UNITED STATES DEPARTMENT OF AGRICULTURE *--*
AGRICULTURAL RESEARCH SERVICE
CROPS RESEARCH DIVISION

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COMPARISON OF WINTER WHEAT VARIETIES GROWN IN COOPERATIVE NURSERY EXPERIMENTS IN THE HARD RED WINTER WHEAT REGION IN 1961

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Preliminary report, not for publication[1/]

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Nebraska Agricultural Experiment Station
Lincoln, Nebraska
CR-14-62

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By

V. A. Johnson[1/]

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1/ The writer expresses appreciation to Dorothy M. Wilson, Mrs. Alyce Ann Schmidt, and Robert Divoky for their assistance in preparing this report.

RANDOM NOTES FROM THE REGION

The Ninth Hard Red Winter Wheat Workers Conference was held at Lincoln, Nebraska, January 16-18, 1962. The 2½-day meeting was attended by research and industry people from 20 states, Mexico and Canada. The theme of the conference was "hard red winter wheat in the next decade." One-half day work sessions were devoted to each of three general topics,--winter wheat quality in relation to production and marketing, hard winter wheat production practices and problems, and role of genetics and wheat breeding in production and marketing efficiency.

A Wheat Literature Service will be established at the University of Nebraska in 1962. Objectives of the Service are as follows: (1) Bring together all references on wheat in a monthly publication. The publication will contain abstracts of the major articles on wheat and will list others by title. (2) Establish a photocopying service that would place in the hands of research workers, on request, the full text of materials which may be of interest to them on the basis of listings in Wheat Abstracts. (3) Establish an IBM card file on all material listed or abstracted in Wheat Abstracts to permit rapid subject-matter retrieval. The service will be financed for an initial 5-year period by grants from the Nebraska Agricultural Products Research Fund Committee, The Nebraska Wheat Commission, Great Plains Wheat Inc., The Nebraska Wheat Growers Association, the Colorado Wheat Commission, and the North Dakota Wheat Commission. Miss Margaret Drenowatz, North Carolina State College, has been retained as consulting editor of the service for the first year.

PERSONNEL CHANGES

James Wilson, agronomist at the Ft. Hays Branch Station in Kansas, resigned to accept a research position with the DeKalb Agriculture Association at Lubbock, Texas. He is succeeded at the Ft. Hays station by R. W. Livers, formerly superintendent of the Plains Substation at Clovis, New Mexico.

E. C. Gilmore, USDA agronomist at Texas Substation No. 6, Denton, Texas, was transferred to St. Paul, Minnesota to assist with the spring wheat research. He is pursuing further graduate study at the University of Minnesota. Wheat nurseries at the Denton station will be continued under the supervision of personnel at College Station, Texas.

Keith Lahr has been named superintendent of the Substation No. 12 at Chillicothe, Texas, following the resignation of former Superintendent Roy Quinby. Mr. Quinby becomes Director of Sorghum Research for Pioneer Hybrid Seed Company at Plainview, Texas. Keith will continue state and regional winter wheat evaluation work at Chillicothe.

Norman Malm was appointed as agronomist at the Plains Station at Clovis, New Mexico. He will take over the wheat breeding and evaluation projects at the Clovis Station.

Byron S. Miller, Cereal Chemist in the USDA Hard Wheat Quality Laboratory, Kansas State University, has joined the research staff of General Mills at Minneapolis, Minnesota.

Arlin B. Ward, until recently with Pillsbury Mills in Minneapolis, has joined the staff of the Dept. of Flour and Feed Milling Industries at Kansas State University.

Greg Hinze replaces F. P. Frazier as agronomist at the U. S. Central Great Plains Station at Akron, Colorado.

J. D. Eastin has joined the staff of the Wheat Quality Laboratory in the Agronomy Dept., University of Nebraska. He will engage in wheat protein research.

COOPERATING AGENCIES, STATIONS, AND PERSONNEL
(The asterisk indicates U.S.D.A. employees)

CEREAL CROPS RESEARCH BRANCH, A.R.S., U.S.D.A.

Wheat Investigations		L. P. Reitz*
Hard Red Winter Wheat Region		V. A. Johnson*
Rust Investigations		W. Q. Loegering*
Quality Investigations		K. F. Finney*

TEXAS AGRICULTURAL EXPERIMENT STATION:

College Station	Texas A. & M. College	
Agronomy		I. M. Atkins*(State Leader)
Plant Physiology and Pathology		M. C. Futrell*
Denton	Substation No. 6	J. H. Gardenhire
Chillicothe	Substation No. 12	K. A. Lahr
Bushland	Southwestern Great Plains Field Sta.	K. B. Porter
		N. E. Daniels

NEW MEXICO AGRICULTURAL EXPERIMENT STATION:

Clovis	Plains Substation	Dave B. Ferguson 1963
		~~Norman Malm~~

OKLAHOMA AGRICULTURAL EXPERIMENT STATION:

Stillwater	Oklahoma State University	
Agronomy		A. M. Schlehuber(State Leader)
		~~B. G. Curtis~~
		E. E. Sebesta*
		B. B. Tucker
		O. D. Smith
		R. M. Oswalt
Botany and Plant Pathology		H. C. Young
		R. C. Bellingham*
Entomology		C. F. Henderson*
		E. A. Woods, Jr.*
Biochemistry		D. C. Abbott
Cherokee	Wheat Land Conservation Sta.	H. R. Myers
Woodward	Southern Gr. Plains Field Sta.	R. A. Hunter
Goodwell	Panhandle Agr. Exp. Station	R. A. Peck

ZIP 73939

KANSAS AGRICULTURAL EXPERIMENT STATION:

Manhattan	Kansas State University	
Agronomy		E. G. Heyne
		A. W. Pauli
		F. W. Stickler
Botany and Plant Pathology		C. O. Johnston*
		W. H. Sill
		E. D. Hansing
		L. E. Browder*
Entomology		R. H. Painter
		E. T. Jones*
		H. W. Somsen*
Flour and Feed Milling Industries		J. A. Shellenberger
		J. A. Johnson
Hays	Ft. Hays Branch Station	R. W. Livers
		W. M. Ross*
Garden City	Garden City Agr. Exp. Sta.	W. D. Stegmeier
Colby	Colby Branch Station	J. R. Lawless

COLORADO AGRICULTURAL EXPERIMENT STATION:

Ft. Collins	Colorado State University	
Agronomy		~~T. E. Haus~~ Dr. B.C. Curtis
Akron	U. S. Central Gr. Plains Sta.	Greg Hinze
Hesperus	San Juan Basin Branch Sta.	V. B. Cardwell
Springfield	Southeastern Colo. Br. Sta.	H. O. Mann

IOWA AGRICULTURAL EXPERIMENT STATION:

Ames	Iowa State University	
Agronomy		R. E. Atkins

NEBRASKA AGRICULTURAL EXPERIMENT STATION:

Lincoln	University of Nebraska	
Agronomy		V. A. Johnson*
		J. W. Schmidt
		M. R. Morris
		P. J. Mattern
		J. D. Eastin
North Platte	North Platte Exp. Station	P. T. Nordquist
		K. P. Pruess
Alliance	Box Butte Exp. Station	P. L. Ehlers
		C. R. Fenster
Concord	Northeast Nebr. Exp. Sta.	A. D. Flowerday

WYOMING AGRICULTURAL EXPERIMENT STATION:

Laramie	University of Wyoming	
Div. of Plant Sci. (Crops)		B. J. Kolp
Plant Pathology and Horticulture		G. H. Bridgmon
Cheyenne	Archer Substation	T. L. Birch
Gillette	Gillette Substation	L. R. Landers
Sheridan	Sheridan Substation	A. F. Gale

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Brookings	South Dakota State College	D. G. Wells
Agronomy		~~V. A. Dirks~~ Frank Holmes
Highmore	Central Substation	

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION:

Fargo	North Dakota Agricultural College	
Agronomy		G. S. Smith
Dickinson	Dickinson Substation	T. J. Conlon

MONTANA AGRICULTURAL EXPERIMENT STATION:

Bozeman	Montana State College	
Agronomy and Soils		E. R. Hehn
		C. R. Haun*
		C. A. Watson
Moccasin	Central Mont. Branch Station	A. L. Dubbs H. R. Guenthner
Huntley	Huntley Branch Station	D. E. Baldridge
Havre	North Montana Branch Station	B. McCallum

MINNESOTA AGRICULTURAL EXPERIMENT STATION:

St. Paul	Institute of Agriculture	
Agronomy and Plant Genetics		E. R. Ausemus*
Waseca	Southern Experiment Station	R. E. Hodgson

ILLINOIS AGRICULTURAL EXPERIMENT STATION:

Urbana	University of Illinois	
Agronomy		R. O. Weibel
Plant Pathology		W. M. Bever

CANADA DEPARTMENT OF AGRICULTURE:

Lethbridge	Alberta Agr. Exp. Station	M. N. Grant

ACCESSION NUMBERS ASSIGNED

Hard winter wheats assigned C. I. numbers at Lincoln in 1961 are listed below. When a number is assigned, seed of that variety is added to the permanent collection maintained by the Cereal Crops Research Branch at Beltsville, Maryland. C. I. numbers take precedence over state and local numbers in this report, and their use by wheat workers in published reports and correspondence is urged.

C. I. No.	Pedigree	State No.	Source
13664	Blackhull (extra early)	----	Texas
13665	(Mida-Ky117A x Cnn-Tm-Mi-Hope) x Pn-Cnn	61967	Nebr.
13666	Ponca x Cheyenne^2	57257	Nebr.
13667	Improved Triumph	----	Okla.
13668	Newest Improved Triumph	----	Okla.
13669	Super Triumph	----	Okla.
13670	Winalta	----	Canada
13671	California-6097	8098	Calif.
13672	Yogo x Ridit-Kanred-Sevier	226-173-11	Utah
13673	Ridit-Kanred-Sevier x Oro-Ridit	231-4-1-13	Utah

Continued on page 5

C. I. No.	Pedigree	State No.	Source
13674	Rex-Rio-Cheyenne^2 x Turkey^2	60M2164-C	Idaho
13675	Rex-Rio x Cheyenne^6	60M946	Idaho
13676	Alicel-Rex, P-80 x Cheyenne,^{2}Sel.4	60BF4	Idaho
13677	Seu Seun 27 x Nebr. 60-Mi-Hope	533321	Nebr.
13678	Norin 16 x Nebr. 60-Mi-Hope	551146	Nebr.
13680	Cmn-Honor-Forward-Cmn-Mi-Hope x LPr25	Tx333-56-18	Texas
13681	Svl-Wi-Hope-Cnn-Wi^2 x Seu Seun	Tx391-56-D4	Texas
13682	Frontana x Minter^2	Minn. II-51-6	Minn.

NEW VARIETIES

No new varieties were distributed in the hard red winter wheat region in 1961. The varieties Ottawa (C. I. 12804), Kaw (C. I. 12871), Omaha (C. I. 13015), Warrior (C. I. 13190), and Colorow (C. I. 12865) released in 1960 have had excellent grower acceptance. Ottawa is recommended for production in eastern Kansas and southeastern Nebraska; Kaw in Kansas and Oklahoma in areas of those states now growing Wichita; Omaha in eastern Nebraska and the eastern portion of the winter wheat-producing area of South Dakota; Warrior in western Nebraska, Colorado, Wyoming and South Dakota; and Colorow in the dwarf smut-infested areas of western Colorado.

Several experimental strains are under increase in the region. In Texas, C. I. 13536 (Wichita x Mql-Oro) has shown considerable promise. It combines high test weight, good yield, and early maturity with resistance to prevalent races of leaf rust and stripe rust.

Initial seed increase of 3 experimental varieties is underway in Nebraska. They are C. I. 13532 (Pnc x Mi-Hope-Pn), C. I. 13546 (Nbr-Hope-Tk x Cnn-Pnc), and C. I. 13547 (Tk-Cnn x Hope-Cnn^2). All carry the Hope resistance to stem rust and have been highly productive in state and regional trials. C. I. 13532 possesses leaf rust resistance and moderate resistance to hessian fly. C. I. 13546 appears to have a broad area of adaptation; it is almost as early as Wichita and is highly tolerant to wheat streak mosaic. C. I. 13547 is winter-hardy, has short stiff straw, and is one day earlier than Warrior.

Northern winter wheat varieties that show some promise include C. I. 13526 (So. Dakota Sel.) and C. I. 13542 /Yogo x (Tk x Oro 221)-117/ developed in Montana. Both combine high winter hardiness with other desirable agronomic characteristics and satisfactory quality.

THE WINTER WHEAT CROP

Winter wheat in the amount of 1,076 million bushels was produced in 1961, the third largest of record. An average yield of 26.4 bushels per harvested acre also was the third highest of record and exceeded the average by more than 5 bushels.

Moisture supplies in the fall and winter were adequate in the southern

and central plains but were critically short in the northern plains. Considerable difficulty in establishing adequate stands of winter wheat was experienced in many areas north of Nebraska. Winter losses were light but stem rust took a heavy toll of wheat in northern Kansas and Nebraska. Race 56 predominated.

Winter wheat production data for the 11 states comprising the hard red winter wheat region appear in the tabulation that follows.

State	Acres		Abandonment	1961 production 1/	1961 av. acre yield 2/	1950-59 av. acre yield 2/
	Seeded 1/	Harvested 1/				
			%	Bu.	Bu.	Bu.
Texas	4,067	3,690	9.3	84,870	23.0	12.3
Oklahoma	4,887	4,618	5.5	110,832	24.0	14.7
New Mexico	291	276	5.2	8,004	29.0	9.8
Kansas	10,727	10,329	3.7	273,718	26.5	17.7
Nebraska	3,326	3,209	3.5	78,620	24.5	22.8
Colorado	2,602	2,443	6.1	56,189	23.0	17.0
Wyoming	232	203	12.5	4,263	21.0	19.1
Montana	2,369	2,058	13.1	39,102	19.0	23.0
South Dakota	721	574	20.4	10,332	18.0	18.6
Iowa	104	97	6.7	2,522	26.0	22.8
Minnesota	26	25	3.8	688	27.5	22.1

1/ In thousands.

2/ Based on harvested acres. Data taken from the 1961 Annual Summary, Crop Production, U. S. Dept. of Agriculture, Statistical Reporting Service, Crop Reporting Board.

UNIFORM QUALITY SERIES

A small number of advanced experimental strains and newly released varieties, together with selected check varieties, are grown each year in a uniform quality series to provide seed for quality evaluation at the Hard Winter Wheat Quality Laboratory at Kansas State University. Grain in the amount of 10 pounds of each variety from each location is provided to the laboratory for evaluation. The varieties comprising the series in each district in 1961 were as follows:

Southern District		Central District	
Pawnee*	C. I. 11669	Pawnee*	C. I. 11669
Comanche*	C. I. 11673	Comanche*	C. I. 11673
Aztec	C. I. 13016	Kaw	C. I. 12871
Tascosa	C. I. 13023	Ottawa	C. I. 12804
Kaw	C. I. 12871	Omaha	C. I. 13015
Chiefkan x Tenmarq	K. 501097	Chiefkan x Tenmarq	K. 501097
do.	K. 501099	do.	K. 501099
Chiefkan x Comanche	K. 501212	Chiefkan x Comanche	K. 501212
Qv-Tm x Mql-Oro	C. I. 12995	Qv-Tm x Mql-Oro	C. I. 12995

Northern District

Minter*	C. I. 12138
Yogo*	C. I. 8033
Nebred*	C. I. 10094
Warrior	C. I. 13190

* Check variety.

SOUTHERN REGIONAL PERFORMANCE NURSERY

Data were reported from 19 of 20 stations growing the nursery in 1961. Urbana, Illinois, grew the nursery for the first time. Severe hail on the last day of May destroyed the nursery at Colby, Kansas and hail spoiled the yields at Bushland. The nursery was composed of 18 entries, 5 more than the number in 1960. Varieties included in the nursery this year are listed below.

Entry No.	Variety or pedigree	C. I. No.	State submitting
1	Kharkof	1442	----
2	Blackhull	6251	----
3	Early Blackhull	8856	----
4	Comanche	11673	----
5	Concho	12517	----
6	Pnc x Mi-Hope-Pn	13532	Nebr.
7	(Mql-Oro x Oro-Tm) x Mi-Hope-Pn	13533	Colo.
8	(Cmn x Mi-Hope) x Iowin	13534	Iowa
9	Kv x (Iowin x Tt-WP5)	13535	Iowa
10	Wichita x Mql-Oro	13536	Texas
11	(RCh x Tk-Oro-Fn) x Mql-Oro	13537	Texas
12*	Nbr-Hope-Tk x Cnn-Pnc (N. 56178)	13546	Nebr.
13*	Triumph x T-Ae	13523	Okla.
14*	Triumph	12132	Okla.
15*	Improved Triumph	13667	Okla.
16*	Super Triumph	13669	Okla.
17*	Newest Improved Triumph	13668	Okla.
18*	Cmn x (Mi-Hope-Pn x Oro-Il#1-Cmn)(K.56644)	13548	Kans.

* New entry in 1961.

DATA OBTAINED

Yield and other agronomic data submitted by the reporting stations appear in table 1.

The nursery at Denton, Texas, was grown on land fallowed for one crop year. Full stands of all entries had emerged by October 26. Traces of leaf rust were present on November 18 which developed into a moderately severe infection by late December. Mildew on the lower leaves was present

throughout most of the winter. Moisture was adequate throughout the winter and by March 24 the wheat had begun to joint. Leaf rust again was moderately severe. Dry weather in April held down the diseases present in the nursery. Insects were not a problem. C. I. 13546 and C. I. 13532 were highest yielding followed by C. I. 13548 and C. I. 13523 in that order. Excellent resistance to leaf rust was exhibited by 6 varieties in the nursery. Bushel weights were high with all varieties weighing 60 pounds or more.

The nursery at Chillicothe was seeded on November 1 in good soil moisture and full stands were obtained. Leaf rust and Septoria tritici became prevalent in late November and early December. The month of January was the coldest since 1949. A minimum temperature of 11°F. was recorded. Heavy precipitation occurred in March. Dry weather in April and May prevented leaf rust from becoming damaging. The four Triumphs and C. I. 13523 were the most productive at Chillicothe. All yielded more than 40 bushels per acre. Only C. I. 13535 produced grain weighing less than 60 pounds per bushel.

Soil moisture was adequate from seeding time until early spring at Bushland. The amount of precipitation in April and May was too low to be beneficial. Three hail storms in late May and early June severely damaged the dryland and irrigated nurseries at Bushland. The nurseries were harvested for seed but yields were not recorded. Some commercial fields in the Bushland area were damaged severely by wheat streak mosaic. C. I. 13536 and 13537 showed the best resistance to lodging in the irrigated nursery.

Soil at Clovis, New Mexico, was wet to a depth of 5 feet in late fall. Fall emergence and growth of the wheat was slow due to unseasonable cold weather. The nursery was damaged by blowing soil in March. There was no winterkilling. A 2-inch rain in March followed by fair precipitation in May and June permitted good yields to be made. C. I. 13546 significantly outyielded all other varieties in the nursery. It also produced grain with the highest bushel weight.

The nursery was seeded on September 28 under good soil moisture conditions at Stillwater, Oklahoma. It was grown on fallow land to which 41 lbs. of P_2O_5 had been applied on September 2. Good stands were obtained. Some moisture stress was apparent in April and early May but thereafter until harvest rainfall was adequate and cool temperatures prevailed. A moderately heavy infestation of aphids may have caused some damage in the spring. The damage from aphids may have been confounded with barley yellow dwarf and/or nematodes. Leaf and stem rusts were present in trace amounts only. C. I. 13546 was significantly more productive than all other varieties in the nursery with a 47.3-bushel yield. C. I. 13548 and Concho also made yields exceeding 40 bushels.

At Woodward, Oklahoma, the nursery was seeded on fallow land in good soil moisture on October 1. The nursery was topdressed on March 27 with 60 lbs. of nitrogen per acre. The topdressing raised the yields as well as the protein content of the grain. A moderate infection of leaf rust developed in the fall but appeared in only trace amounts in the spring.

Cool weather with adequate moisture throughout the spring growing season produced high grain yields. Five varieties, including Improved Triumph, Super Triumph, Concho, C. I. 13546, and C. I. 13536, made yields in excess of 50 bushels per acre. Only 3 varieties yielded less than 40 bushels per acre and only 3 varieties produced grain weighing less than 60 pounds per bushel.

The nursery at Cherokee, Oklahoma, was seeded on October 5 on fallow ground. Forty pounds of P_2O_5 was applied before seeding and the nursery was topdressed with 65 pounds of N per acre in the spring. The wheat was in excellent condition in late May but the flag leaves of susceptible varieties were severely damaged by Septoria. Medium to heavy leaf and stem rust developed on susceptible varieties. Lodging on May 25 ranged from 5 to 85 percent and became more pronounced as the wheat matured. Moisture stress was not apparent at any time during the season nor was there evidence of insect damage. Grain yields were large. Eleven varieties produced yields in excess of 50 bushels with C. I. 13523, C. I. 13532, and C. I. 13546 in that order the highest yielding. Bushel weights ranged from 62.1 pounds for C. I. 13548 to 57.2 pounds for Concho. High leaf rust resistance was shown by 7 varieties. C. I. 13532 and C. I. 13548 lodged the least.

Generally excellent conditions of moisture and temperature prevailed throughout the season at Manhattan, Kansas. The spring was cool and nitrogen deficiency was evident in the nursery. Both leaf and stem rust were late appearing. Little or no damage occurred from the former but stem rust is believed to have caused some damage to susceptible varieties. The yields of C. I. 13548 and C. I. 13532 exceeded 50 bushels per acre. Seven varieties, 6 of which carry the Hope resistance to stem rust, exhibited moderate resistance to leaf rust. Five of the varieties possessed combined resistance to leaf and stem rust. Only C. I. 13548, Concho, and Comanche were resistant to bunt in an artificially inoculated nursery at Manhattan. C. I. 13534 and C. I. 13535 were moderately resistant to bunt. The lack of bunt resistance in many of the experimental varieties in the nursery should be cause for concern among wheat breeders in the region.

Soil moisture was adequate throughout the entire season at Hays, Kansas. Good stands were obtained in the fall and no winter injury was observed. A light hessian fly infestation was noted in the nursery in the fall. A cool, moist spring favored the development of both leaf and stem rust. Rust is believed to have damaged susceptible varieties. Mild nitrogen deficiency was evident in the spring. Five varieties yielded more than 40 bushels per acre with C. I. 13546, C. I. 13532, and C. I. 13548 in that order the most productive. Leaf and stem rust reactions of varieties at Hays were similar to those observed at Manhattan. C. I. 13548 was the only variety in which no lodging occurred at Hays. C. I. 13532 was the second most lodge-resistant variety.

Unusually high yields of grain at Garden City are indicative of the excellent growing conditions at that station. C. I. 13546 yielded more than 50 bushels per acre and all but 3 varieties yielded more than 40 bushels. Ten varieties produced grain weighing 60 pounds per bushel or more. Straw was short and no lodging occurred.

The fall was dry at Ft. Collins. Irrigation was necessary for germination. The spring was cold and wet and all plots were heavily lodged by harvest time. Stem rust became heavy but notes were not obtained due to the severely lodged condition of the nursery. Four varieties made yields higher than 50 bushels per acre. C. I. 13546 was highest yielding followed by Triumph, Improved Triumph, and C. I. 13533 in that order. Test weights ranged from 59.9 down to 49.9 pounds per bushel reflecting the combination of heavy stem rust and lodging.

Moisture stress and high temperatures after heading of the wheat at Akron, Colorado, produced shriveled grain and very low bushel weights. All varieties produced grain weighing less than 50 pounds per bushel. Despite the light grain, yields were fair. The Triumph strains, C. I. 13546, and C. I. 13536, were highest yielding, all making more than 20 bushels per acre.

Soil moisture reserves were low at Springfield, Colorado, at seeding time but 2.5 inches of rain in October improved the situation. The remainder of the fall and winter and spring were extremely dry. The period January through May was the driest of record. The condition of the wheat was poor at the beginning of June but a 1-inch rain during the second week of June carried the wheat to maturity with good yields and high bushel weights. Brown wheat mites attacked the wheat in April but the damage was slight. Less than 8 bushels per acre separated the high- and low-yielding varieties in the nursery (22.6-30.5 bushels). Bushel weights ranged from 60.2 to 64.4 pounds. C. I. 13534 was the tallest variety at only 19 inches. Three varieties were only 16 inches tall.

Three inches of rain after seeding provided good moisture for germination and fall growth of the wheat at Hesperus, Colorado. The winter was mild. From April 15 to August 1, rainfall was light and ineffective, necessitating the use of irrigation water on the nursery. Water distribution during the first irrigation (sprinkler) was unequal over the nursery due to high winds. This is believed to be largely responsible for the relatively high variability encountered in the nursery. Insects and diseases were not a problem at Hesperus. Yields ranged from 42.2 to 68.7 bushels per acre. C. I. 13523 was highest yielding and C. I. 13546 was second high with a 64.2-bushel yield. Only the 3 Triumph strains produced grain weighing less than 60 pounds per bushel.

The southern regional performance nursery was under no apparent moisture stress at any time during the fall and spring growing periods at Lincoln, Nebraska, although precipitation during the winter and spring was below normal. Fall growth was less than normal but the nursery survived the winter without loss of stands. The spring was cooler than usual. Both leaf and stem rust became heavy; the latter caused severe damage to susceptible varieties. Races 56, 15B, and 29 were put out in adjacent breeding nurseries. Race 56 became the predominant race and varietal reactions largely reflect the presence of that race. Heavy stem rust is believed to have been responsible for lodging of the weaker strawed varieties. The wide spread in yields and bushel weights are attributed primarily to the heavy stem rust infection and lodging. C. I. 13548, possessing combined resistance to bunt, leaf rust, and stem rust, was the only variety yielding more than 50 bushels per acre. Six varieties produced more than 40 bushels per acre. Only C. I. 13536 among this group was susceptible to stem rust. C. I. 13537 and

C. I. 13523 were the only varieties in the nursery that did not lodge.

The most severe stem rust epidemic of record occurred at North Platte, Nebraska. Stem rust readings recorded in the North Platte table were made early and do not fully reflect the severity of the disease. Varieties possessing resistance to race 56 of stem rust or sufficiently early maturing to escape the full impact of the epidemic produced fair to high yields and bushel weights. Stem rust susceptible medium or late maturing varieties such as Kharkof, Blackhull, Concho, and Comanche produced low yields of grain that weighed less than 50 pounds per bushel. As at Lincoln, C. I. 13548 was outstanding in both yield and test weight. C. I. 13532 and C. I. 13546 in that order were next highest in yield and bushel weight.

Stem rust was not a factor in the performance of varieties at Alliance, Nebraska. The wheat following heading was under severe moisture stress and several days of abnormally high temperatures added to the critical condition of the crop. The performance of varieties in the nursery was highly associated with maturity. Highest yields and test weights were made by the early maturing C. I. 13546 and the Triumph wheats. Among the early varieties, only Early Blackhull failed to yield among the more productive strains in the nursery.

At Ames, Iowa, a normal fall wheat situation prevailed. Although the winter was not considered to be severe, snow cover was light during periods of low temperatures and moderate to severe killing occurred. Development of the wheat was slow in the spring due to cool, wet weather. Both leaf and stem rust became epidemic. Performance of varieties largely reflect combined high winter survival and resistance to stem rust. C. I. 13546, the most productive variety, yielded 75.3 bushels per acre. It survived 99 percent and showed only a trace of stem rust. Next highest in yield was C. I. 13548 with 62.8 bushels per acre, a survival of 97 percent, and combined resistance to leaf and stem rust. Both varieties produced grain that weighed more than 60 pounds per bushel.

The southern regional performance nursery was grown for the first time at Urbana, Illinois, in 1961. High yields and test weights reflect excellent growing conditions throughout the season. The yields of 7 varieties exceeded 50 bushels per acre. C. I. 13532 was the most productive with a 58.4-bushel yield. Only C. I. 13535 produced less than 40 bushels. All varieties in the nursery produced grain weighing more than 61 pounds per bushel. C. I. 13523, C. I. 13548, and C. I. 13532 lodged the least. Among the more productive varieties, only C. I. 13532 showed fair resistance to soil-borne mosaic. C. I. 13537, in addition to severe mottling, rosetted 98 percent. None of the other entries in the nursery rosetted.

Table 1.--Yield and other data for varieties grown in the southern regional performance nursery at 19 stations in the hard red winter wheat region in 1961.

Denton, Texas
Four replications

C. I. No.	Date Headed	Date Ripe	Plant height	Leaf rust	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	April	May	In.	%	Lbs.	Bu.	Bu.		
13546	23	26	42	10MS	62	42.7	--	1	114.2
13532	25	26	35	Tr	62	42.2	43.7	2	124.3
13548	26	27	40	Tr	61	40.9	--	1	109.4
13523	23	25	43	Tr	63	40.5	--	1	108.3
13533	25	28	38	20S	60	38.5	39.5	2	112.4
13667	19	21	40	50S	62	37.5	--	1	100.3
1442	30	31	38	40S	61	37.4	35.2	25	100.0
13668	19	21	43	50S	62	37.3	--	1	99.7
11673	27	25	40	30S	61	37.0	38.8	21	129.1
13534	26	28	39	40S	60	36.5	37.5	2	106.7
13537	28	28	38	Tr	61	36.2	39.3	2	111.8
13536	22	23	40	Tr	64	34.6	40.0	2	113.8
13535	5/1	30	40	Tr	61	34.1	34.8	2	98.9
6251	5/1	31	40	40S	63	33.8	34.2	25	106.6
12517	27	28	39	40S	62	33.7	37.2	10	109.8
8856	20	22	41	40S	64	31.8	36.0	25	126.7
12132	20	22	41	50S	63	31.3	--	1	83.7
13669	20	22	42	50S	62	28.8	--	1	77.0

Standard error of a difference = 2.25 bushels.

Chillicothe, Texas
Four replications

C. I. No.	Date Headed	Date Ripe	Plant height	Loose smut 1/	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	Apr.	May	In.		Lbs.	Bu.	Bu.		
13668	19	21	33	1	62.5	43.6	--	1	127.5
13669	21	22	35	0	62.0	42.0	--	1	122.8
13523	28	29	35	2	58.5	42.0	--	1	122.8
12132	20	21	36	0	62.5	41.3	--	1	120.8
13667	19	20	34	0	62.5	40.6	--	1	118.7
12517	28	28	30	3	60.0	40.1	33.6	12	115.7
13546	25	27	29	0	60.0	39.2	--	1	114.6
13536	23	27	34	0	63.5	38.4	34.4	2	111.1
13548	30	31	29	0	60.5	37.9	--	1	110.8
13534	29	30	29	0	60.0	37.3	28.0	2	90.3
11673	29	29	31	2	60.5	36.8	33.0	23	116.6
13532	29	30	27	0	60.5	35.2	31.7	2	102.3
8856	21	23	38	0	62.5	35.0	33.5	23	105.2
1442	5/4	6/3	28	0	61.0	34.2	31.0	23	100.0
13537	30	6/1	28	3	61.0	33.6	31.6	2	102.1
13533	27	28	30	3	61.0	33.5	32.7	2	105.7
13535	5/1	6/2	30	0	59.0	30.0	27.3	2	88.2
6251	5/2	6/2	30	19	63.0	29.9	29.5	23	103.2

1/ Number of smutted heads per 32 feet of row.

Standard error of a difference = 2.21 bushels.

Bushland, Texas

C. I. No.	Date headed		Plant height		Lodging	Weight per bushel	
	Dryland nursery	Irrigated nursery	Dryland nursery	Irrigated nursery	Irrigated nursery	Dryland nursery	Irrigated nursery
	May	May	In.	In.	%	Lbs.	Lbs.
1442	13	14	24	35	30	57.2	56.8
6251	11	12	25	35	20	59.9	59.2
8856	3	2	26	36	30	59.6	58.8
11673	10	10	26	34	20	58.9	58.1
12517	10	9	25	36	20	60.1	60.6
13532	9	9	23	33	15	58.9	57.1
13533	9	8	23	33	15	59.2	58.6
13534	11	10	24	33	20	58.1	57.8
13535	13	15	23	33	30	57.1	56.2
13536	6	6	26	35	5	61.6	61.2
13537	11	13	24	34	5	59.5	58.8
13546	9	8	23	34	10	59.5	59.5
13523	7	7	25	32	20	57.3	55.2
12132	5	4	27	35	20	58.9	58.9
13667	3	3	26	33	30	59.5	60.0
13668	4	5	26	34	35	60.6	59.6
13669	1	1	27	34	90	58.8	58.9
13548	11	11	24	34	10	58.8	58.9

Nursery severely damaged by hail storms in late May and early June. Nursery harvested but yields not recorded.

Clovis, New Mexico
Six replications

C. I. No.	Date Headed	Date Ripe	Plant height	Shattering 1/	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	May	June	In.		Lbs.	Bu.	Bu.		
13546	20	24	27	2.7	59.6	29.0	--	1	182.4
13523	23	26	30	2.3	57.1	24.4	--	1	153.5
13548	23	26	31	3.0	59.2	23.5	--	1	147.8
13533	22	26	29	2.3	58.1	23.3	17.8	2	124.1
13537	23	25	31	1.7	58.4	22.1	16.2	2	113.3
13536	20	25	26	2.0	58.6	21.0	18.2	2	127.3
6251	25	28	32	2.0	59.3	20.6	19.1	9	105.5
13532	25	26	28	2.3	57.7	20.5	17.9	2	125.2
11673	23	26	29	2.3	58.0	20.1	16.4	9	99.3
13668	15	22	24	2.7	57.5	18.9	--	1	118.9
13534	26	28	29	4.0	56.7	18.8	15.9	2	111.2
8856	16	23	27	2.3	58.2	17.4	18.0	9	99.2
13535	27	28	31	2.0	56.5	17.0	18.5	2	94.4
12132	16	22	26	2.7	57.3	16.3	--	1	102.5
1442	30	7/2	32	2.7	54.6	15.9	14.3	9	100.0
13667	15	22	26	2.7	57.8	15.6	--	1	98.1
13669	15	22	26	2.7	57.0	14.6	--	1	91.8

Concho (C. I. 12517) not included in nursery due to error at seeding time.

1/ Shattering notes based on 1-5 scale; 1 = shattering resistant.

Standard error of a difference = 2.03 bushels.

Stillwater, Oklahoma
Four replications

C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield: 1961	Av. acre yield: 1960-1961	No. years grown	Percent of Kharkof
	May	In.	Lbs.	Bu.	Bu.		
13546	1	32	61.2	47.3	--	1	179.2
13548	5	35	60.5	40.9	--	1	154.9
12517	3	35	61.8	40.2	46.1	12	133.2
13667	4/27	33	62.4	39.7	--	1	150.4
13537	4	34	61.5	38.2	46.2	2	136.3
13532	2	31	59.8	37.2	43.6	2	128.6
13523	1	33	58.8	35.5	--	1	134.5
13535	6	37	59.0	35.3	40.8	2	120.4
13533	3	32	59.9	35.0	41.7	2	123.0
8856	4/26	37	62.1	34.2	38.1	27	113.8
13534	4	33	59.8	32.3	41.2	2	121.4
13668	4/27	32	61.6	31.5	--	1	119.3
13536	1	32	61.4	30.8	40.6	2	119.8
6251	7	36	60.7	29.4	40,6	27	111.7
13669	4/25	34	61.9	28.8	--	1	109.1
1442	7	37	59.8	26.4	33.9	27	100.0

Comanche (C. I. 11673) and Triumph (C. I. 12132) missing due to seeding error.

Standard error of a difference = 3.05 bushels.

Woodward, Oklahoma
Four replications

C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield: 1961	Av. acre yield: 1960-1961	No. years grown	Percent of Kharkof
	May	In.	Lbs.	Bu.	Bu.		
13667	1	36	61.4	55.3	--	1	181.3
13669	4/29	35	61.0	53.6	--	1	175.7
12517	7	40	61.4	51.7	44.6	13	127.8
13546	6	40	59.6	51.0	--	1	167.2
13536	4	39	61.6	50.6	43.7	2	130.3
13668	1	35	60.5	49.9	--	1	163.6
13532	7	38	60.4	48.6	42.2	2	125.8
12132	2	36	61.6	47.6	--	1	156.1
11673	7	38	60.0	47.5	41.0	25	115.8
13523	6	39	60.0	46.2	--	1	151.5
13537	9	39	61.5	45.3	42.4	2	126.4
13548	9	39	60.8	43.5	--	1	142.6
8856	1	39	61.6	43.2	39.9	30	106.8
13533	7	38	60.1	43.0	39.8	2	118.6
13534	8	38	60.1	41.8	38.3	2	114.0
13535	12	38	58.9	38.2	38.5	2	114.6
6251	12	38	60.6	34.4	35.1	30	106.3
1442	13	37	59.2	30.5	33.6	30	100.0

Standard error of a difference = 4.66 bushels.

Cherokee, Oklahoma
Four replications

C. I. No.	Date headed	Plant height	Lodging	Leaf rust		Weight per bushel	Av. acre yield		No. years grown	Percent of Kharkof
				Severity	Pustule type		1961	1960-1961		
	May	In.	%	%		Lbs.	Bu.	Bu.		
13523	2	43	23	0	0	60.4	58.9	--	1	215.8
13532	4	41	16	1	1	57.7	58.4	47.2	2	159.8
13546	3	43	63	30	4	59.1	56.4	--	1	206.6
8856	4/29	44	79	50	4	61.3	55.7	44.5	14	136.1
12132	1	41	84	50	4	59.9	53.3	--	1	195.2
13667	4/30	41	86	30	4	59.1	52.9	--	1	193.8
13668	4/30	40	85	50	4	60.9	52.7	--	1	193.0
13548	7	45	18	0	1	62.1	52.3	--	1	191.6
13669	4/27	41	84	50	4	60.2	52.3	--	1	191.6
13536	1	44	43	2	2	61.5	51.2	43.5	2	147.3
13537	7	43	25	1	2	60.6	50.4	45.8	2	155.1
12517	5	45	84	25	4	57.2	46.7	39.0	12	144.0
13534	6	46	55	5	2	58.0	45.4	41.1	2	139.2
6251	9	45	34	35	4	60.2	43.4	36.5	14	113.8
13535	9	45	21	0	0	59.6	43.4	40.2	2	136.1
11673	6	45	49	15	4	57.6	42.9	39.5	14	128.4
13533	3	45	28	30	4	59.3	42.5	36.5	2	123.7
1442	10	44	21	75	4	57.4	27.3	29.5	14	100.0

Standard error of a difference = 5.12 bushels.

Manhattan, Kansas
Four replications

C. I. No.	Date headed	Plant height	Diseases			Weight per bushel	Av. acre yield		No. years grown	Percent of Kharkof
			Bunt	Leaf rust	Stem rust		1961	1960-1961		
	May	In.	%	%	%	Lbs.	Bu.	Bu.		
13548	27	38	Tr.	Tr.R	30MR	61.1	51.4	--	1	160.1
13532	25	37	60	Tr.R	15MR	61.2	50.4	44.7	2	139.7
13523	26	39	78	Tr.R	30MR	60.1	45.6	--	1	142.1
12517	23	38	4	38S	50S	60.6	44.8	38.5	13	123.9
13546	23	35	58	41S	30MR	61.1	43.1	--	1	134.3
13667	22	35	65	41S	50S	59.1	43.1	--	1	134.3
13537	28	37	92	5R	20MR	61.3	42.4	43.3	2	135.4
13536	22	35	62	Tr.R	70S	61.0	39.9	36.2	2	113.3
13534	25	37	20	35S	40MR	58.2	39.3	38.5	2	120.5
13669	21	35	88	53S	50S	60.1	38.5	--	1	119.9
6251	29	42	62	33S	30S	61.2	37.1	37.2	30	113.3
13668	21	33	75	31S	50S	60.7	36.1	--	1	112.5
13535	29	40	22	Tr.R	20MR	59.2	36.1	33.5	2	104.7
12132	22	35	88	38S	50S	61.4	35.8	--	1	111.5
11673	26	37	2	43S	50S	57.7	35.2	34.0	25	118.8
8856	21	36	78	40S	40S	61.3	34.7	33.0	30	112.8
13533	24	36	68	29S	20MR	59.5	32.9	30.2	2	94.5
1442	29	38	78	50S	60S	57.0	32.1	32.0	30	100.0

Standard error of a difference = 2.98 bushels.

Hays, Kansas
Four replications

C. I. No.	Date headed	Plant height	Lodging	Rust		Weight per bushel	Av. acre yield		No. years grown	Percent of Kharkof
				Leaf	Stem		1961	1960-1961		
	May	In.	%			Lbs.	Bu.	Bu.		
13546	16	36	8	S+++	R	60.0	46.6	--	1	158.5
13532	18	38	44	R	R	59.0	46.6	49.0	2	133.5
13548	20	41	0	R	R	60.5	44.7	--	1	152.0
13533	17	36	10	S+	S	59.2	42.8	43.9	2	119.6
13537	20	39	8	S+	R	60.8	42.4	41.3	2	112.5
13668	15	34	22	S+++	S+++	58.8	39.6	--	1	134.7
13523	19	40	15	R	R	58.5	37.8	--	1	128.6
13667	15	35	15	S+++	S+++	58.5	37.3	--	1	126.9
13536	17	37	10	S	S	59.8	37.2	42.3	2	115.3
8856	15	38	8	S+++	S+	59.2	35.9	39.2	25	113.1
12132	15	36	12	S+++	S+++	58.5	35.9	--	1	122.1
13534	20	39	40	S++	R	57.5	35.5	37.4	2	101.9
11673	20	39	18	S+++	S+	57.2	35.1	42.1	21	120.8
13535	21	40	5	R	R	58.0	34.3	39.1	2	106.5
6251	21	40	12	S+++	S+	58.8	34.0	40.6	25	110.8
12517	18	38	10	S++	S++	59.2	32.9	39.8	9	122.1
13669	14	31	45	S+++	S+++	58.2	31.5	--	1	107.1
1442	24	41	8	S++	S++	56.5	29.4	36.7	25	100.0

Standard error of a difference = 2.80 bushels.

Garden City, Kansas
Four replications

C. I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	May	June	In.	Lbs.	Bu.	Bu.		
13546	17	19	32	59.9	50.2	--	1	126.8
13548	20	21	33	60.8	48.1	--	1	121.5
13536	18	20	32	62.0	48.0	40.0	2	108.1
13523	22	21	36	60.3	47.6	--	1	120.2
13532	18	20	31	60.0	45.9	40.0	2	108.1
13533	20	20	32	58.9	45.7	39.8	2	107.6
13668	15	17	29	60.7	45.0	--	1	113.6
13667	16	16	30	60.9	44.5	--	1	112.4
13669	13	15	30	59.5	43.9	--	1	110.9
13534	22	21	32	60.0	43.5	39.0	2	105.4
12132	17	17	32	61.0	42.7	--	1	107.8
13537	21	20	32	59.1	42.4	38.5	2	104.2
8856	16	18	31	61.8	41.8	35.2	8	103.2
11673	21	21	33	59.4	41.8	36.3	8	105.6
12517	21	20	32	59.8	41.6	36.2	8	108.3
1442	26	22	36	58.8	39.6	37.0	8	100.0
13535	26	22	34	59.3	38.5	35.5	2	95.9
6251	22	22	40	61.4	36.5	35.7	8	101.0

Standard error of a difference = 2.15 bushels.

Ft. Collins, Colorado
Five replications, irrigated

C. I. No.	Date Headed	Date Ripe	Plant height	Lodging July 6	Leaf rust Severity	Leaf rust Pustule type	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	July	In.	%	%		Lbs.	Bu.	Bu.		
13546	6	22	49	26	30	2	58.9	57.1	--	1	184.8
12132	3	17	49	27	20	2	59.5	54.2	--	1	175.4
13667	3	17	50	29	20	1	55.7	52.1	--	1	168.6
13533	6	21	47	1	2	2	59.1	51.9	52.5	2	140.4
13668	3	17	46	52	30	1	55.6	49.8	--	1	161.2
13536	7	19	47	1	5	0	58.7	48.6	51.9	2	139.0
13669	2	17	47	40	30	1	53.9	48.4	--	1	156.6
13537	11	23	50	4	5	1	59.9	48.2	47.1	2	126.0
13532	9	18	46	5	10	1	54.9	47.9	47.3	2	126.6
13523	12	22	50	26	10	1	55.3	46.0	--	1	148.9
13548	11	17	49	29	10	1	57.4	45.9	--	1	148.5
8856	4	18	52	22	10	1	55.1	39.5	43.7	25	101.6
11673	10	19	49	16	60	2	55.2	35.5	42.9	21	109.8
13534	11	22	46	4	10	1	55.0	33.9	45.3	2	121.3
12517	8	18	51	2	60	2	49.9	32.9	42.9	9	122.4
6251	11	19	53	18	30	2	56.5	32.8	39.2	25	100.7
1442	13	22	48	2	40	3	54.5	30.9	37.4	25	100.0
13535	13	23	49	0	20	3	57.5	30.3	36.3	2	97.1

Standard error of a difference = 8.13 bushels.

Akron, Colorado
Four replications

C. I. No.	Date headed	Plant height	Weight per bushel	Average acre yield	No. years grown	Percent of Kharkof
	June	In.	Lbs.	Bu.		
13668	2	38	46.2	25.0	1	190.8
13546	5	39	45.4	23.8	1	181.7
13669	1	40	46.0	23.7	1	180.9
13667	3	38	44.1	22.0	1	167.9
12132	3	41	46.0	21.2	1	161.8
13536	6	39	47.1	20.4	1	155.7
13537	10	38	45.5	19.5	1	148.9
8856	3	41	46.8	19.2	19	112.1
13548	10	36	45.6	18.9	1	144.3
13532	7	37	41.2	16.8	1	128.2
12517	5	38	40.4	15.9	5	116.9
6251	7	36	44.8	14.6	19	107.5
11673	9	38	40.8	14.5	16	106.7
13533	9	34	43.8	14.2	1	108.4
13535	12	39	42.8	14.2	1	108.4
13534	11	37	39.6	13.9	1	106.1
13523	10	36	41.6	13.7	1	104.6
1442	14	37	46.4	13.1	19	100.0

Standard error of a difference = 1.70 bushels.

Springfield, Colorado
Five replications

C. I. No.	Date Headed	Date Ripe	Plant height	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	May	June	In.	Lbs.	Bu.	Bu.		
13533	12	20	18	62.5	30.5	37.3	2	108.9
12517	14	20	18	62.3	29.6	36.8	4	109.4
13546	12	18	16	61.9	28.1	--	1	108.1
13667	12	17	18	61.8	28.1	--	1	108.1
6251	18	23	17	63.0	27.9	35.6	4	103.0
13535	19	23	18	60.5	27.9	33.3	2	97.2
13532	14	20	18	61.3	27.6	33.7	2	98.4
13536	12	19	17	64.4	27.5	34.3	2	100.3
13534	16	21	19	62.1	27.5	35.6	2	104.1
13537	18	22	17	63.8	27.4	34.6	2	101.2
13548	18	22	18	63.4	27.2	--	1	104.6
11673	15	20	16	62.4	26.1	34.6	4	102.2
1442	21	25	17	62.2	26.0	34.2	4	100.0
8856	11	16	17	62.8	25.1	32.5	4	103.5
13668	12	17	16	62.1	24.9	--	1	95.8
13669	9	15	17	62.3	23.7	--	1	91.2
12132	12	18	18	62.0	23.6	--	1	90.8
13523	12	22	17	60.2	22.6	--	1	86.9

Standard error of a difference = not significant.

Hesperus, Colorado
Five replications, irrigated

C. I. No.	Date headed	Plant height	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	In.	Lbs.	Bu.	Bu.		
13523	13	36	61.4	68.7	--	1	162.8
13546	12	33	62.1	64.2	--	1	152.1
13534	13	34	61.2	58.5	53.6	2	110.7
11673	13	34	61.7	58.0	50.2	21	115.3
13537	14	33	62.5	55.4	52.4	2	108.2
13669	10	30	59.7	54.4	--	1	128.9
8856	10	36	62.0	53.8	48.7	21	100.9
12132	11	33	60.6	53.8	--	1	127.5
13667	10	31	59.5	53.4	--	1	126.5
13533	13	32	62.6	53.3	51.5	2	106.4
13536	12	32	63.1	52.6	52.1	2	107.5
13532	13	32	61.2	51.0	50.1	2	103.4
13548	13	31	61.3	50.1	--	1	118.7
13535	15	35	60.6	48.9	49.9	2	103.0
12517	14	32	62.5	48.1	47.7	11	107.1
6251	14	34	61.7	46.5	46.2	21	107.4
13668	11	25	59.0	43.2	--	1	102.4
1442	19	28	62.3	42.2	48.4	21	100.0

Standard error of a difference = 5.64 bushels.

Lincoln, Nebraska
Four replications

C. I. No.	Date headed	Plant height	Lodging	Diseases			Weight per bushel	Av. acre yield		No. years grown	Percent of Kharkof
				Bunt 1/	Leaf rust	Stem rust		1961	1960-1961		
	June	In.	%	%	%	%	Lbs.	Bu.	Bu.		
13548	3	42	20	1	0	5R	59.9	52.9	--	1	275.5
13532	5/31	39	50	27	Tr.HR	5MR	57.8	48.1	44.9	2	175.2
13536	1	39	10	37	2MR	60S	60.0	45.5	41.7	2	162.7
13546	5/31	39	20	42	60S	5MR	58.1	44.7	--	1	232.8
13537	3	40	0	75	5MR	10MR	60.3	42.4	44.3	2	172.9
13523	4	41	0	48	0	5R	58.9	41.5	--	1	216.1
13533	1	40	20	34	15MS	30MS	58.1	41.4	39.3	2	153.5
13534	2	39	25	29	20MS	20MR	55.9	37.2	39.3	2	153.3
13668	5/30	36	60	40	90S	60S	57.6	36.7	--	1	191.1
13667	5/31	36	50	38	90S	60S	55.0	31.8	--	1	165.6
8856	5/31	40	60	47	60S	60S	57.1	31.7	34.8	29	122.3
13669	5/29	38	95	35	90S	60S	55.8	31.7	--	1	165.1
12132	5/30	37	25	51	90S	60S	55.9	30.2	--	1	157.3
12517	1	42	80	4	25S	90S	49.9	29.5	32.6	12	127.4
11673	2	41	65	4	60S	60S	52.0	27.3	34.8	24	118.0
6251	3	43	65	51	40S	70S	54.6	26.6	30.8	29	111.8
13535	7	39	95	37	Tr.HR	10MR	56.5	23.3	32.0	2	125.0
1442	7	43	10	23	60S	60S	44.0	19.2	25.6	29	100.0

1/ Bunt readings from an artificially inoculated bunt nursery.

Standard error of a difference = 3.70 bushels.

North Platte, Nebraska
Four replications

C. I. No.	Date headed	Plant height	Stem rust	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	In.	%	Lbs.	Bu.	Bu.		
13548	6	45	5	61.8	60.4	--	1	663.7
13532	7	45	10	58.1	49.7	51.9	2	201.0
13546	5	45	7	58.2	48.7	--	1	535.2
13523	7	47	30	55.2	45.8	--	1	503.3
13537	7	46	8	57.0	44.3	46.0	2	178.1
13533	6	44	25	56.0	44.2	45.0	2	174.4
13534	6	46	15	53.1	36.6	40.7	2	157.6
13668	3	43	25	56.1	34.7	--	1	381.3
12132	4	44	45	55.4	34.5	--	1	379.1
13667	4	43	14	56.0	32.7	--	1	359.3
13669	3	44	45	53.6	29.7	--	1	326.4
13535	9	48	25	55.5	29.0	35.7	2	138.4
13536	5	44	75	55.9	28.6	36.7	2	142.1
8856	3	43	45	54.7	26.0	34.9	24	100.5
11673	6	46	35	46.5	23.5	35.1	21	112.0
12517	5	46	30	45.5	20.2	34.9	13	117.3
6251	7	49	33	48.0	18.8	31.4	24	98.7
1442	10	49	65	37.5	9.1	25.8	24	100.0

Standard error of a difference = 2.67 bushels.

Alliance, Nebraska
Four replications

C. I. No.	Date headed	Plant height	Lodging	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	In.	%	Lbs.	Bu.	Bu.		
13546	6	41	5	55.8	40.3	--	1	139.9
13668	6	41	1	57.6	38.1	--	1	132.3
13669	3	41	1	56.8	37.2	--	1	129.2
13697	6	41	5	56.0	35.4	--	1	122.9
12132	6	41	10	57.0	34.7	--	1	120.5
13548	9	41	1	55.6	34.2	--	1	118.8
13536	9	42	0	56.2	33.1	38.9	2	103.5
13532	9	40	0	51.5	32.7	38.0	2	101.1
13533	9	42	1	52.2	32.1	39.9	2	106.0
12517	9	42	10	53.3	32.0	42.6	11	119.8
8856	6	42	1	56.8	31.3	37.3	24	93.4
11673	7	42	5	52.0	30.8	40.0	21	100.3
13537	9	43	1	50.9	30.3	41.0	2	109.0
6251	11	42	5	53.9	29.5	34.5	24	96.2
13534	10	42	5	50.7	28.9	38.6	2	102.7
1442	13	42	5	52.7	28.8	37.6	24	100.0
13523	10	41	30	50.6	26.8	--	1	93.1
13535	12	42	12	46.7	19.8	30.2	2	80.2

Standard error of a difference = 2.00 bushels.

Ames, Iowa
Three replications

C. I. No.	Date Headed	Date Ripe	Plant height	Lodging	Winter survival	Leaf rust Severity	Leaf rust Pustule type	Stem rust	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	July	In.	%	%	%		%	Lbs.	Bu.	Bu.		
13546	2	7	37	7	99	60	3	Tr	61.0	75.3	--	1	418.3
13548	3	10	37	22	97	10	1	Tr	62.1	62.8	--	1	348.9
13669	1	7	37	17	96	90	3	80	58.9	45.0	--	1	250.0
12132	1	7	34	5	92	95	3	85	61.2	43.0	--	1	238.9
13537	7	10	39	14	77	5	1	5	59.2	42.8	53.9	2	168.4
13532	6	10	37	12	72	Tr	1	5	58.5	41.7	54.4	2	169.8
13667	1	7	34	13	87	95	3	80	60.7	40.6	--	1	225.6
13668	1	7	34	10	93	90	3	80	61.1	40.2	--	1	223.3
13534	7	10	37	8	67	80	4	25	57.9	33.1	45.8	2	143.0
6251	8	10	41	30	68	70	3	70	56.6	29.2	43.8	19	108.3
12517	6	9	37	22	52	90	4	70	54.7	27.6	41.4	11	134.1
13536	6	10	37	16	52	10	2	25	59.8	26.5	45.6	2	142.5
8856	5	10	39	33	38	80	4	85	59.0	22.9	41.0	19	113.1
11673	7	9	37	27	55	75	3	70	55.4	21.5	41.3	19	110.2
13535	10	17	41	5	38	Tr	1	20	54.8	18.9	37.6	2	117.5
1442	10	10	41	18	78	75	3	75	47.8	18.0	32.0	19	100.0
13523	3	17	38	4	23	Tr	1	Tr	56.2	16.1	--	1	89.4
13533	5	12	37	7	47	70	3	30	55.6	15.9	35.5	2	110.9

Standard error of a difference = 5.46 bushels.

Urbana, Illinois
Three replications

C. I. No.	Date Headed	Date Ripe	Plant height	Soil-borne mosaic 1/ Mottling Mild	Soil-borne mosaic 1/ Mottling Severe	Soil-borne mosaic 1/ Rosette	Lodging	Weight per bushel	Average acre yield	Percent of Kharkof
	June	July	In.	%	%	%	%	Lbs.	Bu.	
13532	5/31	9	44	60	25	0	15	62.6	58.4	129.2
13667	5/25	7	44	0	100	0	53	62.5	53.9	119.2
13548	1	10	46	0	99	0	3	63.0	53.8	119.0
13523	4	10	49	0	100	0	0	62.4	53.7	118.8
12132	5/25	7	45	1	99	0	18	63.3	53.4	118.1
13668	5/25	7	43	1	95	0	83	62.7	53.0	117.3
13546	5/29	7	44	1	95	0	60	62.1	50.1	110.8
13534	5/31	7	45	2	98	0	67	61.7	49.6	109.7
13536	5/29	9	44	5	95	0	43	62.6	48.8	108.0
6251	1	10	48	2	98	0	43	63.3	48.7	107.7
11673	1	8	45	60	20	0	87	62.4	48.3	106.9
13533	5/31	10	45	50	20	0	28	61.5	48.2	106.6
12517	5/30	7	45	60	15	0	90	63.3	47.5	105.1
8856	5/27	7	46	2	98	0	67	63.3	46.9	103.8
13669	5/24	7	44	0	100	0	93	62.1	45.8	101.3
13537	1	9	45	1	98	98	62	63.7	45.4	100.4
1442	5	12	45	2	98	0	50	61.6	45.2	100.0
13535	3	9	46	2	98	0	67	61.2	36.7	81.2

1/ Soil-borne mosaic readings from a soil-borne mosaic nursery.

Standard error of a difference = 3.45 bushels.

STANDARD ERRORS

Standard errors for the southern regional performance nursery at 18 stations reporting yield data appear in table 2. Only Springfield, Colorado reported yield differences that were not statistically significant. Mean nursery yields exceeded 50 bushels per acre at Hesperus, 40 bushels at 5 stations, 30 bushels at 9 stations, and 20 bushels at 1 station. Coefficients of variability of less than 10 percent were reported from only 5 stations.

SUMMARY OF NURSERY YIELDS

A summary of yields by location, state averages and ranks, and regional yield averages is compiled in table 3. A two-year summary appears in table 4.

The highest average yield on a regional basis was made by C. I. 13546. Second and third ranked varieties regionally were C. I. 13548 and C. I. 13532. All three varieties averaged more than 42 bushels per acre. The regional yield of C. I. 13546 was 46.5 bushels. The excellent performance of C. I. 13546 at all locations suggests that it has an unusually wide range of adaptation. The regional performance of C. I. 13523 also is noteworthy. It ranked sixth or higher in all states except Iowa and was the fifth most productive variety in the nursery on a regional basis.

Among varieties grown in the southern regional performance nursery in both 1960 and 1961, 3 have 2-year average yields of 40 bushels per acre or higher. C. I. 13532, a Nebraska variety, has the highest yield followed by the two Texas varieties C. I. 13537 and C. I. 13536 in that order. Concho occupies fourth place regionally.

SUMMARY OF AGRONOMIC DATA

Agronomic data for varieties in the southern regional nursery in 1961 are summarized in table 5. Varieties are arranged in the table according to average bushel weight. Only C. I. 13536 produced grain that averaged more than 60 pounds per bushel at 19 stations. C. I. 13548 was a close second in test weight with a 59.8 pound test weight. The best combined resistance to lodging, bunt, leaf rust, and stem rust was shown by C. I. 13548. C. I. 13532, C. I. 13548, C. I. 13537, and C. I. 13546 had the lowest average stem rust while C. I. 13532 and C. I. 13523 had slightly the lowest leaf rust readings among 6 resistant varieties. The Triumph strains, Early Blackhull, and C. I. 13546 were earliest maturing on the average.

Table 2. Number of replications, mean yields, and standard errors for the southern regional performance nursery at 18 reporting stations in 1961.

State and Station	Number replications	Number varieties	Av. yield all varieties	Standard error of Diff. in means	Standard error of Mean	Coefficient of variability
			Bu.	Bu.	Bu.	%
TEXAS						
Denton	4	30	35.8	2.25	1.59	8.9
Chillicothe	4	30	36.5	2.21	1.57	8.6
NEW MEXICO						
Clovis	6	17	19.9	2.03	1.43	17.6
OKLAHOMA						
Stillwater	4	16	35.2	3.05	2.16	12.3
Woodward	4	18	45.7	4.66	3.30	14.4
Cherokee	4	18	49.2	5.12	3.62	14.7
KANSAS						
Manhattan	4	18	39.9	2.98	2.11	10.6
Hays	4	18	37.8	2.80	2.21	11.7
Garden City	4	18	43.7	3.04	2.15	9.8
COLORADO						
Ft. Collins	5	18	43.7	8.13	5.75	29.4
Akron	4	18	18.0	1.70	1.20	13.3
Springfield	5	18	26.7	n.s.	n.s.	14.7
Hesperus	5	18	52.7	5.64	3.99	16.8
NEBRASKA						
Lincoln	4	18	35.6	3.70	2.62	14.7
North Platte	4	18	34.2	2.67	1.89	11.1
Alliance	4	18	32.0	2.00	1.41	8.8
IOWA						
Ames	3	33	34.9	5.46	3.86	18.0
ILLINOIS						
Urbana	3	25	49.3	3.45	2.44	8.6

Table 3.--Summary of average yields in bushels per acre made by 18 varieties grown in the southern regional performance nursery at 18 stations in 1961, with state averages and rank.

Variety	C. I. No.	Texas				New Mexico		Oklahoma					Iowa		Illinois	
		Denton	Chillicothe	Average	Rank	Clovis	Rank	Stillwater	Woodward	Cherokee	Average	Rank	Ames	Rank	Urbana	Rank
Nbr-Hope-Tk x Cnn-Pnc (N.56178)	13546	42.7	39.2	41.0	2	29.0	1	47.3	51.0	56.4	51.6	1	75.3	1	50.1	7
Cmn x Mi-Hope-Pn-Oro-Il.1-Cmn (K.56644)	13548	40.9	37.9	39.4	4	23.5	3	40.9	43.5	52.3	45.6	7	62.8	2	53.8	3
Pnc x Mi-Hope-Pn	13532	42.2	35.2	38.7	6	20.5	8	37.2	48.6	58.4	48.1	4	41.7	6	58.4	1
Improved Triumph	13667	37.5	40.6	39.1	5	15.6	16	39.7	55.3	52.9	49.3	3	40.6	7	53.9	2
Triumph x T-Ae	13523	40.5	42.0	41.3	1	24.4	2	35.5	46.2	58.9	46.9	5	16.1	17	53.7	4
(RCh x Tk-Oro-Fn)x Mql-Oro	13537	36.2	33.6	34.9	15	22.1	5	38.2	45.3	50.4	44.6	11	42.8	5	45.4	16
Newest Improved Triumph	13668	37.3	43.6	40.5	3	18.9	10	31.5	49.9	52.7	44.7	10	40.2	8	53.0	6
Triumph	12132	31.3	41.3	36.3	11	16.3	14	--	47.6	53.3	50.5	2	43.0	4	53.4	5
Wichita x Mql-Oro	13536	34.6	38.4	36.5	10	21.0	6	30.8	50.6	51.2	44.2	13	26.5	12	48.8	9
Super Triumph	13669	28.8	42.0	35.4	14	14.6	17	28.8	53.6	52.3	44.9	9	45.0	3	45.8	15
(Mql-Oro x Oro-Tm) x Mi-Hope-Pn	13533	38.5	33.5	36.0	12	23.3	4	35.0	43.0	42.5	40.2	14	15.9	18	48.2	12
Concho	12517	33.7	40.1	36.9	7-8-9	--	-	40.2	51.7	46.7	46.2	6	27.6	11	47.5	13
(Cmn x Mi-Hope) x Iowin	13534	36.5	37.3	36.9	7-8-9	18.8	11	32.3	41.8	45.4	39.8	15	33.1	9	49.6	8
Early Blackhull	8856	31.8	35.0	33.4	16	17.4	12	34.2	43.2	55.7	44.4	12	22.9	13	46.9	14
Comanche	11673	37.0	36.8	36.9	7-8-9	20.1	9	--	47.5	42.9	45.2	8	21.5	14	48.3	11
Blackhull	6251	33.8	29.9	31.8	18	20.6	7	29.4	34.4	43.4	35.7	17	29.2	10	48.7	10
Kv x (Iow x Tt-WP5)	13535	34.1	30.0	32.1	17	17.0	13	35.3	38.2	43.4	39.0	16	18.9	15	36.7	18
Kharkof	1442	37.4	34.2	35.8	13	15.9	15	26.4	30.5	27.3	28.1	18	18.0	16	45.2	17

Table 3.--Concluded

C. I. No.	Kansas					Colorado						Nebraska					18 station average
	Manhattan	Hays	Garden City	Average	Rank	Ft. Collins	Akron	Springfield	Hesperus	Average	Rank	Lincoln	North Platte	Alliance	Average	Rank	
13546	43.1	46.6	50.2	46.6	3	57.1	23.8	28.1	64.2	43.3	1	44.7	48.7	40.3	44.6	2	46.5
13548	51.4	44.7	48.1	48.1	1	45.9	18.9	27.2	50.1	35.5	11	52.9	60.4	34.2	49.2	1	43.9
13532	50.4	46.6	45.9	47.6	2	47.9	16.8	27.6	51.0	35.8	9	48.1	49.7	32.7	43.5	3	42.2
13667	43.1	37.3	44.5	41.6	7	52.1	22.0	28.1	53.4	38.9	2	31.8	32.7	35.4	33.3	10	39.8
13523	45.6	37.8	47.6	43.7	4	46.0	13.7	22.6	68.7	37.8	4	41.5	45.8	26.8	38.0	6	39.6
13537	42.4	42.4	42.4	42.4	5	48.2	19.5	27.4	55.4	37.6	5	42.4	44.3	30.3	39.0	5	39.4
13668	36.1	39.6	45.0	40.2	9	49.8	25.0	24.9	43.2	35.7	10	36.7	34.7	38.1	36.5	7	38.9
12132	35.8	35.9	42.7	38.1	12	54.2	21.2	23.6	53.8	38.2	3	30.2	34.5	34.7	33.1	11	38.4*
13536	39.9	37.2	48.0	41.7	6	48.6	20.4	27.5	52.6	37.3	8	45.5	28.6	33.1	35.7	8	38.9
13669	38.5	31.5	43.9	38.0	13	48.4	23.7	23.7	54.4	37.6	6	31.7	29.7	37.2	32.9	12	37.4
13533	32.9	42.8	45.7	40.5	8	51.9	14.2	30.5	53.3	37.5	7	41.4	44.2	32.1	39.2	4	37.2
12517	44.8	32.9	41.6	39.8	10	32.9	15.9	29.6	48.1	31.6	15	29.5	20.2	32.0	27.2	14	36.2*
13534	39.3	35.5	43.5	39.4	11	33.9	13.9	27.5	58.5	33.5	14	37.2	36.6	28.9	34.2	9	36.2
8856	34.7	35.9	41.8	37.5	14	39.5	19.2	25.1	53.8	34.4	12	31.7	26.0	31.3	29.7	13	34.8
11673	35.2	35.1	41.8	37.4	15	35.5	14.5	26.1	58.0	33.5	13	27.3	23.5	30.8	27.2	15	34.2*
6251	37.1	34.0	36.5	35.9	17	32.8	14.6	27.9	46.5	30.5	16	26.6	18.8	29.5	25.0	16	31.9
13535	36.1	34.3	38.5	36.3	16	30.3	14.2	27.9	48.9	30.3	17	23.3	29.0	19.8	24.0	17	30.9
1442	32.1	29.4	39.6	33.7	18	30.9	13.1	26.0	42.2	28.1	18	19.2	9.1	28.8	19.0	18	28.1

* Average of 17 stations only.

Table 4.--Summary of two-year average yields in bushels per acre for 11 varieties grown in the southern regional performance nursery at 16 stations in 1960 and 1961 with state averages and rank.

Variety	C.I. No.	Texas				New Mexico		Oklahoma					Iowa	
		Denton	Chillicothe	Average	Rank	Clovis	Rank	Stillwater	Woodward	Cherokee	Average	Rank	Ames	Rank
Pnc x Mi-Hope-Pn	13532	43.7	31.7	37.7	1	17.9	5	43.6	42.2	47.2	44.3	2	54.4	1
(RCh x Tk-Oro-Fn) x Mql-Oro	13537	39.3	31.6	35.4	6	16.2	8	46.2	42.4	45.8	44.8	1	53.9	2
Wichita x Mql-Oro	13536	40.0	34.4	37.2	2	18.2	3	40.6	43.7	43.5	42.6	4	45.6	4
Concho	12517	37.2	33.6	35.4	5	--	-	46.1	44.6	39.0	43.2	3	41.4	6
(Mql-Oro x Oro-Tm)x Mi-Hope-Pn	13533	39.5	32.7	36.1	3	17.8	6	41.7	39.8	36.5	39.3	9	35.5	10
(Cmn x Mi-Hope) x Iowin	13534	37.5	28.0	32.8	9	15.9	9	41.2	38.3	41.1	40.2	7	45.8	3
Comanche	11673	38.8	33.0	35.9	4	16.4	7	--	41.0	39.5	40.2	6	41.3	7
Early Blackhull	8856	36.0	33.5	34.8	7	18.0	4	38.1	39.9	44.5	40.8	5	41.0	8
Blackhull	6251	34.2	29.5	31.8	10	19.1	1	40.6	35.1	36.5	37.4	10	43.8	5
Kv x (Iow x Tt-WP5)	13535	34.8	27.3	31.1	11	18.5	2	40.8	38.5	40.2	39.8	8	37.6	9
Kharkof	1442	35.2	31.0	33.1	8	14.3	10	33.9	33.6	29.5	32.3	11	32.0	11

C. I. No.	Kansas					Colorado					Nebraska					16 station average
	Manhattan	Hays	Garden City	Average	Rank	Ft. Collins	Spring field	Hesperus	Average	Rank	Lincoln	North Platte	Alliance	Average	Rank	
13532	44.7	49.0	40.0	44.6	1	47.3	33.7	50.1	43.7	5	44.9	51.9	38.0	44.9	1	42.5
13537	43.3	41.3	38.5	41.0	2	47.1	34.6	52.4	44.7	4	44.3	46.0	41.0	43.8	2	41.5
13536	36.2	42.3	40.0	39.5	3	51.9	34.3	52.1	46.1	2	41.7	36.7	38.9	39.1	5	40.0
12517	38.5	39.8	36.2	38.2	5	42.9	36.8	47.7	42.5	7	32.6	34.9	42.6	36.7	6	39.6*
13533	30.2	43.9	39.8	38.0	6	52.5	37.3	51.5	47.1	1	39.3	45.0	39.9	41.4	3	38.9
13534	38.5	37.4	39.0	38.3	4	45.3	35.6	53.6	44.8	3	39.3	40.7	38.6	39.5	4	38.5
11673	34.0	42.1	36.3	37.5	8	42.9	34.6	50.2	42.6	6	34.8	35.1	40.0	36.6	7	37.3*
8856	33.0	39.2	35.2	35.8	10	43.7	32.5	48.7	41.6	8	34.8	34.9	37.3	35.7	8	36.9
6251	37.2	40.6	35.7	37.8	7	39.2	35.6	46.2	40.3	9	30.8	31.4	34.5	32.2	10	35.6
13535	33.5	39.1	35.5	36.0	9	36.3	33.3	49.9	39.8	11	32.0	35.7	30.2	32.6	9	35.2
1442	32.0	36.7	37.0	35.2	11	37.4	34.2	48.4	40.0	10	25.6	25.8	37.6	29.7	11	32.8

*Average of 15 stations only.

Table 5.--Summary of agronomic data other than yield for varieties grown in the southern regional performance nursery in 1961.

Variety	C. I. No.	Date		Plant height	Lodging	Diseases			Weight per bushel
		Headed	Ripe			Leaf rust	Stem rust	Bunt	
		May	June	In.	%	%	%		
Number of stations		19	8	19	8	6	4	2	19
Wichita x Mql-Oro	13536	20	23	36	16	3	58	50	60.1
Cmn x Mi-Hope-Pn-Oro-Il.1-Cmn	13548	23	24	37	13	3	10	1	59.8
Early Blackhull	8856	18	21	38	38	47	58	63	59.4
(RCh x Tk-Oro-Fn) x Mql-Oro	13537	24	25	37	15	4	11	84	59.3
Nbr-Hope-Tk x Cnn-Pnc	13546	20	22	36 1/	25	39	11	50	59.2
Triumph	12132	19 1/	20	36 1/	25	57	60	70	59.2 1/
Newest Improved Triumph	13668	17	20	34	44	57	54	58	59.1
Improved Triumph	13667	17	19	35	35	54	51	52	58.7
Super Triumph	13669	16	19	35	58	61	59	62	58.4
Blackhull	6251	25	26	38	28	41	51	57	58.4
(Mql-Oro x Oro-Tm) x Mi-Hope-Pn	13533	21	24	36	14	28	26	51	58.2
Pnc x Mi-Hope-Pn	13532	22	23	35	15	2	9	44	58.1
Triumph x T-Ae	13523	22	25	38	15	2	16	63	57.7
(Cmn x Mi-Hope) x Iowin	13534	23	24	36	28	32	25	25	57.1
Kv x (Iow x Tt-WP5)	13535	26	27	38	29	3	19	30	57.0
Concho	12517	22 2/	23 2/	37 2/	40	46	60	4	56.9 2/
Comanche	11673	24 1/	23	37 1/	36	47	54	3	56.6 1/
Kharkof	1442	27	27	37	18	57	65	51	55.3

1/ Average based on 1 less station than indicated. Stillwater data missing.
2/ Average based on 1 less station than indicated. Clovis data missing.

NORTHERN REGIONAL PERFORMANCE NURSERY

Sixteen varieties were grown in the northern regional nursery in 1961. The nursery contained 29 varieties in 1960. Data were reported from 9 of 13 stations growing the nursery. The nursery at Colby, Kansas, was destroyed by hail on May 31. The nursery at Archer, Wyoming, was abandoned due to poor stands. The nursery also was a failure at Dickinson, North Dakota, because of a critically dry seedbed in the fall. The northern regional nursery was grown and harvested at Brookings, South Dakota, but data were not submitted from that station for inclusion in the regional report. Data from the reporting stations appear in table 6. Entries in the 1961 nursery are listed below.

Entry No.	Variety or pedigree	C. I. No.	State submitting
1	Kharkof	1442	----
2	Minter	12138	----
3	Yogo	8033	----
4	Nebred	10094	----
5	Cheyenne	8885	----
6	Shoshoni	13193	Wyo.
7	Nebred x RedChief	13195	Nebr.
8	Yogo x (Turkey x Oro 221)-117	13542	Mont.
9	(Yogo x Rescue 21) x Marmin-1065	13544	Mont.
10	Marmin x (Yogo x Rescue 5)-342	13545	Mont.
11	Minnesota Selection	13280	Minn.
12*	Nbr-Hope-Tk x Cnn-Pnc	13546	Nebr.
13*	Tk-Chey x Hope-Cnn^2	13547	Nebr.
14	So. Dak. Selection	13526	So. Dak.
15	do.	13528	So. Dak.
16	do.	13198	So. Dak.

* New entry in 1961.

DATA OBTAINED

Soil moisture at seeding time at Alliance, Nebraska, permitted the establishment of the nursery with satisfactory stands in the fall. Environmental conditions during the spring growing season are described in connection with the southern regional nursery at Alliance. Similar to its performance in the southern nursery, C. I. 13546 was the highest yielding variety in the northern nursery as well with a yield of 37.6 bushels per acre. Nebred, C. I. 13195, and C. I. 13547 in that order were next most productive. C. I. 13546, Nebred, and C. I. 13195 produced grain with the highest bushel weight. C. I. 13546 and C. I. 13547 headed on June 6 and June 8, respectively, 5 and 3 days earlier than any other variety in the nursery.

Performance of varieties at North Platte, Nebraska, was entirely associated with stem rust reaction (see description of conditions at North Platte in connection with the southern nursery). C. I. 13547 and C. I. 13546 significantly

outyielded all other varieties in the nursery. Both possess the Hope stem rust resistance. The 4 next most productive varieties also were resistant to stem rust. Six late maturing stem rust susceptible varieties made yields of 10 bushels per acre or less and produced grain weighing 40 pounds per bushel or less. There was insufficient seed of C. I. 13542 and Yogo for test weight determinations.

Single rod-row plots of varieties in the northern nursery were grown at Lincoln. Excellent combined resistance to bunt, leaf rust, and stem rust was shown by C. I. 13280. Minter also had low rust readings, combined with bunt resistance and low lodging. C. I. 13546, C. I. 13547, and C. I. 13526 were the earliest to head.

The nursery at Sheridan, Wyoming, emerged to satisfactory stands in the fall. The summer was hot and dry. Only 0.4 inch of precipitation was received in June and 0.6 inch in July. Spring moisture, however, carried the wheat to maturity. Yields ranged from 22.0 for C. I. 13545 to 37.4 bushels per acre made by C. I. 13546. Differences were not significant statistically. The 4 Nebraska varieties C. I. 13546, C. I. 13547, Nebred, and Cheyenne had test weights of 61 pounds. However, all varieties produced grain that weighed 58 pounds per bushel or more.

Heavy stem rust and moderately heavy leaf rust infections were recorded at St. Paul, Minnesota. Some winterkilling also occurred. Yields ranged from 43.0 to 27.9 bushels per acre with C. I. 13280 the most productive variety. It also had the lowest combined leaf and stem rust readings. C. I. 13545 survived the winter with a 75 percent stand, the lowest in the nursery. C. I. 13544, C. I. 1442, and C. I. 13546 also survived with less than 90 percent stands.

Stem and leaf rust also were heavy at Waseca, Minnesota. No winterkilling was observed. Test weights were below normal but grain yields were high. C. I. 13546, the most productive variety as well as the earliest maturing, made 60.2 bushels per acre. Some lodging occurred but varietal differences were slight.

The yields of all varieties at Havre, Montana, were less than 20 bushels per acre. C. I. 13547, C. I. 13195, and C. I. 13546 in that order were the most productive varieties. Only C. I. 13195 produced grain that weighed 60 pounds per bushel. It also was the tallest variety. C. I. 13546 was the earliest heading.

The nursery at Lethbridge, Alberta, was seeded under extremely dry soil conditions. However, it did emerge and made some growth before winter set in. There was no winterkilling. The summer of 1961 also was abnormally dry. Only Cheyenne, C. I. 13546, and Yogo made yields higher than 20 bushels per acre. C. I. 13195, C. I. 13546, and C. I. 13547 produced the highest test weight grain. C. I. 13546 ripened 4 days earlier than any other variety in the test.

Growing conditions at Clovis, New Mexico, were described in connection with the southern regional nursery. C. I. 13546 was the highest yielding variety followed by C. I. 13547 and Nebred in that order. The grain of the 2 Nebraska experimentals also had the highest test weight among varieties in the nursery.

Table 6.--Yield and other data for 16 varieties grown in the northern regional performance nursery at 9 locations in the hard red winter wheat region in 1961.

Alliance, Nebraska
Four replications

C. I. No.	Date headed	Plant height	Lodging	Weight per bushel	Av. acre yield		No. years grown	Percent of Kharkof
					1961	1960-1961		
	June	In.	%	Lbs.	Bu.	Bu.		
13546	6	41	5	55.3	37.6	--	1	133.8
10094	11	38	5	56.0	36.4	39.3	10	115.7
13195	11	40	5	56.6	34.0	37.9	2	125.3
13547	8	40	2	52.7	32.1	--	1	114.2
13193	12	38	2	52.9	31.4	36.5	3	115.6
13280	13	42	0	54.3	30.4	32.4	4	110.8
8885	12	38	1	52.2	30.2	35.4	4	112.0
13528	12	40	2	52.1	29.3	32.4	2	107.1
13526	11	40	2	53.2	28.7	32.9	2	108.8
1442	13	42	5	51.7	28.1	30.2	10	100.0
8033	14	42	1	52.9	27.9	32.0	10	88.6
13544	14	42	2	51.8	27.1	29.4	2	97.2
13545	13	42	2	51.7	26.3	29.8	2	98.7
12138	14	40	0	53.2	26.0	30.5	10	92.2
13542	14	42	2	49.7	22.5	29.6	2	98.0
13198	15	38	12	50.1	22.3	30.3	2	100.3

Standard error of a difference = 2.08 bushels.

North Platte, Nebraska
Four replications

C. I. No.	Date headed	Plant height	Stem rust	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	In.	%	Lbs.	Bu.	Bu.		
13547	7	47	0	59.4	47.8	--	1	937.3
13546	5	46	3	58.1	47.3	--	1	927.5
13280	10	48	0	58.1	41.9	46.6	3	175.1
13526	7	44	3	59.1	40.5	41.4	3	163.9
13528	9	47	3	57.0	38.3	44.0	3	169.9
13198	11	47	1	56.0	30.8	38.2	2	184.7
12138	11	48	55	53.9	25.6	34.1	3	137.9
13195	8	48	80	44.2	12.9	28.7	2	139.0
13544	12	49	75	45.2	12.3	31.8	2	153.8
13545	10	48	35	43.0	11.5	26.0	2	125.7
10094	8	45	80	40.0	10.0	43.3	3	125.0
13193	10	48	75	39.5	9.5	27.0	3	123.4
8885	10	48	85	37.6	9.3	27.1	3	128.3
13542	12	49	70	--	6.3	25.5	2	123.5
1442	10	49	65	35.5	5.1	20.7	3	100.0
8033	12	47	70	--	4.6	21.2	3	94.4

Standard error of a difference = 2.36 bushels.

Lincoln, Nebraska
Single plots

C. I. No.	Date headed	Plant height	Lodging	Diseases		
				Bunt	Leaf rust	Stem rust
	June	In.	%	%	%	%
1442	6	44	20	62	35S	60S
12138	7	46	10	2	15S	5S
8033	8	44	20	2	20S	70S
10094	3	41	20	2	60S	70S
8885	4	41	20	17	45S	70S
13193	6	41	20	51	60S	70S
13195	3	45	10	0	45S	90S
13542	9	40	60	43	45S	60S
13544	9	42	40	8	25S	50S
13545	8	44	40	42	25S	70S
13280	6	43	20	1	5MR	Tr.R
13546	5/31	42	80	7	20MS	5S
13547	1	42	70	42	20S	5S
13526	1	41	80	33	45S	5S
13528	5	41	20	7	65S	5S
13198	8	44	30	1	15MS	5S

Sheridan, Wyoming
Four replications

C. I. No.	Plant height	Weight per bushel	Av. acre yield 1960	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	In.	Lbs.	Bu.	Bu.		
13546	35	61	37.4	--	1	146.1
13195	38	60	32.8	25.9	2	95.9
13528	39	59	32.7	28.0	3	95.2
13547	31	61	31.0	--	1	121.1
13193	38	60	30.9	31.6	4	116.6
10094	36	61	30.5	27.6	10	107.1
13544	38	59	28.3	29.4	2	108.9
8885	34	61	27.8	28.3	5	116.5
12138	36	58	27.3	26.5	10	101.9
13280	36	58	27.3	28.4	5	105,1
13198	37	60	26.9	26.3	2	97.4
8033	36	58	26.5	28.1	10	106.0
13526	35	59	26.0	24.8	3	84.4
1442	34	60	25.6	27.0	10	100.0
13542	37	60	23.4	24.9	2	92.2
13545	39	59	22.0	22.5	2	83.5

Standard error of a difference = not significant.

St. Paul, Minnesota
Three replications

C. I. No.	Date Headed	Date Ripe	Plant height	Winter survival	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	June	July	In.	%	%	%	Lbs.	Bu.	Bu.		
13280	12	16	42	98	20	Tr	61.2	43.0	46.2	2	151.8
12138	13	16	44	100	20	30R	61.5	42.8	41.4	2	136.0
13526	10	15	39	100	50	30S	60.7	41.7	44.7	2	147.0
13198	13	15	42	100	30	20MR	61.7	41.3	39.2	2	128.9
13528	11	16	37	100	30	30S	61.0	40.9	40.6	2	133.4
13547	10	14	36	97	50	20MR	60.8	40.9	--	1	116.9
13546	8	14	37	88	30	25S	61.0	40.1	--	1	114.6
8033	13	16	42	100	30	70S	61.5	36.4	35.9	2	118.1
1442	14	16	42	87	20	60S	60.0	35.0	30.4	2	100.0
10094	12	16	37	95	50	80S	59.8	34.6	29.4	2	96.5
13542	14	16	45	100	40	70S	59.3	34.4	28.8	2	94.7
13544	15	17	42	82	40	60S	61.2	32.8	29.8	2	98.0
13195	11	16	39	90	50	80S	62.2	32.6	27.9	2	91.8
13193	13	16	39	90	50	70S	59.3	32.4	23.7	2	78.0
8885	15	16	40	93	50	80S	59.7	31.5	32.2	2	105.8
13545	14	17	41	75	50	60S	61.7	27.9	27.5	2	90.3

Standard error of a difference = 3.15 bushels.

Waseca, Minnesota
Three replications

C. I. No.	Date Headed	Date Ripe	Plant height	Lodging 1/	Rust Leaf	Rust Stem	Weight per bushel	Av. acre yield	Percent of Kharkof
	June	July	In.		%	%	Lbs.	Bu.	
13546	8	16	40	3.0	30	20MR	57.5	60.2	139.4
13280	12	19	44	2.7	15	10R	58.7	54.6	126.4
13528	11	18	44	3.0	30	15MR	58.0	52.0	120.4
13198	14	20	44	3.5	30	20S	59.0	50.1	116.0
12138	14	19	47	3.3	50	40	59.2	49.3	114.1
13547	10	17	38	2.3	40	T	58.8	48.9	113.2
13526	10	17	37	2.3	40	(T-5R)T	58.2	43.6	100.9
1442	13	18	45	3.3	50	60	53.5	43.2	100.0
13544	15	20	47	3.0	50	20S	58.3	41.8	96.8
13545	12	18	46	2.7	60	40S	56.7	37.6	87.0
8033	14	19	48	3.0	60	60	54.8	37.5	86.8
13195	11	17	44	2.7	60	80	53.0	36.5	84.5
13542	14	19	47	3.0	60	50	53.0	34.2	79.2
10094	11	17	38	2.7	60	80	49.5	27.6	63.9
13193	11	17	42	2.3	60	70	48.3	27.0	62.5
8885	12	17	43	2.7	60	80	51.2	26.7	61.8

1/ 1-9 scale; 1 = no lodging, 9 = completely lodged.

Standard error of a difference = 4.85 bushels.

Havre, Montana
Three replications

C. I. No.	Date headed	Plant height	Weight per bushel	Average acre yield	No. years grown	Percent of Kharkof
	June	In.	Lbs.	Bu.		
13547	3	23	58.6	19.4	1	141.6
13195	3	27	60.3	17.0	1	124.1
13546	5/31	22	59.3	17.0	1	124.1
8885	5	24	57.3	15.4	3	105.7
10094	5	23	55.3	15.2	8	95.4
13193	5	24	59.0	14.7	3	105.2
1442	6	23	57.6	13.7	8	100.0
13545	5	26	57.3	13.6	1	99.3
13198	7	25	55.3	13.2	1	96.4
13526	4	24	57.3	12.4	2	109.2
8033	5	22	55.3	12.4	8	97.6
12138	6	26	55.0	11.3	8	87.7
13542	7	25	55.0	10.9	1	79.6
13280	5	24	55.0	10.6	3	73.4
13528	2	23	57.3	10.2	2	79.6
13544	7	24	56.6	8.3	1	60.6

Standard error of a difference = 2.69 bushels.

Lethbridge, Alberta
Four replications

C. I. No.	Date		Plant height	Weight per bushel 1/	Av. acre yield		No. years grown	Percent of Kharkof
	Headed	Ripe			1961	1960-1961		
	June	July	In.	Lbs.	Bu.	Bu.		
8885	15	15	24	64.0	21.3	26.2	5	109.0
13546	10	10	22	65.0	20.5	--	1	123.5
8033	17	17	26	62.0	20.3	24.0	8	107.6
13544	16	15	25	62.0	19.5	22.5	2	105.1
13547	13	15	22	65.0	19.4	--	1	116.9
13193	17	19	23	64.0	19.4	22.5	4	107.7
13280	13	16	25	63.0	19.1	24.8	5	98.9
13528	15	16	23	64.0	19.0	23.1	3	99.5
13195	13	16	25	66.0	18.6	23.7	2	110.7
10094	15	14	23	63.0	18.4	22.0	8	98.1
1442	17	19	23	64.0	16.6	21.4	8	100.0
13542	17	19	26	61.0	16.6	22.3	2	104.2
13545	17	20	25	63.0	15.8	20.9	2	97.4
12138	18	19	24	64.0	15.7	20.5	8	101.0
13526	15	16	23	63.0	15.2	22.6	3	99.5
13198	18	20	23	64.0	13.4	20.6	2	96.0

1/ Imperial bushel weights.

Standard error of a difference = 2.31 bushels.

Clovis, New Mexico
Six replications

C. I. No.	Date Headed	Date Ripe	Plant height	Shattering 1/	Weight per bushel	Av. acre yield 1961	Av. acre yield 1960-1961	No. years grown	Percent of Kharkof
	May	June	In.		Lbs.	Bu.	Bu.		
13546	19	24	27	2.0	58.4	27.8	--	1	167.5
13547	24	26	29	2.3	58.5	24.6	--	1	148.2
10094	26	26	29	2.0	57.8	22.1	16.4	3	104.4
13544	27	29	33	2.3	58.0	21.5	15.3	2	99.3
13195	26	28	32	2.0	57.9	21.1	16.4	2	106.5
13280	27	29	30	4.0	56.3	20.4	16.1	3	94.4
13198	30	30	32	2.3	56.2	20.1	15.1	2	98.0
8885	28	30	31	2.5	56.4	19.4	15.5	3	102.6
12138	29	30	32	2.8	55.8	19.1	13.5	3	96.8
13542	29	30	31	2.8	56.0	18.8	13.6	2	88.6
8033	30	7/3	31	2.0	55.7	18.6	14.0	3	86.7
13545	26	29	31	2.0	56.7	18.5	12.0	2	77.9
13193	27	30	30	2.8	56.2	18.2	14.7	3	98.6
13526	27	30	28	2.3	57.4	16.9	13.9	3	76.1
1442	29	7/1	33	2.8	55.3	16.6	15.4	3	100.0
13528	28	7/1	29	3.3	56.3	16.4	13.3	3	87.8

1/ Ratings on 1-5 scale; 1 = least shattered.

Standard error of a difference = 2.02 bushels.

STANDARD ERRORS

Mean yields and standard errors for 8 stations reporting yield data for the northern regional performance nursery are summarized in table 7. Only Havre, Montana, and Lethbridge, Alberta, reported mean nursery yields of less than 20 bushels per acre. Highest yields were reported from the 2 Minnesota stations. Varietal differences were not statistically significant at Sheridan, Wyoming. Coefficients of variability ranged from 10 percent at Alliance, Nebraska, to 24.4 percent at Havre, Montana.

SUMMARY OF NURSERY YIELDS

Yields made by varieties in the northern regional nursery in 1961 are summarized in table 8. The 2-year performance of varieties grown in both 1960 and 1961 is contained in table 9. C. I. 13546 ranked first in the nursery in 4 states and second in 2. Its 8-station average yield was 36.0 bushels, 3 bushels higher than the yield of second-ranked C. I. 13547. Stem rust was a major factor in the performance of varieties at 4 out of 8 stations. It is of interest to note that the 7 most productive varieties in the nursery carry full or partial resistance to stem rust race 56, the predominant race in the region in 1961. C. I. 13280 was the highest yielding variety on the average among 14 varieties tested in the northern nursery in both 1960 and 1961. The South Dakota Selections, C. I. 13528 and C. I. 13526 in that order, were the next most productive strains. All 3 had average yields of 30 bushels per acre or higher.

SUMMARY OF AGRONOMIC DATA

Agronomic data other than yield for entries in the northern regional nursery are summarized in table 10. C. I. 13546 and C. I. 13547, the most productive varieties on the average, also had the highest average bushel weights and were the earliest maturing. C. I. 13547 and Nebred were slightly the shortest varieties on the average, followed by C. I. 13546 and C. I. 13526. Minter and C. I. 13280 lodged the least and the latter also showed the highest combined resistance to leaf and stem rust. The 6 varieties with the highest average bushel weights in 1961 also had the lowest stem rust readings at 4 stations reporting stem rust.

Table 7.--Number of replications, mean yields, and standard errors for the northern regional performance nursery at 8 reporting stations in 1961.

State and Station	Number replications	Number varieties	Av. yield all varieties	Standard error of Diff. in means	Standard error of Mean	Coefficient of variability
			Bu.	Bu.	Bu.	%
NEBRASKA						
Alliance	4	16	29.4	2.08	1.47	10.0
North Platte	4	16	22.1	2.36	1.67	15.1
WYOMING						
Sheridan	4	16	28.8	n.s.	n.s.	18.8
MINNESOTA						
St. Paul	3	16	36.8	3.15	2.23	10.5
Waseca	3	16	41.9	4.85	3.43	14.2
MONTANA						
Havre	3	16	13.5	2.69	1.90	24.4
ALBERTA						
Lethbridge	4	16	18.1	2.31	1.63	18.0
NEW MEXICO						
Clovis	6	16	20.0	2.02	1.43	17.4

Table 8.--Summary of average yields in bushels per acre made by 16 varieties grown in the northern regional performance nursery at 8 stations in 1961, with state averages and ranks.

Variety	C. I. No.	Nebraska				Wyoming		Minnesota				Montana		Alberta		New Mexico		8 station average
		North Platte	All-iance	Av.	Rank	Sher-idan	Rank	St. Paul	Was-eca	Av.	Rank	Havre	Rank	Leth-bridge	Rank	Clovis	Rank	
Nbr-Hope-Tk x Cnn-Pnc	13546	47.3	37.6	42.5	1	37.4	1	40.1	60.2	50.2	1	17.0	2-3	20.5	2	27.8	1	36.0
Tk-Cnn x Hope-Cnn^2	13547	47.8	32.1	40.0	2	31.0	4	40.9	48.9	44.9	6	19.4	1	19.4	5	24.6	2	33.0
Minnesota Sel.	13280	41.9	30.4	36.2	3	27.3	10	43.0	54.6	48.8	2	10.6	14	19.1	7	20.4	6	30.9
So. Dakota Sel.	13528	38.3	29.3	33.8	5	32.7	3	40.9	52.0	46.5	3	10.2	15	19.0	8	16.4	16	29.9
do.	13526	40.5	28.7	34.6	4	26.0	13	41.7	43.6	42.7	7	12.4	10	15.2	15	16.9	14	28.1
do.	13198	30.8	22.3	26.6	6	26.9	11	41.3	50.1	45.7	5	13.2	9	13.4	16	20.1	7	27.3
Minter	12138	25.6	26.0	25.8	7	27.3	9	42.8	49.3	46.1	4	11.3	12	15.7	14	19.1	9	27.1
Nbr x RedChief	13195	12.9	34.0	23.5	8	32.8	2	32.6	36.5	34.6	11	17.0	2-3	18.6	9	21.1	5	25.7
Nebred	10094	10.0	36.4	23.2	9	30.5	6	34.6	27.6	31.1	14	15.2	5	18.4	10	22.1	3	24.4
Yogo-Rescue 21 x Mm-1065	13544	12.3	27.1	19.7	12	28.3	7	32.8	41.8	37.3	9	8.3	16	19.5	4	21.5	4	24.0
Kharkof	1442	5.1	28.1	16.6	14	25.6	14	35.0	43.2	39.1	8	13.7	7	16.6	11	16.6	15	23.0
Yogo	8033	4.6	27.9	16.3	15	26.5	12	36.4	37.5	37.0	10	12.4	11	20.3	3	18.6	11	23.0
Shoshoni	13193	9.5	31.4	20.5	10	30.9	5	32.4	27.0	29.9	15	14.7	6	19.4	6	18.2	13	23.0
Cheyenne	8885	9.3	30.2	19.8	11	27.8	8	31.5	26.7	29.1	16	15.4	4	21.3	1	19.4	8	22.7
Mm x Yogo-Rescue5-342	13545	11.5	26.3	18.9	13	22.0	16	27.9	37.6	32.8	13	13.6	8	15.8	13	18.5	12	21.7
Yogo x Tk-Oro 221-117	13542	6.3	22.5	14.4	16	23.4	15	34.4	34.2	34.3	12	10.9	13	16.6	12	18.8	10	20.9

Table 9.--Summary of two-year average yields for 14 varieties grown in the northern regional performance nursery at 6 stations in 1960 and 1961, with state averages and ranks.

Variety	C. I. No.	Nebraska				Wyoming		Minnesota		Alberta		New Mexico		6 station average
		North Platte	Alliance	Average	Rank	Sheridan	Rank	St. Paul	Rank	Lethbridge	Rank	Clovis	Rank	
Minnesota Sel.	13280	46.6	32.4	39.5	2	28.4	3	46.2	1	24.8	2	16.1	3	32.4
So. Dakota Sel.	13528	44.0	32.4	38.2	3	28.0	6	40.6	4	23.1	5	13.3	13	30.2
do.	13526	41.4	32.9	37.2	4	24.8	13	44.7	2	22.6	6	13.9	10	30.1
Nebred	10094	43.3	39.3	41.3	1	27.6	7	29.4	10	22.0	10	16.4	1-2	29.7
So. Dakota Sel.	13198	38.2	30.3	34.3	5	26.3	10	39.2	5	20.6	13	15.1	7	28.3
Minter	12138	34.1	30.5	32.3	7	26.5	9	41.4	3	20.5	14	13.5	12	27.8
Cheyenne	8885	27.1	35.4	31.3	9	28.3	4	32.2	7	26.2	1	15.5	4	27.5
Nebred x RedChief	13195	28.7	37.9	33.3	6	25.9	11	27.9	12	23.7	4	16.4	1-2	26.8
Yogo-Rescue 21 x Mm-1065	13544	31.8	29.4	30.6	10	29.4	2	29.8	9	22.5	7-8	15.3	6	26.4
Shoshoni	13193	27.0	36.5	31.8	8	31.6	1	23.7	14	22.5	7-8	14.7	8	26.0
Yogo	8033	21.2	32.0	26.6	13	28.1	5	25.9	6	24.0	3	14.0	9	25.9
Yogo x Tk-Oro 221-117	13542	25.5	29.6	27.6	12	24.9	12	28.8	11	22.3	9	13.6	11	24.2
Kharkof	1442	20.7	30.2	25.5	14	27.0	8	30.4	8	21.4	11	15.4	5	24.2
Mm x Yogo-Rescue 5-342	13545	26.0	29.8	27.9	11	22.5	14	27.5	13	20.9	12	12.0	14	23.2

Table 10.--Summary of agronomic data other than yield for varieties grown in the northern regional performance nursery in 1961.

Variety	C. I. No.	Date Headed	Date Ripe	Plant height	Lodging	Rust Leaf	Rust Stem	Weight per bushel
		June	July	In.	%	%	%	Lbs.
Number of stations		8	4	9	3	3	4	8
Nbr-Hope-Tk x Cnn-Pnc	13546	3	9	35	39	27	13	59.2
Tk-Cnn x Hope-Cnn^2	13547	6	11	34	34	37	6	59.1
South Dakota Selection	13526	7	12	35	37	45	10	58.2
Minnesota Selection	13280	8	13	38	15	13	3	57.8
South Dakota Selection	13528	8	13	36	17	42	13	57.8
South Dakota Selection	13198	11	14	37	22	25	12	57.5
Nebred x RedChief	13195	7	12	38	17	52	83	57.3
Minter	12138	10	14	38	14	28	33	57.3
Yogo	8033	10	14	38	18	37	68	56.9 1/
(Yogo x Rescue 21)x Marmin-1065	13544	11	13	38	27	38	51	56.3
Yogo x (Tk-Oro 221)-117	13542	11	14	38	30	48	63	56.0 1/
Marmin x (Yogo x Rescue 5)-342	13545	9	14	38	24	45	51	55.9
Nebred	10094	8	11	34	19	57	78	55.1
Cheyenne	8885	9	12	36	19	52	79	54.7
Shoshoni	13193	9	13	36	18	57	71	54.7
Kharkof	1442	10	14	37	17	35	61	54.5

1/ Average based on 1 less station than indicated. North Platte data missing.

UNIFORM WINTER HARDINESS NURSERY

A winter hardiness nursery composed of duplicated observation rows of experimental and appropriate check varieties is grown each year at 7 locations in the northern portion of the hard red winter wheat region. The nursery was composed of 197 strains in 1961. Differential survival of strains occurred at 3 stations. Survival data were summarized in a separate report which was distributed to personnel in the region at an earlier date.

DISEASE NURSERIES

A uniform bunt nursery containing 33 entries was grown at 7 locations. Infection data will be compiled in a separate report for distribution to cooperators.

A hard winter wheat soil-borne mosaic nursery is grown each year at Urbana, Illinois, and Manhattan, Kansas, in areas in which soil-borne mosaic is annually recurring. The nursery contained 146 entries this year. Infection data received from the 2 locations were distributed to cooperators prior to the 1961 harvest.

The uniform and international rust nurseries are grown annually at several locations in the region. Data from these nurseries are summarized and distributed by W. Q. Loegering, Beltsville, Maryland.

A hard winter wheat regional streak mosaic nursery is grown each year at 8 or 9 locations in the region. This year data were received from 7 stations. They are summarized in table 11. Three experimental varieties had average tolerance ratings somewhat better than Blue Jacket. They were C. I. 13546, C. I. 13549, and C. I. 13195. A rating of 3.0 indicates some field tolerance. Twenty-one of the 25 varieties in the nursery fell in the 3.0 or better category. Degree of adaptation of a variety at a location is believed to influence its reaction to streak mosaic. If so, the wide adaptation of C. I. 13546 indicated by its excellent regionwide agronomic performance may partially account for its highly tolerant streak mosaic reaction.

Table 11.--Streak mosaic data for 25 varieties grown in a regional streak mosaic nursery at 7 locations in 1961.

Variety	C. I. or Sel. No.	Stunting 1/							7 station average
		Still-water	Manhattan	Colby	Garden City	Ft. Collins	Lincoln	Alliance	
Nbr-Hope-Tk x Cnn-Pnc	13546	0.5	1.0	2.0	2.0	2.5	1.5	1.0	1.5
Wheat-Rye x IVcl-Cmn	13549	1.0	2.0	3.0	1.0	2.5	1.0	1.0	1.6
Nbr x RedChief	13195	1.0	2.0	2.0	2.0	2.0	1.0	2.0	1.7
Blue Jacket	12502	1.0	2.0	2.0	2.0	4.0	1.0	1.5	1.8
Foreign Introduction	166472	0.5	2.0	-	1.0	2.5	2.0	2.5	1.8 2/
Ap x Ctk-Oro-Tm	53H586	1.0	2.0	2.0	2.0	1.5	2.0	2.0	1.8
Aztec	13016	1.0	2.0	2.0	2.0	3.0	1.0	2.0	1.9
Concho x Tst-Pn[2]	59StwR2419	1.0	2.0	2.0	1.0	2.5	3.5	1.0	1.9
do.	59StwR2349	1.0	2.0	2.0	1.0	3.0	3.0	1.5	1.9
Concho	12517	1.0	2.0	3.0	3.0	3.0	1.0	2.0	2.1
Foreign Introduction	181457	1.0	3.0	4.0	3.0	2.0	1.0	2.0	2.3
Ctr x Mi-Hope-Pn	R6002	1.0	3.0	3.0	3.0	2.5	2.0	1.5	2.3
Triumph	12132	1.0	2.0	2.0	2.0	3.0	4.0	2.5	2.4
Bison	12518	1.0	2.0	2.0	3.0	3.0	3.5	2.0	2.4
Wheat-Rye x IVcl-Cmn	M428	1.0	4.0	3.0	3.0	2.0	2.5	2.0	2.5
Foreign Introduction	Hays5111	0.5	3.0	3.0	3.0	3.0	2.0	3.0	2.5
Comanche	11673	1.0	3.0	4.0	3.0	1.5	3.0	2.5	2.6
Ponca x Cheyenne[2]	N57234	1.5	3.0	3.0	2.0	3.0	3.0	2.5	2.6
Rodco	13560	1.5	3.0	3.0	3.0	3.5	2.0	3.0	2.7
Ctr x Mi-Hope-Pn	R6073	1.5	3.0	3.0	3.0	4.0	2.0	4.0	2.9
Mql-Oro-Tnf x Pn	52A1	1.5	4.0	3.0	4.0	3.0	2.5	3.0	3.0
Pawnee	11669	2.0	2.0	5.0	4.0	3.0	2.5	4.5	3.3
Ottawa	12804	2.0	4.0	3.0	4.0	3.5	2.5	5.0	3.4
Kaw	12871	2.0	5.0	4.0	4.0	3.5	3.0	5.0	3.8
Mql-Oro x Pn	12851	3.0	5.0	5.0	5.0	2.5	4.0	5.0	4.2

1/ Stunting values based on 0-5 scale; 0 = no stunting, 5 = completely stunted. At some stations values reported reflect degree of yellowing in addition to stunting. A rating of 3.0 indicates some field tolerance.

2/ Average value based on 6 reporting stations.

QUALITY DATA

Grain samples from regional nurseries are submitted each year to the Hard Winter Wheat Quality Laboratory in amounts as follows:

Uniform Quality Series ----------10 pounds from each location
Southern Regional Performance Nursery --- 1 pound from each location
Northern Regional Performance Nursery --- 1 pound from each location

Quality Series samples are evaluated individually from each location, in addition to which evaluation is made on composite samples from each district. Evaluation of varieties in the Northern and Southern Regional Performance Nurseries is based on samples composed of grain from all locations. Results of evaluation of samples are reported annually to the cooperators by Karl Finney.