1	---
C. I. 12701 x Wichita	12703	13	5/29	28	110	62	19.6	15.3	--	4	76.2
Red Chief	12109	18	6/3	31	110	63	19.6	13.9	19.2	13	101.8
Wichita	11952	12	5/22	25	100	63	19.2	16.8	21.2	13	108.6
Triumph	12132	9	5/22	24	130	62	16.3	15.9	16.0	9	91.0
Early Blackhull	8856	7	5/23	23	120	61	15.8	14.2	18.7	17	101.5
C. I. 12701 x Wichita	237-46-26-2	9	5/24	27	100	61	15.5	15.9	--	4	89.2

Standard error of a difference = 1.52 bushels.

Bushland, Texas
Twelve plots, rod rows, three irrig.

Variety	C.I.No.	Date Headed	Date Ripe	Plant height	Weight per bu.	1954 Av. acre yield Sept.14 Dry	Oct.20 Dry	Irrig.	Av. 1954	Av. acre yield 1953-1954	1950-1954	No. Years Grown	Percent of Kharkof
		May	June	Ins.	Lbs.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.		
Concho	12517	4	21	25	57.5	17.4	19.3	50.8	26.2	19.8	--	4	123.1
C.I. 12701 x Wichita	12702W	4	22	31	61.0	14.0	23.0	44.2	23.8	--	--	1	--
C.I. 12701 x Wichita	12702B1.	4	22	28	60.0	14.2	16.4	43.1	22.0	--	--	1	--
Ponca	12128	3	22	27	61.0	12.3	15.6	45.2	21.4	17.2	13.4	6	103.3
Red Chief	12109	7	23	29	58.0	11.8	19.7	34.4	19.4	16.7	15.7	11	114.4
Comanche	11673	5	22	26	58.0	13.3	10.5	38.7	18.9	15.8	13.4	15	111.5
Kharkof	1442	11	23	35	55.5	10.4	14.5	33.5	17.2	15.7	13.1	18	100.0
Early Blackhull	8856	4/25	17	25	62.0	9.8	13.3	29.8	15.7	13.5	12.1	17	95.8
Tenmarq	6936	18	23	30	51.5	11.6	11.2	26.8	15.3	13.3	12.1	18	103.0

Standard error of a difference = 2.31 bushels.

Stillwater, Oklahoma
Four 1/68 acre plots

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1954	1953-1954	1950-1954	No. years grown	Percent of Kharkof
		April	June	Ins.	Lbs.	Bus.	Bus.	Bus.		
Concho	12517	26	7	22	62.7	22.8	30.3	27.8	5	125.1
Clarkan	8858	29	11	29	63.1	20.5	24.4	22.1	18	101.9
C.I.12701 x Wichita	12702B1	26	7	25	61.9	20.3	--	--	1	---
Westar	12110	28	10	23	61.0	19.3	27.3	24.1	9	110.9
Cheyenne	8885	30	11	23	61.2	19.0	25.5	22.8	22	102.8
Oro x Bkhl.-Hd. Fed.	13001	27	10	22	61.0	18.6	26.9	--	2	109.1
Com. x Chey.-Bkhl.	12708	29	11	22	61.5	18.2	27.4	--	3	110.9
Red Chief	12109	29	11	27	63.6	18.0	25.4	22.1	12	104.0
Kharkof	1442	30	11	23	61.2	17.5	24.7	22.2	22	100.0
Comanche	11673	28	11	23	61.3	17.4	26.5	22.7	14	108.1
Tenmarq	6936	29	12	25	61.8	17.2	24.6	21.2	22	98.2
Ponca	12128	29	10	21	62.2	16.4	25.9	22.5	7	101.8
Wichita	11952	22	3	22	61.4	15.7	20.5	21.0	10	92.8
Pawnee	11669	28	9	21	60.7	14.3	24.4	21.4	14	108.4
Early Blackhull	8856	22	4	22	61.5	13.7	20.9	19.9	22	93.7
Triumph	12132	23	2	20	59.9	9.8	18.7	19.1	12	98.0

Standard error of a difference = 1.42 bushels.

Cherokee, Oklahoma
Five plots, rod rows

Variety	C.I. No.	Plant height	Lodging 6/16	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
		Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.		
Concho	12517	28	69	20	25	58.3	32.3	29.1	32.9	5	136.9
Oro x Blkhl.-Hd. Fed.	13001	32	73	20	75	59.0	30.7	27.1	--	2	125.5
Cheyenne	8885	33	46	35	10	57.8	27.7	23.2	24.3	9	107.7
Comanche x Chey.-Blkhl.	12708	29	64	10	15	57.0	26.7	24.9	--	3	117.3
Red Chief	12109	30	31	25	100	61.0	25.8	24.7	25.6	9	116.0
Kharkof	1442	36	81	5	20	58.0	25.5	21.6	24.0	0	100.0
Comanche	11673	26	68	20	75	57.3	25.2	23.5	26.1	9	112.9
Early Blackhull	8856	26	76	15	25	59.9	24.7	28.4	26.2	9	112.0
Tenmarq	6936	32	66	25	15	57.9	24.5	21.8	23.4	9	94.2
Ponca	12128	27	61	8	80	57.3	24.3	23.5	22.6	7	91.1
Pawnee	11669	27	55	40	25	57.8	24.2	23.5	23.7	9	106.6
Westar	12110	32	56	3	75	56.3	24.0	22.3	24.7	9	109.0
Triumph	12132	23	63	30	25	58.3	23.9	27.7	24.9	9	115.2
Wichita	11952	25	60	45	75	58.9	23.3	26.2	28.0	9	116.8
12701 x Wichita	12702 Bl.	27	59	2	90	58.8	22.9	--	--	1	---
12701 x Wichita	12703	28	49	1	20	58.0	20.7	--	--	1	---

Standard error of a difference = 2.03 bushels.

Woodward, Oklahoma
Five plots, rod rows

Variety	C. I. No.	Date Headed	Date Ripe	Plant height	Shattering	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
		May	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
Concho	12517	4	12	24	T	61.0	22.9	21.4	22.2	5	131.2
Cheyenne	8885	6	14	28	5	59.3	20.9	18.7	20.9	23	110.2
Oro x Bkhl.-Hd. Fed.	13001	4	13	25	T	59.3	20.3	19.0	--	2	123.8
Red Chief	12109	3	13	29	T	62.5	20.2	18.9	20.5	13	117.8
C.I.12701 x Wichita	12702B1.	4/30	11	25	T	60.5	18.9	--	--	1	---
Ponca	12128	3	11	24	T	61.0	18.0	18.2	17.2	7	105.9
Com. x Chey.-Bkhl.	12708	5	14	26	T	60.2	17.4	18.0	--	3	120.8
Comanche	11673	3	12	25	4	60.3	17.0	17.1	18.7	17	115.9
Pawnee	11669	2	11	26	8	59.7	16.9	17.7	18.0	17	122.5
Westar	12110	2	10	29	5	59.0	16.9	17.3	18.2	11	110.3
Triumph	12132	4/28	6	23	T	60.0	16.3	20.4	17.0	10	108.4
Wichita	11952	4/29	7	22	T	59.6	15.6	18.6	18.5	13	118.3
Kharkof	1442	6	14	30	28	59.0	15.6	15.4	16.9	23	100.0
Tenmarq	6936	5	14	29	18	60.0	15.2	15.9	17.4	23	106.1
Early Blackhull	8856	4/29	7	23	T	60.5	15.1	18.8	17.5	23	99.0
C.I.12701 x Wichita	12703	3	12	24	3	59.2	13.8	--	--	1	---

Standard error of a difference = 1.60 bushels.

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

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1947-1954 1/	No. years grown	Percent of Kharkof
			June	Ins.	Lbs.	Bus.	Bus.	Bus.		
Early Blackhull	8856	4/25	8	22	60.8	26.8	29.8	25.6	14	99.8
Apache	12122	4/27	9	20	61.0	24.7	29.6	--	5	164.0
Comanche	11673	5/3	10	22	60.0	24.4	27.0	26.5	10	130.1
Concho	12517	5/2	11	23	60.5	23.0	28.1	--	2	174.2
Ponca	12128	5/7	12	23	59.0	21.3	25.0	23.7	5	117.0
Oro x Blkhl.-Hd. Fed.	13001	4/29	11	22	59.0	19.8	--	--	1	---
Red Chief	12109	5/7	14	25	61.2	19.5	24.0	23.9	8	123.6
Com. x Chey. - Blkhl.	12708	5/13	12	23	59.6	16.5	23.9	--	2	148.0
Triumph	12132	4/26	7	21	58.0	16.4	25.1	24.0	6	113.8
C.I.12701 x Wichita	12703	4/29	9	21	58.5	16.2	--	--	1	---
Cheyenne	8885	5/15	16	24	60.9	15.7	19.1	22.0	13	105.0
Wichita	11952	4/26	8	20	60.0	14.9	25.4	25.2	8	133.3
Kharkof	1442	5/13	12	24	58.1	14.5	16.1	20.3	14	100.0
Pawnee	11669	4/29	11	22	57.2	13.8	21.4	20.9	10	120.3
Tenmarq	6936	5/7	10	24	59.1	13.6	18.8	21.2	14	98.4
C.I.12701 x Wichita	12702Bl.	4/29	9	21	58.5	13.5	22.0	--	2	136.3
Westar	12110	4/29	10	25	57.8	12.1	20.7	24.2	8	124.6

1/ Average of five years. No data in 1950, 1951, and 1952.
Standard error of a difference = 1.94 bushels.

Manhattan, Kansas
Eight plots, rod rows 1/

Variety	C.I. No.	Date headed	Plant height	Lodging	Rust Leaf 2/	Rust Stem 3/	Weight per bushel	Av. acre yield 1954	1953-1954	1950-1954	No. years grown	Percent of Kharkof
		May	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.		
Ponca	12128	16	30	50	7	70	62.2	39.7	33.8	40.1	10	144.2
Comanche	11673	17	31	55	43	60	61.6	39.0	33.3	38.9	17	136.3
Concho	12517	16	30	40	12	70	62.9	38.6	34.7	--	3	138.4
Med.-Hope-Pn. x Oro-Ill.1-Com.	12804	16	27	3	3	60	62.1	38.4	--	--	1	---
Pawnee	11669	16	29	50	60	60	62.0	38.3	33.6	38.9	17	148.8
Blue Jacket	12502	20	36	15	60	--	63.0	37.9	32.5	35.6	8	130.1
Tenmarq	6936	20	31	35	63	50	60.1	37.0	30.9	36.5	23	118.3
Kiowa	12133	16	28	25	60	60	62.0	37.0	32.7	39.2	9	137.7
KanKing	12719	15	28	50	77	70	64.0	35.7	33.6	--	2	124.4
Mqo.-Oro x Oro-Tenq.	12406	17	28	8	12	60	61.0	34.9	31.6	37.9	6	129.1
Wichita	11952	12	30	35	73	50	62.6	34.7	31.2	36.8	15	135.5
Turkey	1558	21	30	50	67	50	59.3	32.7	28.9	33.7	23	104.6
Red Chief	12109	18	33	50	73	--	63.4	32.0	29.1	--	13	119.4
Kharkof	1442	24	33	45	70	50	58.0	30.2	27.0	32.0	23	100.0
Triumph	12132	7	23	30	63	50	61.0	28.6	28.3	39.8	9	141.0
Pawnee Sel. 33	12707	6	23	30	70	70	61.2	28.2	26.4	--	4	108.5

1/ Agronomy farm: 4 replications seeded Sept. 29,2 replications seeded Oct. 14; Cereal nursery: 2 replications seeded Oct. 19, 1953.
2/ Av. of rust nursery and cereal nursery. 3/ Rust nursery data.

Standard error of a difference = 3.00 bushels.

Hays, Kansas
Six plots, rod rows

Variety	C.I.No.	Date headed	Lodging 1/	Plant height	Weight per bushel 2/
		June		Ins.	Lbs.
KanKing	12719	5/31	1.0	32	62.5
Triumph	12132	5/29	2.1	30	62.0
Red Chief	12109	1	1.8	35	61.0
Wichita	11952	5/29	1.7	31	60.5
Kiowa	12133	3	1.2	33	58.0
Concho	12517	2	1.6	32	58.0
Med.-Hope-Pn. x Oro -Ill. 1-Com.	12804	4	1.0	31	58.0
Ponca	12128	6	1.4	30	58.0
Pawnee	11669	4	1.8	31	57.5
Mqo. - Oro x Oro - Tenq.	12406	5	1.4	35	57.0
Comanche	11673	8	1.3	32	56.5
Sioux	12142	9	2.0	32	55.5
Tenmarq	6936	6	1.5	32	55.5
Turkey	1558	8	1.8	30	54.0
Kharkof	1442	9	1.1	30	52.0

1/ Lodging score from 1 to 5: 1 = No Lodging, 5 = Complete lodging.
2/ Data from one 1/50 acre plot.

Garden City, Kansas
Three 1/45 acre plots

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Winter survival	Weight per bushel	Av. acre yield 1954	Av. acre yield 1952, 1954	Av. acre yield 1948-1954 1/	No. years grown	Percent of Turkey
		May	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
Kiowa	12133	5	6	19	53	52.1	5.3	16.9	24.8	7	131.0
KanKing	12719	5	6	19	53	55.7	5.1	--	--	1	---
Red Chief	12109	8	8	21	60	54.7	4.2	15.3	19.8	11	116.5
Kharkof	1442	10	9	20	70	51.6	4.1	--	--	1	---
Turkey	1558	11	9	20	73	50.5	3.7	11.7	17.9	14	100.0
Med-Hope-Pn.x Oro-Ill.1-Com.	12804	5	6	19	35	48.8	3.6	--	--	1	---
Pawnee	11669	5	6	18	40	49.1	3.5	13.5	22.7	14	131.9
Wichita	11952	3	5	20	15	52.6	3.2	10.6	20.0	12	114.6
Tenmarq	6936	9	8	19	25	50.4	3.0	14.8	21.3	14	120.7
Comanche	11673	8	7	19	28	49.0	2.9	15.5	23.4	14	134.6
Marqo. - Oro x Oro-Tenq.	12406	6	6	19	23	49.5	2.9	13.3	--	2	113.7
Triumph	12132	2	4	19	23	51.4	2.9	18.5	21.3	7	112.8
Concho	12517	5	6	19	8	49.4	1.8	12.9	--	2	110.3
Ponca	12128	7	7	18	8	45.4	1.1	15.2	22.3	6	124.8

1/ Average of five years, no data in 1951 and 1953.

Standard error of a difference = 0.75 bushels.

Colby, Kansas
Three 1/50 acre plots (Sept. 12)

Variety	C.I. No.	Date Headed	Plant height	Weight per bushel	Av. acre yield 1954	1952, 1954	1947-1954 1/	No. years grown	Percent of Turkey
		June	Ins.	Lbs.	Bus.	Bus.	Bus.		
Triumph	12132	16	30	56.8	21.6	40.9	35.8	6	111.1
KanKing	12719	20	32	57.5	21.2	--	--	1	---
Pawnee	11669	22	29	52.7	19.4	39.6	37.0	11	117.1
Wichita	11952	18	31	55.7	17.9	39.1	37.1	11	113.4
Kiowa	12133	22	29	52.5	17.7	39.0	39.3	6	116.0
Mqo. - Oro x Oro-Tenq.	12406	23	33	54.0	17.7	38.7	--	2	105.4
Sioux	12142	22	31	54.0	17.5	38.7	--	2	105.4
Red Chief	12109	25	33	57.2	17.4	38.5	32.7	10	106.0
Kharkof	1442	29	32	54.8	15.5	--	--	1	---
Cheyenne	8885	27	30	57.8	15.3	37.4	36.1	15	108.1
Ponca	12128	24	31	51.5	15.1	37.2	34.9	6	106.7
Concho	12517	23	29	52.0	14.8	37.3	--	2	101.6
Turkey	1558	30	29	54.3	14.6	36.7	34.3	15	100.0
Med.-Hope-Pn.x Oro-Ill.1-Com.	12804	24	30	51.8	14.5	--	--	1	---
Comanche	11673	25	31	53.3	13.7	35.8	34.7	12	111.8
Tenmarq	6936	27	29	52.8	12.2	35.9	34.4	14	108.6

1/ Average of five years, no data in 1949, 1951, and 1953.
Standard error of a difference = 2.51 bushels.

Akron, Colorado

Four 1/41 acre plots; 2 after corn, 2 on fallow

Variety	C.I.No.	Date headed	Weight per bushel	Av acre yield 1954	1953-1954	1950-1954	No. years grown	Percent of Kharkof
		May	Lbs.	Bus.	Bus.	Bus.		
Comanche	11673	29	59.5	13.1	11.7	17.0	16	104.4
Triumph	12132	27	60.5	12.8	11.0	15.3	5	94.4
Wichita	11952	26	59.0	12.5	11.0	16.6	14	102.2
Early Blackhull	8856	26	59.0	11.7	10.2	15.8	23	109.7
Kiowa	12133	29	59.5	11.7	10.4	17.1	8	105.8
Red Chief	12109	6/1	61.5	11.7	10.1	16.2	13	102.1
Pawnee	11669	29	56.5	11.1	9.9	15.8	16	101.7
Kiowa Sel.	12518	29	57.0	10.9	--	--	1	---
Concho	12517	28	56.5	10.9	9.0	--	2	103.4
Ponca	12128	29	56.5	10.3	9.2	15.1	7	97.0
Tenmarq	6936	30	57.5	10.2	9.0	15.8	23	107.8
Cheyenne	8885	30	59.5	10.2	9.1	16.3	23	107.1
Sioux	12142	30	57.5	9.8	6.8	--	2	78.2
Kharkof	1442	6/2	60.0	9.8	8.7	16.2	23	100.0
Alton	1438	6/11	59.0	8.2	7.2	13.8	23	81.8

Standard error of a difference = 0.84 bushels.

Ft. Collins, Colorado
Seven plots, rod rows

Variety	C. I. No.	Date headed	Plant height	Stem rust	Weight per bushel	Av. acre yield 1954	Av. acre yield 1951, 1954	Av. acre yield 1948-1954 1/	No. years grown	Percent of Kharkof 2/
		May	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
Kiowa	12133	23	32	5	62.0	66.8	64.4	57.9	6	108.9
Kiowa Sel.	12518	23	33	15	61.8	66.6	--	--	1	---
Cheyenne	8885	31	33	15	62.3	65.6	66.6	55.1	9	107.1
Tenmarq	6936	29	35	10	62.3	63.5	63.6	52.5	9	101.2
Concho	12517	24	31	5	63.6	62.3	--	--	1	---
Comanche	11673	26	31	5	61.6	59.2	59.9	55.0	9	104.7
Sioux	12142	29	31	5	61.6	57.5	--	--	1	---
Kharkof	1442	31	35	5	62.2	57.3	57.8	52.8	7	100.0
Ponca	12128	25	29	5	62.1	57.1	56.5	49.9	5	94.5
Pawnee	11669	25	30	5	60.6	56.9	58.1	53.8	9	106.9
Red Chief	12109	25	37	30	63.8	55.6	59.6	--	7	95.3
Med.-Hope x Pawnee	12873	25	31	T	61.6	53.7	--	--	1	---
Wichita	11952	21	31	T	62.7	51.7	57.1	56.7	9	106.1
Triumph	12132	22	30	T	62.0	46.6	48.8	--	3	78.9

1/ Average of five years, no data in 1952 and 1953.
2/ Kanred used for 1944 and 1945 when Kharkof was not grown.

Standard error of a difference = 3.32 bushels.

Lincoln, Nebraska
Five 1/51 acre plots, fall irrig. once

Variety	C. I. or Sel. No.	Date Headed	Date Ripe	Plant height	Lodging	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
		May	June	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.		
Pawnee x Nebred	13015	24	30	43	T	45	50	59.3	43.3	--	--	1	---
Concho	12517	24	29	45	4	4	78	56.8	42.9	42.3	--	2	138
Ponca	12128	24	30	45	T	5	63	57.6	41.6	39.8	37.0	7	111
Pawnee x Cheyenne	12875	26	7/1	45	T	35	65	60.3	40.5	40.0	--	2	131
Pawnee	11669	25	30	44	2	30	60	57.5	40.5	38.0	38.0	18	126
Kiowa Sel.	12518	25	30	47	1	45	75	57.6	40.4	--	--	1	---
Pawnee x Cheyenne	12715	26	7/1	45	0	23	70	59.2	39.9	39.2	--	3	123
Pawnee x Cheyenne	13007	26	29	43	0	35	70	58.6	39.4	39.3	--	2	128
Turkey x Cheyenne	12711	26	7/1	44	0	25	78	57.6	39.0	38.4	--	3	126
Pawnee x Cheyenne	13017	26	30	43	0	43	75	59.7	38.2	--	--	1	---
Comanche	11673	25	30	47	1	15	68	55.1	37.8	37.7	37.6	16	113
Red Chief	12109	26	7/1	49	T	40	80	60.1	37.5	37.7	37.8	12	116
Nebred x Mqo. - Oro	N.483434	28	7/2	45	0	4	70	55.9	37.3	--	--	1	---
Nebred	10094	30	7/1	44	T	45	65	56.5	36.5	36.9	39.3	23	109
Pawnee x Cheyenne	N.483406	27	30	46	0	25	70	57.3	35.6	36.1	--	2	118
Cheyenne	8885	31	7/2	46	0	40	75	55.9	33.4	35.3	37.5	23	112
Tenmarq	6936	29	7/1	47	1	43	70	53.6	32.7	34.3	35.1	23	106
Sioux	12142	31	7/2	46	3	35	78	53.9	32.0	34.2	37.4	9	110
Chey.-Red Chief x Pn.-Mqo.-Oro.	13008	31	7/3	43	0	28	90	56.1	32.0	34.9	--	2	114
Turkey	12137	31	7/3	46	3	30	68	55.0	30.7	32.6	34.1	23	100
Kharkof	1442	31	7/3	46	1	33	68	54.1	30.0	30.6	33.2	23	100
Blackhawk	12218	6/2	7/4	49	0	T	35	55.4	29.1	28.9	--	3	98

Standerd error of a difference = 1.06 bushels.

Ames, Iowa
Three plots, rod rows

Variety	C.I. No.	Spring stand 1/	Date headed	Plant height	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1954	1952, 1954	1950-1954 2/	No. years grown	Percent of Minter
		%	June	Ins.			Lbs.	Bus.	Bus.	Bus.		
Minter	12138	83	15	45	VS	S	49.7	21.5	26.4	28.0	4	100
Iohardi	12510	81	13	46	VS	VS	44.3	12.0	20.5	29.1	4	88
H44-Minh x Marmin	12704	42	16	45	VS	S	42.5	10.0	20.1	23.3	4	83
Minturki	6155	52	16	46	VS	VS	--	6.8	20.9	25.5	4	91
Mint. x Tim. - Vulgare[2]	12806	63	23	49	S	S	--	6.1	--	--	1	---

1/ Not an estimate of winter survival. All varieties emerged late. 2/ Average of four years, no data in 1953.
Standard error of a difference = 3.00 bushels.

Havre, Montana
Six plots, rod rows

Variety	C. I. or Sel. No.	Weight per bushel	Av. acre yield 1954	1952, 1954	1948-1954 1/	No. years grown	Percent of Kharkof
		Lbs.	Bus.	Bus.	Bus.		
Newturk	6935	55.6	29.9	23.7	--	14	101
Kharkof	1442	55.8	28.7	22.9	20.0	20	100
Cheyenne	8885	57.4	27.4	--	--	1	---
Yogo x Wasatch	Mont.6	56.8	27.3	--	--	1	---
Yogo x Wasatch	Mont.4	55.4	27.2	--	--	1	---
Blackhull-Rex x Cheyenne	12933	57.2	27.1	--	--	1	---
Red Chief	12109	59.4	25.8	--	--	1	---
Yogo	8033	55.9	25.5	21.4	20.5	20	109
Yogo x Wasatch	Mont.3	55.0	25.4	--	--	1	---
Turkey x Oro	12705	54.5	25.4	21.2	--	3	89
Yogo Comp. (Good)	--	55.1	25.2	--	--	1	---
Yogo Comp. (Elite)	--	54.5	25.1	--	--	1	---
Rio-Rex x Cheyenne	12925	58.7	24.4	--	--	1	---
Karmont	6700	55.9	24.3	21.4	19.4	20	103
Kharkof Sel.	--	55.8	24.3	--	--	1	---
Minter	12138	55.5	24.1	20.9	19.2	9	96
Yogo x Wasatch	Mont.8	54.5	24.1	--	--	1	---
Wasatch	11925	56.3	23.3	--	--	3	67
Sioux	12142	54.8	23.0	--	--	1	---
Yogo Comp. ("Poor")	--	55.4	21.4	--	--	1	---
Nebred x Com.-Med.-Hope.	--	56.0	17.9	--	--	1	---

1/ Average of five years, no data in 1949 and 1953.
Standard error of a difference = 6.63 bushels.

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 yield 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 random arrangement of plots was not followed at all stations. Somewhat higher errors were experienced this year than in many previous years. Poor stands and drought effects are believed to be the main cause.

SUMMARY OF PLOT DATA

Summaries of yield data for 1954 and the recent two-year period appear in the sections which follow along with an average of other agronomic data for 1954. In the southern district 10 varieties were grown uniformly at seven stations. The high district average goes to Concho by a big margin with Ponca, Comanche, and C. I. 12702 making a second group (Table 3). The 2-year averages at these same stations (Table 4) show Concho to be outstanding also with about 30 percent increase in yield over Kharkof.

In the central district Kiowa, Concho, and Pawnee have the highest average yield (Table 5) and this same relation is maintained in the 2-year averages (Table 6). Kharkof, Tenmarq, and Red Chief have the lowest averages.

A summary of the agronomic data other than yield for the southern district shows that Blackhull derivatives have the highest weight per bushel (Table 7). C. I. 12702 had the least leaf rust and Tenmarq the least stem rust. Rank in earliness was not changed from that noted in previous years. The data from the central district (Table 8) differ from the southern area mainly in the magnitude of the differences, with Ponca and Concho showing up better for leaf rust resistance and Tenmarq much poorer for stem rust.

So few stations in the northeastern and northwestern districts obtained yields and other data that no summaries were prepared.

Table 2. Number of plots, average yields, and standard errors for the variety tests at the cooperating stations in 1954.

State and Station	No. of plots	No. of vars.	Average yield all vars.	Standard error of a --- Single plot	Difference in means	Mean	Coefficient of variability
			Bus.	Bus.	Bus.	Bus.	%
TEXAS							
Denton	10*	26	36.5	5.52	2.47	1.75	15.13
Chillicothe	10*	25	23.2	3.39	1.52	1.07	14.59
Bushland	12*	9	20.0	5.67	2.31	1.64	28.37
OKLAHOMA							
Stillwater	4	16	17.4	2.01	1.42	1.01	11.56
Cherokee	5*	16	25.4	3.21	2.03	1.44	12.65
Woodward	5*	16	17.6	2.53	1.60	1.13	14.41
Goodwell	4*	17	18.0	2.74	1.94	1.37	15.21
KANSAS							
Manhattan	8*	16	35.2	6.00	3.00	2.12	17.05
Garden City	3	14	3.4	0.92	0.75	0.53	27.19
Colby	3	16	16.6	3.07	2.51	1.77	18.45
COLORADO							
Akron	4	15	11.0	1.19	0.84	0.59	10.80
Ft. Collins	7*	14	58.6	8.86	3.32	2.35	15.12
NEBRASKA							
Lincoln	5	22	36.8	1.68	1.06	0.75	4.55
IOWA							
Ames	3*	5	11.3	3.67	3.00	2.12	22.20
MONTANA							
Havre	6*	21	25.1	11.48 1/	6.63 1/	4.69 1/	45.78

*Nursery plots.
1/ Non-significant at the 5% level.

Table 3. Summary of average yields of varieties grown uniformly at 7 stations in the southern district in 1954.

Variety	C.I.No.	Average acre yield in bushels per acre at----							Seven-station average
		Denton	Chillicothe	Bushland	Stillwater	Cherokee	Woodward	Goodwell	
Concho	12517	38.3	29.9	26.2	22.8	32.3	22.9	23.0	27.9
Ponca	12128	40.5	22.3	21.4	16.4	24.3	18.0	21.3	23.5
Comanche	11673	38.5	21.6	18.9	17.4	25.2	17.0	24.4	23.3
12701 x Wichita	12702B1.	40.6	24.1	22.0	20.3	22.9	18.9	13.5	23.2
Red Chief	12109	37.1	19.6	19.4	18.0	25.8	20.2	19.5	22.8
Kharkof	1442	34.7	28.2	17.2	17.5	25.5	15.6	14.5	21.9
Early Blackhull	8856	39.3	15.8	15.7	13.7	24.7	15.1	26.8	21.6
Wichita	11952	40.9	19.2	--	15.7	23.3	15.6	14.9	21.6 1/
Tenmarq	6936	38.8	25.4	15.3	17.2	24.5	15.2	13.6	21.4
Triumph	12132	40.7	16.3	--	9.8	23.9	16.3	16.4	20.6 1/

1/ Six-station average. Comparable average for Concho is 28.2 bus., and for Ponca is 23.8 bus.

Table 4. Two-year summary of the average yields of varieties grown uniformly in the southern district in 1953 and 1954.

Variety	C.I. No.	Average acre yield in bushels per acre at-----							Two-year average
		Denton	Chillicothe	Bushland	Stillwater	Cherokee	Woodward	Goodwell	
Years grown - - - - - - -		2	2	2	2	2	2	2	14
Concho	12517	39.6	20.9	19.8	30.3	29.1	21.4	28.1	27.0
Ponca	12128	38.1	18.1	17.2	25.9	23.5	18.2	25.0	23.7
Early Blackhull	8856	39.4	14.2	13.5	20.9	28.4	18.8	29.8	23.6
Comanche	11673	37.3	17.0	15.8	26.5	23.5	17.1	27.0	23.5
Red Chief	12109	34.6	13.9	16.7	25.4	24.7	18.9	24.0	22.6
Tenmarq	6936	37.6	18.2	13.3	24.6	21.8	15.9	18.8	21.5
Kharkof	1442	33.5	20.0	15.7	24.7	21.6	15.4	16.1	21.0

Table 5. Summary of average yields of the varieties grown uniformly at 6 stations in the central district in 1954.

Variety	C.I. No.	Average yields in bushels per acre at --- Man-hattan	Garden City	Colby	Akron	Fort Collins	Lincoln	Six-station average
Kiowa	12133	37.0	5.3	17.7	11.7	66.8	40.4 1/	29.8
Concho	12517	38.6	1.8	14.8	10.9	62.3	42.9	28.6
Pawnee	11669	38.3	3.5	19.4	11.1	56.9	40.5	28.3
Comanche	11673	39.0	2.9	13.7	13.1	59.2	37.8	27.6
Ponca	12128	39.7	1.1	15.1	10.3	57.1	41.6	27.5
Tenmarq	6936	37.0	3.0	12.2	10.2	63.5	32.7	26.4
Red Chief	12109	32.0	4.2	17.4	11.7	55.6	37.5	26.4
Kharkof	1442	30.2	4.1	15.5	9.8	57.3	30.0	24.5
Triumph	12132	28.6	2.9	21.6	12.8	46.6	--	24.5 2/
Wichita	11952	34.7	3.2	17.9	12.5	51.7	--	24.0 2/

1/ Not grown in 1954, yield for C.I. 12518 used.
2/ Five station average. Comparable average for Kiowa is 27.7 bus., and for Concho is 25.7 bus.

Table 6. Two-year summary of the average yields of varieties grown uniformly in the central district in 1953 and 1954.

Variety	C.I. No.	Average yield in bushels per acre at --- Man-Hattan	Garden City	Colby	Akron	Fort Collins	Lincoln	Two-year average
Years grown		2	1	1	2	1	2	9
Kiowa	12133	32.7	5.3	17.7	10.4	66.8	39.2 1/	28.7
Concho	12517	34.7	1.8	14.8	9.0	62.3	42.3	27.5
Pawnee	11669	33.6	3.5	19.4	9.9	56.9	38.0	26.9
Comanche	11673	33.3	2.9	13.7	11.7	59.2	37.7	26.4
Ponca	12128	33.8	1.1	15.1	9.2	57.1	39.8	26.0
Red Chief	12109	29.1	4.2	17.4	10.1	55.6	37.7	25.7
Tenmarq	6936	30.9	3.0	12.2	9.0	63.5	34.3	25.5
Kharkof	1442	27.0	4.1	15.5	8.7	57.3	30.6	23.9

1/ Not grown in 1954, yield for C.I. 12518 used.

Table 7. Summary of agronomic data other than yield for the variety tests in the southern district, 1954.

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Rust Leaf	Rust Stem	Weight per bushel
		April	June	Ins.	%	%	Lbs.
Number of Stations --		6	6	7	2	2	7
Red Chief	12109	28	9	30	48	55	61.9
Early Blackhull	8856	19	1	25	33	13	61.2
Concho	12517	26	7	25	10	13	61.0
12701 x Wichita	12702Bl.	25	5	27	6	45	60.7
Ponca	12128	27	7	26	17	40	60.6
Comanche	11673	27	7	27	35	38	59.9
Tenmarq	6936	30	8	29	43	8	59.3
Kharkof	1442	5/2	10	29	15	13	59.2
Wichita	11952	20 1/	5/29 1/	24 1/	48	43	60.8 1/
Triumph	12132	19 1/	5/28 1/	23 1/	45	13	60.0 1/

1/ Average for one less station than indicated above.

Table 8. Summary of agronomic data other than yield for the variety tests in the central district, 1954.

Variety	C.I. No.	Date Headed	Date Ripe	Plant height	Rust Leaf	Rust Stem	Weight per bushel
		May	June	Ins.	%	%	Lbs.
Number of Stations --		7	2	6	2	3	7
Red Chief	12109	28	20	35	57	37	60.2
Triumph 1/	12132	19	4	26	32	25	59.0
Wichita 1/	11952	20	5	29	37	25	58.9
Kiowa	12133	26	18	31	53	47	57.7
Concho	12517	26	13	31	8	51	57.0
Comanche	11673	29	14	32	29	44	56.7
Pawnee	11669	27	18	30	45	42	56.6
Ponca	12128	28	14	31	6	46	56.2
Kharkof	1442	6/2	21	33	52	41	56.1
Tenmarq	6936	30	20	32	53	43	56.0

1/ All averages are for one less station than indicated.

UNIFORM YIELD NURSERY

This 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. New entries this year are starred in the list on this page. The nurseries at Clovis, Akron, and Alliance were abandoned because of drought effects in the first two instances and from hail in the last. The varieties grown in 1954 were as follows:

Entry No.	Variety or Cross	State No.	C.I. No.
1	Kharkof		1442
2	Blackhull		6251
3	Early Blackhull		8856
4	Pawnee		11669
5	Comanche		11673
6	Concho	Wd. 43h2-123	12517
7	Turkey x Cheyenne	N.P. 40672	12711
8	Pawnee x Cheyenne	Nebr. 47NP1965	12715
9	Do.	Nebr. 483405	12875
10*	Do.	Nebr. 482548	13007
11	Ea. Blkhl.-Tenq. x Oro-Med.-Hope	Ks. 471238	12871
12	Med.-Hope-Pn. x Oro-Ill. 1-Com.	Ks. 49383	12872
13	Do.	Ks. 49454	12804
14	Med.-Hope x Pawnee^2	Ks. 50249	12873
15	Med.-Hope x Comanche^2	Ks. 50266	12874
16	Oro x Blackhull-Hd. Federation	Wd. 44h2-24	13001
17	Sinv.-Wich.-Hope-Chey. x Wichita	T.237-46-22 Bl.	12702 Bl.
18*	Do.	T.237-46-22 W.	12702 W.
19	Do.	T.237-46-23-1	12703
20	Kanred x Clarkan	T.73-44-2B	13002
21	Do.	T.73-44-2C	13003
22	Martin-Tenmarq x Chiefkan	T.160-44-135	13004

*New entries

The nursery at most stations was grown near the varietal plots or advanced nursery test so the general conditions for the two series were similar. Differences in time and method of planting or in location are important at several stations as reflected by varietal performance and yield levels. Dry seedbeds were more troublesome in the Uniform Nursery plantings because more of these are planted by hand-operated seeders. Mechanical seeders are being used more widely and should be encouraged for practically all yield trials without regard to plot size.

DATA OBTAINED

Yields, agronomic, and disease data recorded at the stations are presented in Table 9. Summaries appear in Tables 10 to 13.

Three tests were completed in Texas. At Denton the yields were so variable that differences in means were not significant. Quality of grain was excellent. Concho, the Hope derivatives, and Sinvalocho derivatives had low leaf rust readings. Stem rust was light throughout. At Chillicothe good yields and test weights were produced with Concho the best performing variety. At Bushland about average

yields were produced on dry land with rather high yields from the irrigated replications. The best varieties on dry land were 12702 W., Pawnee, 12873, 12871, 13004, and Concho; under irrigation, Concho, 12804, 12873, 12871, 12702 W., and Pawnee were highest. Rather good agreement was evident. Concho has the best 2- and 5-year averages.

In Oklahoma there were three tests. Concho, 13002, and 13003 were best at all stations. Leaf rust data were recorded at Stillwater and Cherokee and heavy stem rust developed at Cherokee. In relative yields practically all entries have outyielded Kharkof, many by as much as 30 percent.

Four tests in Kansas gave variable results. Concho ranked last at Colby but was third at Manhattan and Garden City. Excellent yields and test weights were produced at Manhattan under limited moisture conditions. Lodging was marked and leaf rust abundant. No yields were taken at Hays due to the variability induced partly by soil drifting. Test weights were very low. Low yields of poor quality grain were produced at Garden City and low yields at Colby.

At Fort Collins, Colorado, very high yields were produced and all test weights were above 61 pounds. C.I. 13004, 13002, and 12715 were highest in yield. There was a range of 65 percent in stem rust readings with 12872 rated at zero. Concho has an excellent yield record at this station where irrigation supplements the normal precipitation. Stands were too poor at Akron to make the test worth reporting.

The one test in Iowa got off to such a poor start that little hope was held for it until late in the spring. Surprisingly good yields were made by several varieties with Concho highest. Stem rust attacked all varieties. Test weights were very low. Leaf rust resistance of Concho and the Sinvalocho hybrids was impressive.

The two tests in Nebraska were fall irrigated to assure stands. Excellent yields and a full set of notes were taken at Lincoln. Four varieties yielded over 50 bushels to the acre. Stem rust spread from a nearby inoculated breeding plot and became abundant on most varieties although 12874 had a low reading. Leaf rust infection under 10 percent was recorded for three varieties. Marked differences in lodging were noted. At North Platte the crop suffered from drought. In general, late varieties had low test weights. Varieties 12873, 12715, and Pawnee were highest in yield and looked best.

STANDARD ERRORS

A statistical summary of the yields produced in the various uniform nursery tests is made in Table 10. 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. The coefficients of variability are higher than desired, there being only one station below 10 percent while five were above 20 percent.

Table 9. Yield and other data for varieties grown in the uniform yield nursery in cooperative experiments at 14 stations in the hard red winter wheat region in 1954, and period averages.

Denton, Texas
Four plots 1/

C.I. No.	Date Headed	Date Ripe	Plant height	Shattering	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1948-1954 3/	No. years grown	Percent of Kharkof
	April	May	Ins.	2/	%	%	Lbs.	Bus.	Bus.	Bus.		
6251	18	23	36	0	70	5	63.0	40.1	36.1	28.9	19	115
13003	18	24	35	L	40	T	60.0	38.0	37.9	--	2	125
12702W	13	17	32	L	15	T	62.0	37.9	--	--	1	--
12715	15	21	31	H	70	5	62.0	35.9	36.1	--	3	112
12702Bl.	13	17	36	M	10	T	62.5	35.7	35.9	24.2	4	120
12871	8	13	33	T	5	T	63.5	35.7	39.0	--	2	128
11673	14	19	36	T	50	T	60.5	35.3	35.6	28.5	15	140
13004	19	25	28	T	60	20	62.5	33.7	36.9	--	2	121
13002	18	23	30	L	50	5	61.0	33.6	35.3	--	2	116
12517	14	19	26	M	T	T	63.0	33.5	36.9	24.9	4	123
8856	7	11	34	M	50	T	62.5	31.9	35.7	27.5	19	135
13007	12	15	30	M	60	T	62.0	31.8	--	--	1	--
1442	19	25	28	L	25	5	60.5	31.7	30.4	25.4	19	100
12875	13	17	28	H	60	10	62.5	31.3	31.6	--	2	104
12711	14	20	30	T	50	T	62.0	29.2	32.9	--	3	113
12872	14	18	28	MH	T-50	T	62.5	28.4	32.3	--	2	106
12874	13	17	31	L	T	T	62.5	28.2	28.8	--	2	95
12873	13	16	28	L	T	T	61.5	28.0	31.7	--	2	104
12804	13	19	27	L	5-40	T	61.5	27.5	31.7	--	2	104
11669	15	21	32	M	60	10	60.0	26.1	32.4	26.0	16	132
13001	13	18	27	T	60	T	62.0	26.0	32.9	--	2	108
12703	11	18	32	L	T-30	T	61.0	24.0	26.7	19.3	4	96

1/ Simple lattice, two replications, adjusted yield reported. 2/ 0: none; L: light; H: heavy
3/ Average of four years, no data in 1949 and 1951.
Standard error of a difference = 4.71 bushels (not significant at 5% level).

Chillicothe, Texas
Four plots

C.I. No.	Date Headed	Date Ripe	Plant height	Fall grazing 1/	Weight per bushel	Av. acre yield 1954	1953-1954	1950-1954	No. years grown	Percent of Kharkof
	April		Ins.	%	Lbs.	Bus.	Bus.	Bus.		
12517	18	6/1	29	110	64	34.4	26.9	27.5	5	109
1442	21	6/5	29	110	62	31.9	23.2	25.2	16	100
13002	20	6/2	33	125	62	30.5	26.1	--	2	113
13003	20	6/3	28	120	61	30.0	24.0	--	2	103
13001	18	6/1	28	120	63	28.3	20.6	--	2	89
12804	15	6/1	27	100	64	27.1	22.6	--	2	97
12711	19	6/2	32	100	62	26.7	24.5	--	3	101
12702 Bl.	17	5/25	30	90	63	26.6	21.6	24.2	5	96
6251	12	6/2	28	100	63	26.6	21.0	22.2	16	103
12702 W	16	5/26	28	120	63	26.3	--	--	1	--
12872	16	6/1	28	120	63	25.9	22.1	--	2	95
11669	16	5/31	28	110	63	25.5	23.0	23.8	16	117
12874	16	6/1	28	110	63	24.3	21.2	--	2	91
12873	17	5/29	27	120	63	24.1	19.2	--	2	83
12715	17	5/31	29	100	62	24.1	21.9	--	3	93
12875	17	5/31	29	100	63	23.0	19.6	--	2	85
13007	16	5/29	27	100	62	22.7	--	--	1	--
11673	18	5/30	28	100	62	21.7	18.4	22.7	16	114
13004	20	6/2	27	130	62	21.4	19.1	--	2	82
12871	10	5/26	23	90	64	20.9	20.6	--	2	89
12703	13	5/29	28	110	62	19.7	16.2	19.3	5	77
8856	7	5/23	23	120	61	16.1	15.5	18.8	16	103

1/ Comanche = 100 percent.
Standard error of a difference = 2.39 bushels.

Bushland, Texas
Six plots, three irrigated

C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield Dry 1954	Av. acre yield Irrig. 1954	Av. acre yield Av. 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
	May	June	Ins.	Lbs.	Bus.	Bus.	Bus.	Bus.	Bus.		
12517	6	21	25	57.5	19.3	50.8	35.1	24.2	16.1	6	110
12702 W	4	22	31	61.0	23.0	44.2	33.6	--	--	1	---
12873	9	22	25	62.0	21.0	45.6	33.3	23.7	--	2	124
11669	6	21	23	60.0	21.5	43.8	32.7	22.1	15.7	16	115
12871	27	19	27	63.0	20.0	45.2	32.6	22.9	--	2	120
12804	5	21	26	61.0	14.8	46.4	30.6	21.5	--	2	113
13004	11	23	28	57.0	19.6	41.4	30.5	20.7	--	2	108
13007	8	23	27	60.0	17.1	43.2	30.2	--	--	1	---
12702 Bl.	4	22	28	60.0	16.4	43.1	29.8	22.3	15.2	5	105
12711	8	22	26	59.0	18.5	37.8	28.2	20.7	--	3	108
12872	9	22	28	61.5	16.2	38.7	27.5	20.2	--	2	106
12874	8	22	29	61.0	12.7	42.3	27.5	19.2	--	2	101
13001	8	23	31	60.0	15.0	39.1	27.1	19.0	--	2	100
12715	8	22	30	60.0	14.9	36.2	25.6	19.0	--	3	107
13003	11	24	32	52.0	17.8	33.1	25.5	17.9	--	2	94
11673	9	22	26	58.0	10.5	38.7	24.6	18.6	14.6	16	107
1442	13	23	35	55.5	14.5	33.5	24.0	19.1	14.4	16	100
12703	5	20	25	60.0	15.3	32.0	23.7	18.1	14.3	5	99
13002	11	24	33	54.0	17.8	28.9	23.4	16.9	--	2	89
6251	12	23	28	56.0	16.3	27.5	21.9	16.5	14.8	16	109
8856	26	17	25	62.0	13.3	29.8	21.6	16.5	13.3	16	97
12875	8	22	26	59.0	15.3	21.6	18.5	16.0	--	2	84

Standard error of a difference = 3.44 bushels.

Stillwater, Oklahoma
Four plots

C.I. No.	Date Headed	Date Ripe	Plant height	Leaf rust 1/	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
	April	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
12517	26	9	22	1	60.8	25.9	23.5	31.7	6	129
13002	27	10	25	6	60.5	25.9	24.9	--	2	151
13003	29	10	25	18	60.5	25.8	24.1	--	2	146
12702 W	23	9	23	5	60.0	22.1	--	--	1	---
12702 Bl.	24	9	23	6	60.0	21.7	23.0	30.8	5	125
13001	26	10	21	14	58.8	21.6	24.5	--	2	149
13004	27	9	22	30	60.0	21.6	23.9	--	2	145
6251	29	11	25	7	60.3	20.9	23.6	27.5	21	109
12711	27	10	21	8	59.5	20.0	22.2	--	3	106
12875	25	9	22	30	59.7	19.0	22.4	--	2	136
11669	26	8	20	10	59.0	18.9	21.0	25.7	18	119
12873	25	9	21	2	58.3	18.1	20.0	--	2	121
12874	27	11	21	2	59.1	17.9	20.9	--	2	127
11673	28	12	22	6	58.0	17.8	19.6	27.5	16	116
12871	24	10	21	8	61.2	17.1	22.5	--	2	136
13007	25	9	19	10	58.3	16.7	--	--	1	---
12804	25	9	19	4	59.0	16.6	20.4	--	2	124
12703	25	9	21	3	59.3	16.4	20.1	25.9	5	105
8856	19	6	21	15	59.9	16.1	22.8	25.9	21	109
12715	27	9	23	25	59.1	16.0	18.0	--	3	123
12872	26	10	20	9	59.7	15.6	19.8	--	2	120
1442	29	10	24	10	57.0	10.1	16.5	24.6	21	100

1/ Leaf rust readings taken May 29, 1954, on 1 replication.

Standard error of a difference = 1.49 bushels

Cherokee, Oklahoma
Four plots

C.I. No.	Plant height	Lodging 6/16	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.		
13002	35	51	1	50	56.0	28.5	25.7	--	2	130
13003	36	58	5	10	55.1	27.1	24.1	--	2	122
12517	25	61	1	100	58.1	26.6	26.1	31.5	6	141
13004	30	33	18	100	57.8	26.1	25.9	--	2	131
12702 W	29	55	12	75	57.3	25.3	--	--	1	---
6251	35	44	18	50	59.4	25.0	23.8	23.9	8	104
12804	24	35	90	5	58.0	24.5	26.1	--	2	132
13001	27	56	30	10	57.5	24.5	23.7	--	2	120
12711	27	24	25	50	57.2	24.3	23.5	--	3	119
11673	29	71	15	10	57.0	22.5	22.3	25.8	8	117
11669	27	38	40	15	56.8	22.5	22.7	21.6	8	106
12873	23	39	12	1	56.0	22.2	23.3	--	2	118
13007	24	53	40	20	55.7	21.7	--	--	1	---
12871	27	56	1	90	60.0	21.4	26.0	--	2	131
12875	27	48	40	5	57.9	21.0	23.9	--	2	121
12702 Bl.	29	53	1	1	58.0	20.7	22.9	26.9	5	122
12872	28	36	5	T	59.0	20.7	20.7	--	2	105
12703	28	43	10	5	57.9	20.7	21.6	23.5	5	106
8856	24	68	25	10	58.7	20.5	26.2	24.7	8	108
1442	32	58	20	25	56.1	20.1	19.8	22.1	8	100
12715	30	41	35	25	57.9	19.7	20.2	--	3	112
12874	26	44	5	T	57.8	19.4	22.3	--	2	113

Standard error of a difference = 1.96 bushels.

Woodward, Oklahoma
Four plots

C.I. No.	Date Headed	Date Ripe	Plant height	Shattering 1/	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No years grown	Percent of Kharkof
	May	June	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
13002	6	14	31	2	58.2	21.3	19.0	--	2	130
12517	3	13	25	T	61.7	19.4	19.0	22.7	6	130
13003	7	15	31	T	58.3	18.7	17.7	--	2	121
6251	5	14	32	2	60.6	18.3	18.5	20.0	23	106
13004	5	14	26	T	61.0	17.3	17.7	--	2	121
12702 B1	4/30	9	25	2	60.7	17.0	18.9	22.3	5	127
12702 W	4/30	10	26	T	61.0	16.6	--	--	1	--
12871	1	12	23	T	60.5	16.4	18.3	--	2	125
12875	2	11	25	T	59.9	15.3	17.6	--	2	121
13001	4	13	24	T	60.0	15.3	18.0	--	2	123
12874	1	11	22	T	60.5	15.1	15.7	--	2	108
12711	3	12	25	T	60.3	14.9	17.0	--	3	117
11673	5	12	26	T	60.2	14.7	15.8	18.0	18	115
11669	2	12	24	3	60.0	14.1	15.5	16.3	20	120
12804	2	12	22	T	61.0	14.0	15.4	--	2	106
12873	2	11	22	T	59.8	13.4	15.1	--	2	103
12703	3	12	25	T	59.2	13.3	15.0	16.6	5	95
13007	2	11	22	T	58.5	13.0	--	--	1	---
8856	4/29	7	22	T	60.8	13.0	16.9	16.7	23	105
1442	6	14	31	22	58.4	12.4	14.6	17.5	23	100
12715	2	11	25	9	60.0	12.1	14.8	--	3	99
12872	2	11	25	3	60.9	11.7	13.6	--	2	93

1/ Shattering notes taken June 15, 1954, average of 3 replications.

Standard error of a difference = 1.31 bushels

Manhattan, Kansas
Four plots

C.I. No	Date Headed	Plant height	Lodging	Diseases: Leaf rust	Diseases: Stem rust 1/	Diseases: bunt 1/	Weight per bushel	Av. acre yield: 1954	Av. acre yield: 1953-1954	Av. acre yield: 1950-1954	No. years grown	Percent of Kharkof
	May	Ins.	%	%	%	%	Lbs.	Bus.	Bus.	Bus.		
12702 B1	16	32	50	7	50	50	63.3	51.6	39.1	34.2	5	124
12702 W	16	31	45	7	30	60	62.7	51.6	--	--	1	---
12517	18	30	35	10	70	2	63.0	49.8	40.2	35.0	6	128
12873	17	26	20	1	30	4	61.9	49.4	37.4	--	2	116
12871	14	30	65	7	60	10	64.0	48.7	36.3	--	2	112
11673	17	30	25	33	60	2	61.9	47.5	35.7	32.4	18	123
11669	17	28	40	46	47	19	62.4	47.4	37.2	29.9	20	129
12872	18	30	30	2	20	80	63.1	46.3	35.7	--	2	111
13007	16	28	8	60	50	75	61.6	46.0	--	--	1	---
12804	16	30	10	3	40	70	62.8	46.0	34.8	--	2	108
12874	15	28	20	2	30	50	62.6	44.2	31.9	--	2	99
13002	23	32	35	50	70	80	58.2	43.8	33.1	--	2	103
12711	18	27	35	60	70	2	60.4	43.6	36.5	--	3	115
12715	18	29	25	70	60	70	60.8	43.1	35.8	--	3	110
6251	20	31	20	43	60	85	62.0	42.4	34.5	34.1	23	114
12703	14	28	15	2	40	95	62.2	42.0	32.4	31.1	5	112
12875	17	28	25	47	60	70	61.7	41.2	32.8	--	2	102
13001	18	28	95	63	60	80	61.0	40.9	30.8	--	2	95
13004	21	29	20	60	60	90	58.8	40.8	33.0	--	2	102
8856	8	27	40	60	50	85	63.4	38.8	34.0	32.2	23	116
1442	23	30	30	70	50	70	59.8	38.7	32.4	27.7	23	100
13003	23	31	40	57	70	90	56.6	38.1	27.8	--	2	86

1/ Data from disease nursery.

Standard error of a difference = 3.50 bushels.

Hays, Kansas
Four plots

C.I. No.	Date headed	Plant height	Lodging 1/	Weight per bushel	Av. acre yield 1950-1953 2/	No. years grown	Percent of Kharkof
		Ins.		Lbs.	Bus.		
12871	5/29	33	1.4	56.3	--	1	---
12703	5/29	35	1.8	56.0	24.6	4	120
12873	5/31	34	1.3	55.8	--	1	---
12874	6/1	34	1.6	55.5	--	1	---
12702 Bl.	5/29	35	2.0	55.5	27.0	4	132
12875	6/3	35	1.0	55.5	--	1	---
12715	5/31	36	1.0	55.3	--	1	---
12872	6/1	35	1.3	55.0	--	1	---
13007	5/31	34	1.2	54.5	--	1	---
8856	5/26	33	1.6	54.5	28.1	21	116
12711	5/30	35	2.0	54.3	--	1	---
11669	5/30	35	1.6	54.0	28.7	18	130
13001	6/4	32	2.5	54.0	--	1	---
6251	6/2	34	2.4	53.0	27.7	21	113
12804	5/28	36	1.3	53.0	--	1	---
12702 W	5/30	35	2.0	53.0	--	1	---
13002	6/3	33	1.5	52.8	--	1	---
12517	5/31	35	1.3	52.5	30.8	5	150
11673	6/1	35	1.5	52.0	29.4	17	126
1442	6/7	35	1.4	50.5	20.6	21	100
13003	6/2	35	1.3	49.3	--	1	---
13004	6/6	32	1.5	--	--	1	---

1/ Lodging notes on a scale of 1 to 5: 1.0 = no lodging and 5.0 = complete lodging.
2/ No yield data in 1954.

Garden City, Kansas
Four plots

C.I. No	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield
	May	June	Ins.	Lbs.	Bus.
12711	22	23	23	53.5	15.8
12873	22	22	23	51.0	14.4
12517	22	24	23	53.0	14.0
13007	22	22	23	49.8	13.6
12875	22	23	24	52.8	13.4
11673	22	23	24	50.5	13.2
1442	26	27	23	53.0	13.0
12874	22	24	22	54.0	12.2
12804	21	21	23	49.0	12.0
12703	22	23	23	53.3	11.8
12715	22	22	24	53.0	11.6
13004	25	25	25	49.3	11.5
11669	20	22	23	50.0	11.3
12702 B1	20	22	23	50.8	11.1
13003	26	26	24	47.0	11.1
12871	24	24	22	54.8	10.4
13002	26	26	22	49.5	10.1
13001	23	23	22	49.0	10.0
12702 W	21	22	24	49.0	8.4
6257	26	27	23	54.8	8.3
12872	24	24	22	48.0	7.6
8856	22	24	23	52.8	7.4

Standard error of a difference=1.87 bushels.

Colby, Kansas
Four plots

C.I. No.	Weight per bushel	Av. acre yield 1954	1952, 1954	1948-1954 1/	No. years grown	Percent of Kharkof
	Lbs.	Bus.	Bus.	Bus.		
11669	58.5	16.2	24.1	28.7	4	98
12873	60.0	16.2	--	--	1	---
12711	60.0	15.5	28.0	--	2	125
13007	58.5	15.0	--	--	1	---
12875	58.0	14.8	--	--	1	---
13001	55.5	14.6	--	--	1	---
6251	59.0	14.0	23.3	28.4	5	94
13002	56.0	13.8	--	--	1	---
1442	56.0	13.7	22.4	29.2	5	100
12804	57.0	13.6	--	--	1	---
12715	58.5	12.2	26.6	--	2	119
13003	54.0	12.0	--	--	1	---
12872	58.0	10.2	--	--	1	---
8856	59.5	9.9	23.2	27.5	5	83
13004	54.5	9.6	--	--	1	---
11673	56.5	9.6	21.5	28.7	4	98
12874	55.0	9.2	--	--	1	---
12703	58.0	8.7	23.8	--	3	109
12702 B1	57.0	8.6	23.3	--	3	111
12702 W	57.0	8.5	--	--	1	---
12871	58.5	7.7	--	--	1	---
12517	53.5	7.1	20.9	--	3	117

1/ Average of four years, no data in 1949, 1951, 1953.

Standard error of a difference=1.69 bushels.

Ft. Collins, Colorado
Five plots (irrigated)

C.I. No.	Date headed	Plant height	Stem rust	Weight per bushel	Av. acre yield 1954	Av. acre yield 1951 & 1954	Av. acre yield 1949-1954 1/	No. years grown	Percent of Kharkof
	May	Ins.	%	Lbs.	Bus.	Bus.	Bus.		
13004	29	35	50	61.9	77.4	--	--	1	---
13002	31	35	20	61.9	72.2	--	--	1	---
12715	26	35	5	62.2	71.9	--	--	1	---
12703	24	33	25	62.6	71.4	67.9	--	3	119
12711	27	30	10	63.0	67.0	--	--	1	---
11669	25	31	T	62.3	66.1	65.5	55.3	18	109
12804	21	32	T	62.6	66.0	--	--	1	---
6251	27	34	5	62.9	65.2	62.1	51.4	20	101
8856	21	32	50	62.8	64.9	62.1	51.1	20	98
12517	23	31	30	62.4	64.8	66.1	58.8	4	128
13007	24	31	15	62.1	63.2	--	--	1	---
12702 B1	22	31	T	63.1	62.6	66.4	--	3	123
12702 W	23	31	T	62.5	62.3	--	--	1	---
12871	23	31	35	63.1	61.2	--	--	1	---
12872	26	31	0	63.5	61.2	--	--	1	---
11673	27	34	20	61.4	60.8	64.7	54.9	16	108
13003	31	37	65	61.3	60.1	--	--	1	---
1442	31	32	T	63.0	57.8	57.5	46.1	20	100
12875	24	32	T	62.7	57.2	--	--	1	---
12874	22	30	T	62.0	55.3	--	--	1	---
13001	24	29	5	61.0	53.4	--	--	1	---
12873	26	29	T	61.6	49.5	--	--	1	---

1/ Average of four years, no data in 1952 and 1953

Standard error of a difference = 6.47 bushels.

Ames, Iowa
Three plots

C.I. No.	Date headed	Plant height	Stem rust	Leaf rust	Spring stand	Weight per bushel	Av. acre yield 1954	Av. acre yield 1952 & 1954	Av. acre yield 1949-1954 1/	No. years grown	Percent of Kharkof
	June	Ins.			%	Lbs.	Bus.	Bus.	Bus.		
12517	10	42	HS++	HR	77	45.7	28.0	33.7	40.3	4	145
12702 Bl.	9	42	S	HR+	62	53.2	27.5	--	--	3	163
12872	10	42	HS	HR	68	54.8	26.6	--	--	1	---
12804	9	42	S	MR	72	52.5	24.6	--	--	1	---
12871	10	41	HS	R	63	52.8	22.4	--	--	1	---
12702 W.	9	41	HS	HR+	73	47.6	22.3	--	--	1	---
12703	10	40	S	HR+	54	53.5	22.3	31.9	--	3	138
12875	10	43	HS+	HS	77	48.1	21.6	--	--	1	---
12873	10	38	S	MS	66	51.0	21.5	--	--	1	---
8856	9	41	S	S	41	52.6	20.9	32.0	35.4	12	109
13004	13	42	HS	S	66	43.6	19.8	--	--	1	---
13001	11	40	HS	HS	55	48.4	18.2	--	--	1	---
12874	10	40	MR+	MR	65	51.3	17.8	--	--	1	---
13007	10	39	HS+	HS	73	46.2	17.1	--	--	1	---
11673	11	42	HS	MR	58	44.0	16.4	28.5	36.6	12	106
11669	10	40	HS	HS+	65	45.0	15.3	28.9	36.2	12	120
13002	14	43	HS	S	55	43.3	12.4	--	--	1	---
6251	12	44	S	S	57	48.0	12.1	22.5	31.6	12	102
12715	11	42	HS	HS	57	44.1	10.5	27.1	--	2	154
12711	13	40	HS	S	46	41.8	9.9	24.1	--	2	137
13003	15	44	HS+	S	41	40.6	9.1	--	--	1	---
1442	13	44	S	HS	61	41.0	8.4	17.6	27.7	12	100

1/ Average of four years, no data in 1951 and 1953.
Standard error of a difference = 2.95 bushels.

Lincoln, Nebraska
Five plots, fall irrigated

C.I. No.	Date Headed	Date Ripe	Plant height	Lodging	Rust Stem	Rust Leaf	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
	May	June	Ins.	%	%	%	Lbs.	Bus.	Bus.	Bus.		
12873	25	26	46	0	17	18	59.4	51.8	45.6	--	2	153
12702 Bl.	24	25	51	19	33	25	61.2	50.3	44.1	41.6	5	122
12872	25	26	49	0	20	35	59.8	50.2	46.8	--	2	157
12874	24	25	46	2	3	5	60.1	50.1	44.3	--	2	149
12517	24	26	49	22	45	3	58.4	47.9	47.8	44.4	6	130
12804	24	25	48	T	18	33	59.0	46.8	41.2	--	2	138
12871	24	25	49	10	40	32	61.6	46.3	46.3	--	2	155
12702 W	23	25	51	41	25	20	59.0	45.3	--	--	1	---
13004	28	28	48	T	27	70	55.7	44.8	40.8	--	2	137
13007	24	25	46	1	52	77	58.9	44.7	--	--	1	---
8856	20	25	48	34	28	52	60.6	44.1	44.2	39.3	23	123
11669	24	25	47	0	28	70	59.2	43.9	42.4	41.4	20	132
12703	24	25	49	14	38	9	59.6	43.4	39.1	37.2	5	109
12711	24	25	48	8	32	66	57.7	42.7	42.8	--	3	136
12875	24	25	49	18	27	75	59.6	42.2	40.2	--	2	135
12715	27	25	49	4	32	85	58.8	41.9	41.7	--	3	130
11673	25	26	49	6	35	50	56.6	39.7	39.2	39.5	18	115
6251	27	28	50	10	32	60	57.6	38.7	39.6	37.1	23	110
13001	26	27	47	70	25	63	56.0	36.9	36.7	--	2	123
13002	30	29	50	7	63	57	52.3	33.1	33.7	--	2	113
13003	30	30	52	3	48	59	52.4	32.7	31.9	--	2	107
1442	6/1	30	50	7	40	58	52.4	27.6	29.8	34.1	23	100

Standard error of a difference = 2.26 bushels.

North Platte, Nebraska
Three plots, fall irrigated

C.I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1954	Av. acre yield 1953-1954	Av. acre yield 1950-1954	No. years grown	Percent of Kharkof
	June	July	Ins.	Lbs.	Bus.	Bus.	Bus.		
12873	1	3	30	59.0	27.3	30.6	--	2	126
11669	5/29	1	32	60.0	27.0	29.2	26.2	16	122
12715	3	2	32	61.0	25.3	27.7	--	3	118
12874	1	3	29	58.8	24.5	27.6	--	2	114
12872	1	3	31	58.3	24.1	27.2	--	2	112
12871	1	2	30	60.3	23.4	27.9	--	2	115
13007	1	1	30	58.3	23.3	--	--	1	---
1442	7	7	33	60.0	23.0	24.3	24.2	17	100
12517	2	2	31	57.5	22.9	28.5	27.6	6	125
12711	3	3	30	59.1	22.6	25.7	--	3	115
12875	1	2	31	59.9	21.8	24.9	--	2	103
13001	5	5	31	57.0	21.5	24.1	--	2	99
11673	1	2	31	57.0	21.2	25.7	23.9	14	113
12804	5/31	1	30	57.4	20.8	26.7	--	2	110
12702 Bl.	2	2	32	57.3	20.3	27.1	24.2	5	100
12702 W	4	3	31	57.7	19.2	--	--	1	---
8856	5/29	1	31	59.5	17.8	20.4	19.8	17	98
13002	7	7	33	53.2	17.1	23.0	--	2	95
6251	7	6	33	58.5	15.9	22.4	20.9	17	97
12703	5/31	3	31	59.9	15.4	20.7	19.2	5	79
13004	7	7	33	54.9	14.3	20.7	--	2	85
13003	7	7	34	52.9	13.0	18.7	--	2	77

Standard error of a difference = 2.33 bushels.

Table 10. Number of plots, average yields, and standard errors for the uniform yield nursery at the cooperating stations in 1954.

State and station	No. of plots	No. of varieties	Average yield of all vars.	Standard error of a.... Single plot	Difference between means	Mean	Coefficient of variability
			Bus.	Bus.	Bus.	Bus.	%
TEXAS							
Denton	4	22	32.5	6.66 1/	4.71 1/	3.33 1/	20.48
Chillicothe	4	22	25.3	3.39	2.39	1.69	13.36
Bushland	6	22	27.6	5.96	3.44	2.43	21.60
OKLAHOMA							
Stillwater	4	22	19.2	2.11	1.49	1.06	11.02
Cherokee	4	22	22.9	2.77	1.96	1.39	12.08
Woodward	4	22	15.3	1.85	1.31	0.92	12.06
KANSAS							
Manhattan	4	22	44.6	5.95	3.50	2.47	13.34
Garden City	4	22	11.5	2.64	1.87	1.32	23.04
Colby	4	22	11.8	2.40	1.69	1.20	20.23
COLORADO							
Ft. Collins	5	22	63.3	10.23	6.47	4.57	16.17
NEBRASKA							
Lincoln	5	22	43.0	3.57	2.26	1.60	8.30
North Platte	3	22	21.0	2.85	2.33	1.65	13.59
IOWA							
Ames	3	22	18.4	3.61	2.95	2.09	22.20

1/ Non-significant at the 5% level.

SUMMARY OF NURSERY YIELDS

In Table 11 are the yields by stations with averages by states and for the region. In Texas Concho and 12702 W. were highest. In Oklahoma 13002 and Concho ranked first and second. Med. - Hope x Pawnee^2 (12873) and Pawnee excelled in Kansas. In Nebraska first and second rank went to 12873 and Med. - Hope x Comanche^2 (12874), reflecting the Lincoln yields primarily. Only one station each was available from Colorado and Iowa.

In the 13-station regional average Concho at 31.5 bushels and the two sister lines from 12702 yielded highest. A stiff competitor nearly every year has been Pawnee which ranked seventh this season. Early Blackhull and Kharkof were lowest running about 7 bushels per acre below Concho. Among the isogenic pairs, the blace and white glumed composites yielded very nearly the same whereas the awned type (13002) outyielded its awnless conterpart (13003) by about 2 bushels to the acre.

Two-year average yields appear in Table 12 where it may be noted that Concho is highest in average yield, or second, in all states and in the regional average. C. I. 12871, highest in 1953, ranked ninth in 1954 and second in the 2-year averages. The awned selection of Kanred x Clarkan has a 2-year average of 1.5 bushels per acre above its awnless pair (13002 vs. 13003). Kharkof and 12703 have the lowest 2-year averages, running 7 bushels per acre below Concho.

SUMMARY OF AGRONOMIC DATA

In Table 13 the agronomic data other than yield are summarized with the varieties listed in declining order of test weight. C.I. 12871 and Early Blackhull had the highest weight per bushel just as they did in 1953. Concho, Pawnee, Comanche, and Kharkof, among others, had weights below 58 pounds, a level required for the No. 2 market grade. Early Blackhull and 12871 were the earliest to head and ripen. C.I. 12873 and 13007 had the shortest straw while 12804 and 13004 lodged least. Leaf rust resistance was most evident in 12874 and Concho, whereas stem rust readings were lowest on 12874 and 12872.

Table 11. Summary of the average yields in bushels per acre made by the 22 entries grown in the uniform yield nursery at 13 stations in 1954, with state averages.

Variety	C.I. No.	TEXAS					OKLAHOMA					KANSAS					COLORADO	NEBRASKA				IOWA	13 Station Average
		Denton	Chilli-cothe	Bush-land	Average	Rank	Still-water	Cherokee	Wood-ward	Average	Rank	Man-hattan	Garden City	Colby	Average	Rank	Ft. Col-lins	Lincoln	North Platte	Average	Rank	Ames	
Concho	12517	33.5	34.4	35.1	34.3	1	25.9	26.6	19.4	24.0	2	49.8	14.0	7.1	23.6	7	64.8	47.9	22.9	35.4	5	28.0	31.5
12701 x Wichita	12702 Bl.	35.7	26.6	29.8	30.7	4	21.7	20.7	17.0	19.8	8	51.6	11.1	8.6	23.8	6	62.6	50.3	20.3	35.3	6	27.5	29.5
12701 x Wichita	12702 W	37.9	26.3	33.6	32.6	2	22.1	25.3	16.6	21.3	6	51.6	8.4	8.5	22.8	10	62.3	45.3	19.2	32.3	13	22.3	29.2
Med.-Hope-Pn.x Oro-Ill. 1-Com.	12804	27.5	27.1	30.6	28.4	12	16.6	24.5	14.0	18.4	12	46.0	12.0	13.6	23.9	5	66.0	46.8	20.8	33.8	10	24.6	28.5
Med.-Hope x Pawnee[2]	12873	28.0	24.1	33.3	28.5	11	18.1	22.2	13.4	17.9	15	49.4	14.4	16.2	26.7	1	49.5	51.8	27.3	39.6	1	21.5	28.4
Martin-Tenq.x Chiefkan	13004	33.7	21.4	30.5	28.5	10	21.6	26.1	17.3	21.7	4	40.8	11.5	9.6	20.6	20	77.4	44.8	14.3	29.6	16	19.8	28.4
Pawnee	11669	26.1	25.5	32.7	28.1	14	18.9	22.5	14.1	18.5	10	47.4	11.3	16.2	25.0	2	66.1	43.9	27.0	35.5	4	15.3	28.2
Kanred x Clarkan	13002	33.6	30.5	23.4	29.2	8	25.9	28.5	21.3	25.2	1	43.8	10.1	13.8	22.6	11	72.2	33.1	17.1	25.1	21	12.4	28.1
Ea. Blkhl.-Tenq.x Oro-Med.-Hope	12871	35.7	20.9	32.6	29.7	5	17.1	21.4	16.4	18.3	14	48.7	10.4	7.7	22.3	13	61.2	46.3	23.4	34.9	8	22.4	28.0
Turkey x Cheyenne	12711	29.2	26.7	28.2	28.0	15	20.0	24.3	14.9	19.7	9	43.6	15.8	15.5	25.0	3	67.0	42.7	22.6	32.7	12	9.9	27.7
Pawnee x Cheyenne	13007	31.8	22.7	30.2	28.2	13	16.7	21.7	13.0	17.1	17	46.0	13.6	15.0	24.9	4	63.2	44.7	23.3	34.0	9	17.1	27.6
Med.-Hope-Pu. x Oro-Ill. 1-Com.	12872	28.4	25.9	27.5	27.3	16	15.6	20.7	11.7	16.0	20	46.3	7.6	10.2	21.4	18	61.2	50.2	24.1	37.2	3	26.6	27.4
Pawnee x Cheyenne	12715	35.9	24.1	25.6	28.5	9	16.0	19.7	12.1	15.9	21	43.1	11.6	12.2	22.3	12	71.9	41.9	25.3	33.6	11	10.5	26.9
Blackhull	6251	40.1	26.6	21.9	29.5	6	20.9	25.0	18.3	21.4	5	42.4	8.3	14.0	21.6	17	65.2	38.7	15.9	27.3	19	12.1	26.9
Med.-Hope x Comanche[2]	12874	28.2	24.3	27.5	26.7	19	17.9	19.4	15.1	17.5	16	44.2	12.2	9.2	21.9	14	55.3	50.1	24.5	37.3	2	17.8	26.6
Comanche	11673	35.3	21.7	24.6	27.2	17	17.8	22.5	14.7	18.3	13	47.5	13.2	9.6	23.4	8	60.8	39.7	21.2	30.5	16	16.4	26.5
Kanred x Clarkan	13003	38.0	30.0	25.5	31.2	3	25.8	27.1	18.7	23.9	3	38.1	11.1	12.0	20.4	21	60.1	32.7	13.0	22.9	22	9.1	26.2
Pawnee x Cheyenne	12875	31.3	23.0	18.5	24.3	20	19.0	21.0	15.3	18.4	11	41.2	13.4	14.8	23.1	9	57.2	42.2	21.8	32.0	14	21.6	26.2
Oro x Blkhl. -Hd. Fed.	13001	26.0	28.3	27.1	27.1	18	21.6	24.5	15.3	20.5	7	40.9	10.0	14.6	21.8	15	53.4	36.9	21.5	29.2	18	18.2	26.0
12701 x Wichita	12703	24.0	19.7	23.7	22.5	22	16.4	20.7	13.3	16.8	18	42.0	11.8	8.7	20.8	19	71.4	43.4	15.4	29.4	17	22.3	25.6
Early Blackhull	8856	31.9	16.1	21.6	23.2	21	16.1	20.5	13.0	16.5	19	38.8	7.4	9.9	18.7	22	64.9	44.1	17.8	31.0	15	20.9	24.8
Kharkof	1442	31.7	31.9	24.0	29.2	7	10.1	20.1	12.4	14.2	22	38.7	13.0	13.7	21.8	16	57.8	27.6	23.0	25.3	20	8.4	24.0

Table 12. Summary of the two-year average yields in bushels per acre for 20 varieties grown in the uniform yield nursery at 9 stations in 1953 and 1954, with state averages.

Variety	C.I. No.	TEXAS					OKLAHOMA					KANSAS		NEBRASKA				9
		Denton	Chilli-cothe	Bush-land	Average	Rank	Still-water	Cherokee	Wood-ward	Average	Rank	Man-hattan	Rank	Lincoln	North Platte	Average	Rank	Station Average
Concho	12517	36.9	26.9	24.2	29.3	1	23.5	26.1	19.0	22.9	2	40.2	1	47.8	28.5	38.2	1	30.3
Ea.Blkhl.-Tenq.x Oro-Med.-Hope	12871	39.0	20.6	22.9	27.5	2	22.5	26.0	18.3	22.3	4	36.3	6	46.3	27.9	37.1	3	28.9
12701 x Wichita	12702Bl.	35.9	21.6	22.3	26.6	4	23.0	22.9	18.9	21.6	9	39.1	2	44.1	27.1	35.6	7	28.3
Med.-Hope x Pawnee[2]	12873	31.7	19.2	23.7	24.9	12	20.0	23.3	15.1	19.5	15	37.4	3	45.6	30.6	38.1	2	27.4
Turkey x Cheyenne	12711	32.9	24.5	20.7	26.0	6	22.2	23.5	17.0	20.9	11	36.5	5	42.8	25.7	34.3	9	27.3
Pawnee	11669	32.4	23.0	22.1	25.8	7	21.0	22.7	15.5	19.7	13	37.2	4	42.4	29.2	35.8	6	27.3
Med.-Hope-Pn. x Oro-Ill.1-Com.	12804	31.7	22.6	21.5	25.3	10	20.4	26.1	15.4	20.6	12	34.8	10	41.2	26.7	34.0	10	26.7
Martin-Tenq. x Chiefkan	13004	36.9	19.1	20.7	25.6	9	23.9	25.9	17.7	22.5	3	33.0	14	40.8	20.7	30.8	15	26.5
Med.-Hope-Pn. x Oro - Ill.1-Com.	12872	32.3	22.1	20.2	24.9	11	19.8	20.7	13.6	18.0	18	35.7	9	46.8	27.2	37.0	4	26.5
Kanred x Clarkan	13002	35.3	26.1	16.9	26.1	5	24.9	25.7	19.0	23.2	1	33.1	13	33.7	23.0	28.4	18	26.4
Blackhull	6251	36.1	21.0	16.5	24.5	13	23.6	23.8	18.5	22.0	7	34.5	11	39.6	22.4	31.0	14	26.2
Pawnee x Cheyenne	12715	36.1	21.9	19.0	25.7	8	18.0	20.2	14.8	17.7	19	35.8	7	41.7	27.7	34.7	8	26.1
Early Blackhull	8856	35.7	15.5	16.5	22.6	18	22.8	26.2	16.9	22.0	8	34.0	12	44.2	20.4	32.3	13	25.8
Med.-Hope x Comanche[2]	12874	28.8	21.2	19.2	23.1	17	20.9	22.3	15.7	19.6	14	31.9	18	44.3	27.6	36.0	5	25.8
Comanche	11673	35.6	18.4	18.6	24.2	15	19.6	22.3	15.8	19.2	16	35.7	8	39.2	25.7	32.5	12	25.7
Oro x Blkhl. - Hd. Fed.	13001	32.9	20.6	19.0	24.2	16	24.5	23.7	18.0	22.1	5	30.8	19	36.7	24.1	30.4	16	25.6
Pawnee x Cheyenne	12875	31.6	19.6	16.0	22.4	19	22.4	23.9	17.6	21.3	10	32.8	15	40.2	24.9	32.6	11	25.4
Kanred x Clarkan	13003	37.9	24.0	17.9	26.6	3	24.1	24.1	17.7	22.0	6	27.8	20	31.9	18.7	25.3	20	24.9
Kharkof	1442	30.4	23.2	19.1	24.2	14	16.5	19.8	14.6	17.0	20	32.4	17	29.8	24.3	27.1	19	23.3
12701 x Wichita	12703	26.7	16.2	18.1	20.3	20	20.1	21.6	15.0	18.9	17	32.4	16	39.1	20.7	29.9	17	23.3

Table 13. Summary of agronomic data other than yield for varieties grown in the uniform yield nursery, 1954.

Variety	C.I. No.	Date		Plant height	Lodging	Rust		Weight per bushel
		Headed	Ripe			Leaf	Stem	
		May	June	Ins.	%	%	%	Lbs.
Number of stations		12	8	13	3	5	5	14
Ea. Blkhl.-Tenq. x Oro-Med. - Hope	12871	10	11	30	44	11	45	60.3
Early Blackhull	8856	8	9	30	47	40	28	59.3
Med.-Hope-Pn.x Oro-Ill. 1-Com.	12872	14	13	31	22	20	8	59.1
12701 x Wichita	12702 Bl.	12	11	32	41	10	17	59.0
12701 x Wichita	12703	12	12	31	24	11	22	58.9
Med.-Hope x Comanche^2	12874	13	13	30	22	3	7	58.8
Med.-Hope x Pawnee^2	12873	13	12	29	20	7	10	58.6
Pawnee x Cheyenne	12875	13	13	31	30	50	20	58.6
Blackhull	6251	16	16	33	25	40	30	58.4
Med.-Hope-Pn. x Oro-Ill. 1-Com.	12804	12	13	30	15	34	13	58.4
Pawnee x Cheyenne	12715	14	13	32	23	57	25	58.2
12701 x Wichita	12702 W	12	12	32	47	12	26	58.1
Concho	12517	13	13	30	39	5	49	57.9
Pawnee	11669	12	13	30	26	45	20	57.9
Turkey x Cheyenne	12711	14	14	30	22	42	32	57.8
Pawnee x Cheyenne	13007	13	12	29	21	49	27	57.6
Oro x Blkhl. - Hd. Fed.	13001	14	14	30	74	46	20	57.4
Martin-Tenq. x Chiefkan	13004	17	16	31	18	48	51	56.8
Comanche	11673	14	13	32	34	31	25	56.8
Kharkof	1442	18	17	33	32	37	24	56.1
Kanred x Clarkan	13002	17	16	34	31	33	42	55.6
Kanred x Clarkan	13003	18	16	34	34	36	39	54.4

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 1953-54 at Alliance, Akron, St. Paul, Moccasin, and Dickinson. Some usable data were obtained which 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 1954, varieties were planted at eight stations, but no very satisfactory hardiness data were obtained. Yield of grain and weights per bushel were taken at several stations. These data appear in Table 14. No attempt has been made to analyze these data further as their meanings on a regional basis, if any, are not clear. It was to dry too get stands at St. Paul and Brookings and the crop was lost from hail at Alliance. In recent years this test has provided less information than in earlier years, owing in part to drought complications and a series of mild winters.

Table 14. Summary of grain yields and weights per bushel for varieties grown in the uniform winterhardiness nursery, 1954.

Variety	C.I. or Sel. No.	Av. acre yield in bushels at - - - -					Weight per bushel in pounds at - -			
		Ames	Sheridan	Dickinson	Havre	Lethbridge	Sheridan	Dickinson	Havre	Lethbridge
Kharkof	1442	6.7	13.3	9.6	24.9	38.1	52	49	57	65
Kharkof MC22	6938	2.0	10.4	4.9	22.4	35.3	50	45	53	63
Nebred	10094	11.2	13.0	9.7	27.8	38.6	55	50	57	66
Minturki	6155	9.7	11.3	10.2	19.9	37.8	52	48	57	65
Minter	12138	17.5	14.4	9.6	25.9	39.1	54	48	56	65
Yogo	8033	6.8	12.4	12.6	23.4	36.7	52	48	55	65
Sioux	12142	13.4	16.0	9.1	26.2	35.6	52	47	55	64
Turkey x Chey.	12711	13.6	13.3	9.0	30.4	43.4	53	50	58	65
Ho.-Tk. x Chey.	12716	19.6	13.8	10.6	23.7	35.3	54	49	56	65
Hope x Chey.^{2}	12717	22.3	16.8	11.7	26.3	35.3	59	51	57	66
Chey. - H44 x Chey. Sel.	N461529	12.3	13.0	12.4	25.0	35.3	52	49	57	65
Chey. Sel. x Turkey	N462239	12.5	15.2	9.6	25.0	42.2	52	48	56	66
Yogo Comp. (Elite)	---	4.3	12.0	10.3	25.3	38.3	51	44	57	64
Yogo resel. (good)	---	6.6	12.9	9.8	21.3	38.8	51	47	56	65
H44 x Mint.^{4}	Minn.2844	16.3	15.1	10.5	19.3	35.6	57	46	59	66
Ch.-Chief. x H44-Mint.^{2}	"2863	21.4	13.2	13.7	24.2	37.1	54	51	57	65
Mint. x Tim.- Vulgare^2	12806	5.2	7.4	8.8	11.3	33.6	--	50	56	66
Concho	12517	23.8	13.9	6.2	18.6	34.8	52	50	56	66
Ch.-R. Ch. x Pn.-Mqo.- Oro	13008	9.9	15.0	6.7	21.6	43.9	60	51	60	66
L. S. D.(.05)		3.6	3.6	--	--	3.6	--	--	--	--

UNIFORM VARIETY-PROTEIN NURSERY

Eight varieties of wheat were grown in a replicated yield nursery at three 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 trials in southeastern states' showed high protein content in that region; namely, Atlas 66, Atlas 50, and Taylor. These with five Plains' varieties comprised the entries uniformly grown in the Variety-Protein Nursery. Certain other varieties were added by each state.

Yield of grain and percentage of protein are shown in Table 15. Within the group of 8 uniform varieties, Comanche at Stillwater, Wichita at Denton, Comanche at Chillicothe, and Quanah at Pullman had the highest grain yields. At Pullman the highest percentage of protein was in C.I. 12511. Tests have not been finished on grain from the other stations.

This is the second year for the variety-protein test. A third season's data will be gathered and at that time a critical study of the data will be made with the expectation that a revision of procedure or of objective, or both, may be desirable.

Table 15. Yield of grain in bushels per acre and protein content for varieties grown in the uniform protein nursery at 4 stations in 1954. 1/

Variety	C.I. or Sel. No.	Stillwater, Oklahoma	Denton, Texas	Chillicothe, Texas	Pullman, Wash.	
					Yield	Protein
		Bus.	Bus.	Bus.	Bus.	%
Comanche	11673	16.4	44.9	25.3	43.0	9.0
Atlas 66	12561	13.8	33.8	16.1	34.8	9.5
Wichita	11952	12.7	48.2	19.8	42.7	8.6
Atlas 50	12534	12.4	35.3	16.0	37.6	9.8
Frisco	13106	11.3	40.3	13.2	41.5	8.9
Taylor	12461	10.5	39.6	22.0	29.4	9.5
29-34-275 D. Cr.	12511	10.3	43.5	18.3	33.7	9.9
Quanah	12145	9.6	40.9	20.6	50.2	9.4
Concho	12517	21.3	--	--	--	--
Triumph	12132	8.8	--	--	--	--
Alba	---	--	--	--	62.5	7.8

1/ Protein analyses not completed on samples from Stillwater, Denton, and Chillicothe.

DATA FROM THE DISEASE NURSERIES

The Uniform Bunt Nursery was grown at eight stations in 1954. 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, especially those descending from C.I. 12250. This disease has spread up and down the Rocky Mountains and has increased in Pennsylvania, New York, and eastern Canada. A five-year summary of bunt tests is being prepared.

The Uniform Rust Nursery data likewise will appear as a separate report. The best resistance to leaf rust in 1954 among the hard winters was in Concho, two Agropyron derivatives (C.I. 13014 and 13113), and two Hope derivatives (C.I. 12801 and 13112). The best stem rust resistance appeared in two Agropyron derivatives (C.I. 13113 and 13114) and three timopheevi derivatives (C.I. 12662, 13093, and 13005).

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.