No. 9200033

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Goertzen Seed Research

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS Y THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Discovery'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 30th *day of* November *in the year of our Lord one thousand nine hundred and* ninety-three.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Mike Espy

Secretary of Agriculture

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Office, OIRM, Room 404-W, Washington, D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0581-0055), Washington, 20250. FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*: GOERTZEN SEED RESEARCH
2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.: G790
3. VARIETY NAME: Discovery
4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*: ~~Route 2 Box 43~~ 6 Stadium Dr. KAG 11-18-93 Haven, Kansas, 67543
5. PHONE *(Include area code)*: 316-465-7744

FOR OFFICIAL USE ONLY

PVPO NUMBER: 9200033

FILING: Date: Dec. 9, 1991 Time: ☐ A.M. ☐ P.M.

FEES RECEIVED: Filing and Examination Fee: $2150.— Date: Dec. 9, 1991; Certificate Fee: $250.00 Date: Nov. 16, 1993

6. GENUS AND SPECIES NAME: Triticum aestivum
7. FAMILY NAME *(Botanical)*: Gramineae
8. CROP KIND NAME *(Common Name)*: wheat, common
9. DATE OF DETERMINATION: July, 1988 KAG 11-18-93
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*: family business
11. IF INCORPORATED, GIVE STATE OF INCORPORATION:
12. DATE OF INCORPORATION:
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Kenneth & Betty Goertzen
6 Stadium St.
Haven, Kansas 67543

316-465-7744
PHONE *(Include area code)*:

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. ☒ Exhibit A, Origin and Breeding History of the Variety.
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety.
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 12/3/1991
g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)* ☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?

☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____ .)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?

☒ YES (If "YES," give names of countries and dates) "First sold commercially in 1992" AAA 3 Nov 1993 per letter
☐ NO

Breeders Seed (Greenbush Seed & Supply) Reno County 1990
Foundation or registered level may be offerred in 1992

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Kenneth L. Goertzen	Owner	12/3/91
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

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14 EXHIBIT A Origin & Breeding History of the Variety G790

This line was the result of a cross between 4555 and Plainsman V. Both of these parent lines were developed by Kenneth & Betty Goertzen and are under Plant Variety Protection and have been grown as a class of certified seed.

An F4 single plant selection was made in 1986 with 10 tillers, free of stem and leaf rust, semi dwarf height, and brown chaff. This selection , G790, was tested and increased simultaneously and has been named Discovery.

The line has appeared stable and uniform during testing and seed increase.

Purity is maintained by roguing and isolation. This method will continue for breeders seed by Goertzen Seed Research. Kansas Crop Improvement is the certifying agency.

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EXHIBIT B NOVELTY OF DISCOVERY

Most similar variety to Discovery is the variety Haven. Both are brown chaff, awned, semi dwarfs, and have similar ability to emerge from a 4" planting depth in the laboratory in 1992. Both had 92% emergence from a 4" soil depth. Differences are as follows when grown side by side at Haven, Kansas.

DISCOVERY	HAVEN
leaf tip firing present (same as in Scout)	leaf tip firing absent
super strong gluten strength (100)	medium gluten strength (60)
glumes long 8-9mm	glumes midlong 7.5-8.5mm
shoulder of glumes narrow 2-3mm	shoulder of glumes midwide 3-3.9mm
shape of shoulder-oblique	shape of shoulder-elevated
length of beak med. 2.5mm	length of beak medlong 4-6mm

G790 hard red winter wheat

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
~~LIVESTOCK AND SEED DIVISION~~
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
GOERTZEN SEED RESEARCH

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Route 2, Box 43
Haven, Kansas, 67543

FOR OFFICIAL USE ONLY
PVPO NUMBER 9200033
VARIETY NAME OR TEMPORARY DESIGNATION

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____
[2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____
[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[2][0][9] FIRST FLOWERING
[2][2][0] LAST FLOWERING

4. MATURITY (*50% Flowering*):
[0][6] NO. OF DAYS *EARLIER* THAN .....
[ ][ ] NO. OF DAYS *LATER* THAN .....
[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):
[ ][8][9] CM. HIGH
[ ][ ] CM. TALLER THAN .....
[2][5] CM. SHORTER THAN .....
[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):
[1] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[0][3] NO. OF NODES (*Originating from node above ground*)
[2][5] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[1] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[0][7] MM. LEAF WIDTH (*First leaf below flag leaf*)
[2][1] CM. LEAF LENGTH (*First leaf below flag leaf*):

FORM LMGS 470-6 (6-82) (Formerly Form LPGS 470-6 (3-79), which may be used)

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11. HEAD:

[2] Density: 1 = LAX 2 = DENSE (Mid)

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) ____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[5] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): ____

[ ][7] CM. LENGTH.

[1][8] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[1] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[2] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[ ] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush. 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[5] Phenol reaction (See Instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) ____

[0][6] MM. LENGTH [0][3] MM. WIDTH [2][9] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] STEM RUST (Races) ____ [2] LEAF RUST (Races) ____ [0] STRIPE RUST (Races) ____ [0] LOOSE SMUT

[2] POWDERY MILDEW [0] BUNT [ ] OTHER (Specify) ____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) ____

HESSIAN FLY RACES: [1] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	4555 Parent	Seed size	Voyager PVP91000031
Leaf size	4555 "	Seed shape	" " "
Leaf color	Plainsman V Parent	Coleoptile elongation	Sierra
Leaf carriage	" " "	Seedling pigmentation	Plainsman V

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

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14 EXHIBIT D Description of G790

G790
DISCOVERY

This is a hard red winter bearded brown chaff semi dwarf wheat. It is a good milling wheat and has good baking quality. The mixing time is long.

This wheat is shorter, earlier, and with a smaller head than Newton. The head is held at an inclined position at maturity.

G790 has good leaf rust resistance. It has moderate resistance to mildew. It is susceptible to Hessian Fly and tan spot. It is similar to Larned, Siouxland, and Cardinal on SBMV susceptibility.

Primary adaptation is within Kansas and the primary purpose for its use will be as a strong mixing bread wheat.

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A number of GSR wheats were evaluated for Gluten strength in a commercial laboratory in 1992. These were grown under the same conditions in an observation plot at Haven, Kansas.

weak=20, mellow=40, medium=60, strong=80, super strong=100

Variety	Gluten strength
Plainsman V	100
Karl	100
Discovery	100
G1990	100
Snow White	100
G2542	80
G2500	80
G1056	80
Haven	60

92000 33
Haven

GSR

GOERTZEN SEED RESEARCH

6 STADIUM DRIVE • HAVEN, KANSAS 67543

Some Quality Data on Some Plainsman V and Sib Descendants

Variety	Adapted	Abs.	Mix	Volume	Grain Texture	Strength	Kind				
Snow White	KS	62.0	13	985	78	100	HWW	½ Plainsman V			
Trafalgar	KS, Sim	62.5	11	1010	72	80	HRW	½ Plainsman V Sib			
G825	KS	62.0	12	975	72	80	HRW	¼ Plainsman V	¼ Sib		
G825	KS	62.5	12	950	72	100	HRW	¼ Plainsman V	¼ Sib		
G62	KS, OK	62.5	11	940	72	100	HRW	½ Plainsman V			
G1253	KS OK	63.0	12	1065	72	100	HRW	3/4 Plainsman V			
G1282	KS OK	63.0	13	980	72	100	HRW	3/4 Plainsman V			
G1281	KS OK	63.5	12	1050	72	100	HRW	3/4 Plainsman V			
G1420 **	KS OK MO	62.0	12	1000	72	100	SRW	Very High Yield			
G1056	KS	63.0	10	990	72	80	SRW	½ Plainsman V			
G3000	KS	63	12	1015	72	80	HRW	Multi line 3/4 PIV			
G1781	KS	63.5	12	1030	72	100	HRW	3/4 Plainsman V			
Wx 9104	KS ?	63.0	11	980	62	100	SW	Hybrid			
Haven	KS OK CO	63.0	11	950	67	60	HRW	½ Plainsman V ¼ Sib			
G1783	PI Area	63.0	11	1025	67	60	HRW	3/4 Plainsman V			
G1893	PIV area	62.5	12	1000	67	100	HRW	3/4 Plainsman V			
G1216	KS ?	62.0	12	970	67	80	HRW	¼ Plainsman V			
G1785	PIV area	63.0	13	990	62	100	HRW	3/4 Plainsman V			
Discovery	KS ?	63.0	13	1035	67	100	HRW	½ Plainsman V			
G1990	MT	63.0	12	950	67	100	HRW	½ Plainsman V Sib			
G1009	KS OK	63.0	10	970	67	80	HRW	½ Plainsman V			
Plainsman V	KS OK MT Texas	63.0	13	970	67	100	HRW	Plainsman V			
Karl	KS OK NO	62.5	13	1015	62	100	HRW	½ Plainsman V			
Voyager	MT	63	12	950	62	100	HRW	½ Plainsman V Sib			

1992 Was a very difficult year from a quality stand point many wheats had lower protein, shorter mix and poorer texture than usual.

FAX (316) 465-2693 • PHONE (316) 465-7744

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Table 8. Test weight (pounds per bushel) from 1991 Kansas Winter Wheat Performance Tests

Brand	Cultivar	Brown	Fran-klin	Lab-ette	Riley	Har-vey	Repu-blic	Ellis	Reno	Sta Dry.	Sta Irr.	Tho Dry.	Tho Irr.	Gre Dry.	Gre Irr.	Fin Dry.	Fin Irr.	16-Sta Avg.
AgriPro	Abilene	56.6	62.1	–	54.5	–	58.7	60.1	–	–	–	60.9	56.6	–	57.3	57.1	–	–
AgriPro	Bronco	–	–	–	–	–	57.1	59.6	–	60.1	–	59.8	–	56.6	–	56.9	–	–
AgriPro	Longhorn	–	–	–	–	–	–	60.3	60.5	–	–	–	–	–	–	56.7	–	–
AgriPro	Mesa	–	–	57.9	–	56.1	–	–	59.7	–	59.2	–	–	–	60.5	–	–	–
AgriPro	Sierra	57.4	60.5	52.4	54.8	52.4	58.7	60.2	59.2	59.8	61.1	60.0	56.0	58.5	57.3	57.2	56.1	57.6
AgriPro	Thunderbird	57.9	61.3	57.2	55.9	54.7	59.3	60.4	59.0	60.3	61.7	60.4	56.4	59.8	59.0	57.6	58.2	58.6
AgriPro	Tomahawk	55.5	58.9	51.2	57.3	52.8	59.5	60.5	59.0	59.5	60.5	59.3	55.5	57.1	57.3	57.1	55.0	57.2
AgriPro	Victory	54.3	58.3	51.0	55.0	52.8	57.2	60.2	57.8	–	60.4	–	54.5	–	–	–	–	–
AGSECO	7805	52.0	–	–	–	–	57.9	60.4	–	–	–	59.9	55.3	58.3	54.6	56.1	55.2	–
AGSECO	7833	58.5	60.4	–	51.0	–	58.2	58.3	–	–	60.7	58.4	54.2	–	–	57.2	53.5	–
AGSECO	7837	–	58.6	51.2	–	52.0	–	–	–	–	–	–	–	–	–	–	–	–
AGSECO	7846	56.7	60.0	55.7	57.0	53.9	57.1	60.0	54.9	62.3	62.7	60.8	56.8	56.4	58.3	56.4	53.0	57.5
AGSECO	7853	58.8	63.0	56.9	56.7	57.9	59.8	62.7	60.5	62.2	63.1	62.5	59.0	58.0	60.8	55.7	55.8	59.6
Greenbush	790 Exp	–	–	54.5	57.7	–	–	–	58.1	–	–	–	54.4	–	–	–	–	–
Greenbush	Voyager	55.8	60.9	53.7	56.1	52.3	58.6	57.4	55.0	60.9	56.2	58.6	55.3	57.5	52.5	51.6	51.7	55.9
HybrITech	Pacer (S)	56.8	58.8	53.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MBS	8860 Exp	–	–	–	–	–	–	62.8	–	–	61.8	–	–	–	61.2	–	57.7	–
MBS	8905 Exp	–	–	–	–	–	56.8	59.0	57.0	–	–	59.7	–	–	–	56.0	–	–
MBS	90201 Exp	–	60.4	–	–	–	–	–	–	58.8	60.0	–	–	–	–	–	54.6	–
MBS	90202 Exp	–	–	–	–	–	57.3	57.6	–	–	–	–	–	–	–	58.0	53.1	–
MBS	90203 Exp	56.8	–	54.0	54.2	–	–	–	58.8	–	–	–	–	–	–	–	–	–
Merschman	Julie III (S)	55.7	58.3	52.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Merschman	Katie IV (S)	–	56.5	50.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Merschman	Katie V (S)	–	56.1	50.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pharaoh	Kleo Red	–	–	–	–	–	–	60.0	–	–	–	59.7	–	57.2	–	57.3	–	–
Pharaoh	Kleo White	–	–	–	–	–	–	60.5	–	–	–	60.6	–	59.5	–	56.6	–	–
Pharoah	Tut	–	–	–	–	–	–	–	–	–	–	62.3	–	58.9	–	58.1	–	–
Pioneer	2548 (S)	–	59.4	54.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pioneer	2551 (S)	–	57.6	51.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Quantum	542	–	–	–	–	–	–	–	–	–	–	58.4	–	58.8	–	53.1	–	–
Quantum	549	–	–	–	–	–	57.8	57.6	–	–	–	59.0	–	–	–	–	–	–
Quantum	581	57.2	58.8	–	55.3	–	58.2	–	–	–	–	–	–	–	–	–	–	–
Quantum	582	–	–	–	–	–	57.5	58.7	–	–	–	59.7	55.2	59.7	55.7	56.5	52.4	–
Quantum	574	56.3	59.3	53.7	55.4	49.8	–	–	58.3	–	–	–	–	–	–	–	–	–
Quantum	577	–	–	53.2	–	51.8	–	–	58.8	–	–	–	–	–	–	–	–	–
Quantum	578	–	–	–	–	–	–	–	–	–	–	–	53.9	–	56.8	–	53.7	–
Quantum	589	–	–	–	–	–	–	–	–	–	–	–	54.0	–	57.6	–	53.7	–
Terra	HR 152	–	60.3	55.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 200 (S)	–	57.8	51.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 201 (S)	–	56.4	52.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 202 (S)	–	56.1	50.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 203 (S)	–	58.0	51.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 87 (S)	–	58.0	53.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
----	2157	–	–	–	55.0	54.5	57.8	60.1	58.3	62.0	61.5	56.7	–	58.8	54.1	51.8	50.6	–
----	2158	56.3	60.0	54.0	54.5	52.4	57.5	58.7	56.4	60.3	60.5	56.9	54.5	54.7	54.5	51.5	51.0	55.9
----	2163	55.8	59.1	50.8	56.3	51.4	57.1	59.2	57.5	59.4	60.1	57.1	53.5	50.8	55.3	54.4	53.2	55.7
----	2172	57.6	59.6	51.6	53.5	51.1	57.5	–	59.2	57.3	59.6	–	–	54.8	57.4	54.2	54.5	–
----	2180	–	60.5	53.8	56.2	53.1	59.2	–	57.5	57.5	59.0	–	–	55.9	54.7	–	–	–
----	Arapahoe	54.9	–	–	54.3	–	58.2	59.2	–	–	–	58.9	55.1	58.6	53.2	57.6	–	–
----	Arkan	57.2	59.6	53.5	54.0	52.3	59.4	58.0	57.6	58.9	59.0	–	–	–	–	–	–	–
----	Caldwell (S)	56.1	57.8	52.5	53.8	–	57.0	–	–	–	–	–	–	–	–	–	–	–
----	Cardinal (S)	53.0	59.0	53.0	53.2	–	56.3	–	–	–	–	–	–	–	–	–	–	–
----	Centura	–	–	–	–	–	–	–	–	61.0	–	–	–	–	–	–	–	–
----	Century	51.5	60.3	52.5	52.5	53.7	57.6	61.2	56.2	60.9	57.7	–	–	58.0	–	–	–	–
----	Chisholm	54.8	60.6	57.3	–	–	–	–	–	60.3	–	–	–	–	–	–	–	–
----	Cimarron	56.4	61.4	56.9	57.2	54.9	58.9	60.5	61.7	60.9	58.7	60.8	56.0	60.2	55.7	56.5	55.5	58.3
----	Clark (S)	56.9	57.4	51.2	56.0	–	58.0	–	–	–	–	–	–	–	–	–	–	–
----	Colt	55.0	–	–	–	–	57.0	–	–	–	–	59.3	54.9	58.6	56.8	–	–	–
----	Karl	59.9	61.5	56.3	56.5	54.2	59.5	60.8	61.0	59.3	59.5	61.5	57.0	58.1	58.8	57.0	56.3	58.6
----	Lamar	–	–	–	–	–	–	–	–	–	–	61.0	–	58.8	–	58.1	–	–
----	Larned	53.5	60.9	52.5	53.3	54.7	57.2	60.2	57.1	61.8	–	60.4	–	57.0	–	57.6	–	–
----	Newton	55.7	60.5	52.8	51.5	52.0	57.5	59.3	57.0	60.8	61.3	59.6	54.8	57.5	56.3	56.1	53.6	56.6
----	Norkan	56.7	60.6	–	56.8	–	59.1	59.7	–	–	–	59.8	56.8	–	–	–	–	–
----	Rawhide	52.7	60.4	53.7	54.8	52.1	58.5	59.5	58.3	60.6	57.7	59.2	54.3	57.6	57.1	56.9	54.6	56.7
----	Redland	54.5	–	–	49.8	–	57.8	–	–	–	–	58.8	–	–	–	–	–	–
----	Scout 66	55.7	61.3	52.8	54.3	56.0	58.1	61.1	59.3	61.1	–	61.0	–	58.9	–	58.4	–	–
----	Siouxland	55.5	60.1	50.3	49.8	53.6	58.4	–	58.3	60.1	56.6	60.7	–	–	–	–	–	–
----	TAM 107	53.7	58.8	52.3	54.2	54.0	57.7	60.7	58.0	59.7	59.7	59.1	55.7	55.1	57.8	54.9	54.2	56.6
----	TAM 108	51.6	57.0	–	44.9	46.9	–	–	49.0	58.1	58.8	–	–	–	–	–	–	–
----	TAM 200	55.8	59.4	57.2	55.9	56.3	59.8	63.2	58.7	61.3	59.0	62.0	57.4	60.4	59.8	56.8	55.6	58.7
----	Triumph 64	–	62.0	–	–	57.5	–	62.7	61.5	–	–	–	–	–	–	–	–	–
Test Averages, bushels		55.6	59.4	53.1	54.2	53.1	58.0	59.9	57.9	60.1	60.0	59.7	55.4	57.6	56.8	56.1	54.2	---
L.S.D. (.05) **		1.7	1.0	1.6	4.3	0.9	1.5	0.8	3.9	0.9	1.3	0.6	1.1	1.9	2.0	1.4	1.5	---

* Upper L.S.D. group. Differences among those values marked with an asterisk at any one location are not statistically significant.

** Unless two varieties differ by more than the L.S.D. (Least Significant Difference), little confidence can be placed in one being superior.

Table 9. Maturity (days earlier or later than Scout 66 – Dry., or Newton – Irr.) from 1991 KS Winter Wheat Tests

Brand	Cultivar	Brown	Fran-klin	Lab-ette	Riley	Har-vey	Repu-blic	Ellis	Reno	Sta Dry.	Sta Irr.	Tho Dry.	Tho Irr.	Gre Dry.	Gre Irr.	Fin Dry.	Fin Irr.	16-Sta Avg.
AgriPro	Abilene	-0.5	1.3	-	0.0	-	-0.3	0.8	-	-	-	1.8	2.0	-	1.0	0.3	-	-
AgriPro	Bronco	-	-	-	-	-	-2.3	-2.8	-	-4.5	-	1.0	-	-0.5	-	-3.8	-	-
AgriPro	Longhorn	-	-	-	-	-	-	0.5	-0.5	-	-	-	-	-	-	2.3	-	-
AgriPro	Mesa	-	-	-6.5	-	-7.5	-	-	-8.8	-	-8.0	-	-	-	-2.5	-	-	-
AgriPro	Sierra	-1.0	-0.8	-0.8	-5.0	-1.0	-0.8	-1.0	-1.5	1.0	0.5	0.8	1.3	0.8	-0.8	-1.3	-0.3	-0.6
AgriPro	Thunderbird	-2.0	-2.5	-1.3	-4.0	0.0	-2.3	-0.3	-2.0	-0.5	-0.5	0.0	1.0	0.5	-1.0	-1.3	0.0	-1.0
AgriPro	Tomahawk	-0.8	0.3	0.3	-3.0	-1.8	-3.5	-0.8	-2.0	-1.0	0.0	-3.0	-2.3	-1.3	-1.0	0.0	-0.5	-1.3
AgriPro	Victory	-1.0	-0.8	0.3	-4.0	-1.8	-5.3	-0.8	-1.0	-	1.5	-	-0.5	-	-	-	-	-
AGSECO	7805	1.3	-	-	-	-	-0.3	0.0	-	-	-	1.5	1.5	0.5	0.8	-2.0	0.5	-
AGSECO	7833	-1.3	-2.5	-	-3.0	-	-1.3	-1.3	-	-	-0.5	-0.8	-0.3	-	-	-2.0	-1.3	-
AGSECO	7837	-	-5.8	-5.0	-	-6.0	-	-	-	-	-	-	-	-	-	-	-	-
AGSECO	7846	-3.0	-6.5	-6.0	-7.0	-5.0	-3.5	-1.3	-5.8	-5.5	-5.5	-0.8	1.0	-1.5	-1.3	-3.5	-2.0	-3.6
AGSECO	7853	-2.8	-2.5	-1.0	-5.0	-2.8	-4.8	-3.0	-2.5	-2.5	-2.0	-3.0	-0.3	-2.3	-2.0	-3.0	-1.8	-2.6
Greenbush	790 Exp	-	-	-4.3	-7.0	-	-	-	-6.5	-	-	-	1.8	-	-	-	-	-
Greenbush	Voyager	-0.8	-2.3	-1.0	-4.0	0.5	-0.5	-0.8	-0.5	-0.5	2.3	2.8	3.8	0.0	0.5	-0.8	-0.5	-0.1
HybriTech	Pacer (S)	-3.0	-2.8	-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MBS	8880 Exp	-	-	-	-	-	-	-3.3	-	-	-8.5	-	-	-	-3.0	-	-3.8	-
MBS	8905 Exp	-	-	-	-	-	-4.0	-2.5	-5.5	-	-	-1.3	-	-	-	-2.8	-	-
MBS	90201 Exp	-	-8.3	-	-	-	-	-	-	-14.0	-9.5	-	-	-	-	-	-3.8	-
MBS	90202 Exp	-	-	-	-	-	0.5	2.8	-	-	-	-	-	-	-	3.3	6.0	-
MBS	90203 Exp	0.0	-	2.0	-2.0	-	-	-	-0.3	-	-	-	-	-	-	-	-	-
Merschman	Julie III (S)	-2.8	-4.3	-4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Merschman	Katie IV (S)	-	-6.0	-6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Merschman	Katie V (S)	-	-5.8	-6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pharaoh	Kleo Red	-	-	-	-	-	-	2.0	-	-	-	3.8	-	2.3	-	0.0	-	-
Pharaoh	Kleo White	-	-	-	-	-	-	0.5	-	-	-	3.0	-	1.8	-	-2.3	-	-
Pharoah	Tut	-	-	-	-	-	-	-	-	-	-	2.8	-	2.0	-	0.8	-	-
Pioneer	2548 (S)	-	-2.0	-3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pioneer	2551 (S)	-	-2.5	-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quantum	542	-	-	-	-	-	-	-	-	-	-	2.5	-	1.8	-	-1.3	-	-
Quantum	549	-	-	-	-	-	-1.0	2.0	-	-	-	3.0	-	-	-	-	-	-
Quantum	561	-0.8	-1.8	-	-4.0	-	-0.5	-	-	-	-	-	-	-	-	-	-	-
Quantum	562	-	-	-	-	-	0.8	1.3	-	-	-	2.3	2.0	2.8	1.3	1.0	1.8	-
Quantum	574	-2.3	-5.5	-1.5	-6.0	-0.5	-	-	-4.0	-	-	-	-	-	-	-	-	-
Quantum	577	-	-	-3.5	-	-3.5	-	-	-4.8	-	-	-	-	-	-	-	-	-
Quantum	578	-	-	-	-	-	-	-	-	-	-	-	-2.0	-	-1.3	-	-1.5	-
Quantum	589	-	-	-	-	-	-	-	-	-	-	-	-1.5	-	-1.5	-	-1.8	-
Terra	HR 152	-	-6.3	-5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terra	SR 200 (S)	-	-6.0	-6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terra	SR 201 (S)	-	-6.3	-4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terra	SR 202 (S)	-	-5.3	-5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terra	SR 203 (S)	-	0.3	-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terra	SR 87 (S)	-	-5.3	-5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
----	2157	-	-	-	-7.0	-1.5	-3.5	-1.5	-2.5	-1.5	-1.0	0.5	-	0.3	0.3	-2.0	-0.8	-
----	2158	-1.8	-4.8	-1.8	-7.0	-2.8	-2.3	-2.0	-4.0	-2.5	-0.5	0.0	1.5	-1.3	0.3	-3.5	-1.0	-2.1
----	2163	-2.3	-4.8	-3.0	-8.0	-3.3	-4.0	-2.8	-5.5	-3.0	-1.0	-0.8	0.8	-1.0	-0.5	-2.3	-1.0	-2.5
----	2172	-3.0	-7.3	-5.8	-7.0	-6.3	-4.5	-	-6.8	-8.0	-5.0	-	-	-2.5	-2.3	-1.5	-3.3	-
----	2180	-	-6.5	-8.0	-11.0	-8.5	-6.8	-	-12.5	-14.5	-10.5	-	-	-5.5	-3.8	-	-	-
----	Arapahoe	2.5	-	-	2.0	-	0.8	1.5	-	-	-	2.5	3.0	1.0	1.0	0.0	-	-
----	Arkan	-3.5	-6.5	-7.3	-6.0	-5.8	-5.5	-2.8	-6.0	-6.5	-4.5	-	-	-	-	-	-	-
----	Caldwell (S)	-3.0	-4.0	-4.5	-8.0	-	-7.8	-	-	-	-	-	-	-	-	-	-	-
----	Cardinal (S)	1.5	-0.3	0.0	-3.0	-	-2.0	-	-	-	-	-	-	-	-	-	-	-
----	Centura	-	-	-	-	-	-	-	-	-1.0	-	-	-	-	-	-	-	-
----	Century	2.0	-2.0	-2.3	-5.0	0.8	-0.8	0.8	-1.5	-0.5	3.8	-	-	3.3	-	-	-	-
----	Chisholm	-1.8	-7.3	-7.0	-	-	-	-	-	-9.0	-	-	-	-	-	-	-	-
----	Cimarron	-1.3	-7.8	-5.5	-8.0	-4.5	-6.5	-3.0	-6.0	-7.0	0.0	-1.0	0.8	-2.0	-1.3	-3.8	-3.3	-3.8
----	Clark (S)	-3.8	-5.5	-6.5	-9.0	-	-7.5	-	-	-	-	-	-	-	-	-	-	-
----	Colt	0.5	-	-	-	-	-0.5	-	-	-	-	2.0	0.5	0.8	-0.8	-	-	-
----	Karl	-3.5	-6.8	-5.3	-8.0	-4.3	-6.3	-3.0	-7.0	-8.5	-7.0	-2.8	-2.0	-4.3	-1.5	-3.8	-2.0	-4.8
----	Lamar	-	-	-	-	-	-	-	-	-	-	2.8	-	2.0	-	0.5	-	-
----	Larned	1.0	-0.5	0.5	-2.0	-0.8	-0.5	-0.8	0.0	-0.5	-	0.3	-	-0.3	-	-1.0	-	-
----	Newton	-0.8	-0.3	0.8	-2.0	0.0	-1.5	0.0	-2.0	0.0	5/9	0.5	5/20	-0.5	5/19	-0.3	5/16	-0.4
----	Norkan	0.3	-1.5	-	-3.0	-	-1.0	0.0	-	-	-	-0.8	0.5	-	-	-	-	-
----	Rawhide	-1.3	-5.0	-5.3	-5.0	-3.8	-2.0	-1.3	-4.3	-3.5	1.8	0.5	1.3	-1.5	-0.3	-3.0	0.3	-2.0
----	Redland	2.0	-	-	1.0	-	0.3	-	-	-	-	2.8	-	-	-	-	-	-
----	Scout 66	5/14	5/4	4/26	5/13	5/2	5/9	5/13	5/9	5/7	-	5/18	-	5/21	-	5/19	-	-
----	Siouxland	-0.5	-4.0	-3.0	-2.0	-0.8	0.0	-	-1.5	0.0	2.3	3.0	-	-	-	-	-	-
----	TAM 107	-3.5	-8.3	-7.8	-9.0	-7.5	-9.3	-4.8	-9.5	-9.0	-2.5	-4.5	-3.5	-4.3	-3.0	-4.3	-4.5	-6.0
----	TAM 108	0.3	1.5	-	1.0	4.3	-	-	2.5	2.0	2.5	-	-	-	-	-	-	-
----	TAM 200	-1.5	-5.5	-5.8	-5.0	-3.3	-4.0	-1.5	-3.5	-4.5	4.5	-1.0	-0.5	-0.3	-2.0	-0.5	-1.3	-2.2
----	Triumph 64	-	-6.3	-	-	-4.0	-	-4.0	-6.8	-	-	-	-	-	-	-	-	-
Test Averages, bushels		-1.0	-3.8	-3.2	-4.3	-2.3	-2.5	-0.8	-3.5	-3.8	-1.7	0.7	0.5	-0.2	-0.8	-1.3	-0.9	---
L.S.D. (.05) **		1.2	1.1	1.3	--	1.0	0.6	0.8	1.4	2.3	2.8	0.9	1.3	1.1	1.5	1.6	0.9	---

* Upper L.S.D. group. Differences among those values marked with an asterisk at any one location are not statistically significant.

** Unless two varieties differ by more than the L.S.D. (Least Significant Difference), little confidence can be placed in one being superior.

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Table 10. Plant heights (inches) from 1991 Kansas Winter Wheat Performance Tests

Brand	Cultivar	Brown	Fran-klin	Lab-ette	Riley	Har-vey	Repu-blic	Ellis	Reno	Sta Dry.	Sta Irr.	Tho Dry.	Tho Irr.	Gre Dry.	Gre Irr.	Fin Dry.	Fin Irr.	18-Sta Avg.
AgriPro	Abilene	32	33	–	34	–	32	27	–	–	–	30	36	–	35	21	–	–
AgriPro	Bronco	–	–	–	–	–	31	29	–	33	–	30	–	24	–	23	–	–
AgriPro	Longhorn	–	–	–	–	–	–	30	46	–	–	–	–	–	–	27	–	–
AgriPro	Mesa	–	–	31	–	28	–	–	37	–	31	–	–	–	32	–	–	–
AgriPro	Sierra	35	32	35	37	30	31	28	40	31	34	32	36	25	33	22	37	32.4
AgriPro	Thunderbird	38	37	39	41	33	34	29	45	34	37	33	37	27	35	24	36	34.9
AgriPro	Tomahawk	35	37	37	39	33	32	30	42	31	35	30	35	25	35	23	38	33.6
AgriPro	Victory	37	36	36	39	33	32	29	44	–	35	–	37	–	–	–	–	–
AGSECO	7805	37	–	–	–	–	35	31	–	–	–	34	36	26	37	24	39	–
AGSECO	7833	35	36	–	39	–	31	30	–	–	35	33	36	–	–	26	37	–
AGSECO	7837	–	36	36	–	30	–	–	–	–	–	–	–	–	–	–	–	–
AGSECO	7846	35	37	37	42	32	33	28	42	29	32	32	37	24	37	22	37	33.5
AGSECO	7853	33	36	40	42	36	30	29	46	34	36	31	38	26	36	24	39	34.8
Greenbush	790 Exp	–	–	35	38	–	–	–	41	–	–	–	35	–	–	–	–	–
Greenbush	Voyager	36	36	37	44	32	34	32	44	35	30	34	39	27	37	26	37	35.0
HybriTech	Pacer (S)	36	35	36	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MBS	8660 Exp	–	–	–	–	–	–	26	–	–	30	–	–	–	28	–	31	–
MBS	8905 Exp	–	–	–	–	–	32	29	41	–	–	32	–	–	–	23	–	–
MBS	90201 Exp	–	30	–	–	–	–	–	–	28	30	–	–	–	–	–	32	–
MBS	90202 Exp	–	–	–	–	–	31	28	–	–	–	–	–	–	–	24	38	–
MBS	90203 Exp	33	–	34	36	–	–	–	40	–	–	–	–	–	–	–	–	–
Merschman	Julie III (S)	35	35	38	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Merschman	Katie IV (S)	–	37	37	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Merschman	Katie V (S)	–	35	34	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pharaoh	Kleo Red	–	–	–	–	–	–	32	–	–	–	36	–	26	–	24	–	–
Pharaoh	Kleo White	–	–	–	–	–	–	32	–	–	–	35	–	26	–	24	–	–
Pharoah	Tut	–	–	–	–	–	–	–	–	–	–	37	–	28	–	31	–	–
Pioneer	2548 (S)	–	33	37	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pioneer	2551 (S)	–	34	36	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Quantum	542	–	–	–	–	–	–	–	–	–	–	37	–	28	–	28	–	–
Quantum	549	–	–	–	–	–	32	31	–	–	–	36	–	–	–	–	–	–
Quantum	561	36	38	–	41	–	34	–	–	–	–	–	–	–	–	–	–	–
Quantum	562	–	–	–	–	–	32	29	–	–	–	35	37	26	37	25	39	–
Quantum	574	35	37	39	40	33	–	–	43	–	–	–	–	–	–	–	–	–
Quantum	577	–	–	38	–	34	–	–	45	–	–	–	–	–	–	–	–	–
Quantum	578	–	–	–	–	–	–	–	–	–	–	–	38	–	37	–	35	–
Quantum	589	–	–	–	–	–	–	–	–	–	–	–	35	–	34	–	36	–
Terra	HR 152	–	36	37	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 200 (S)	–	34	36	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 201 (S)	–	38	38	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 202 (S)	–	36	37	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 203 (S)	–	39	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Terra	SR 87 (S)	–	36	41	–	–	–	–	–	–	–	–	–	–	–	–	–	–
----	2157	–	–	–	37	33	30	29	41	32	35	31	–	28	36	24	37	–
----	2158	35	35	35	39	34	30	29	41	31	34	31	36	25	37	24	37	33.3
----	2183	33	33	34	37	30	31	28	43	30	32	30	35	24	34	22	36	32.0
----	2172	33	31	32	36	28	29	–	36	30	30	–	–	23	32	21	33	–
----	2180	–	30	30	31	25	29	–	37	27	30	–	–	23	27	–	–	–
----	Arapahoe	37	–	–	40	–	36	30	–	–	–	36	40	27	39	26	–	–
----	Arkan	35	35	34	41	29	32	29	42	31	30	–	–	–	–	–	–	–
----	Caldwell (S)	35	36	36	36	–	33	–	–	–	–	–	–	–	–	–	–	–
----	Cardinal (S)	36	38	40	41	–	34	–	–	–	–	–	–	–	–	–	–	–
----	Centura	–	–	–	–	–	–	–	–	37	–	–	–	–	–	–	–	–
----	Century	35	38	39	41	34	33	28	45	36	31	–	–	26	–	–	–	–
----	Chisholm	30	36	36	–	–	–	–	–	31	–	–	–	–	–	–	–	–
----	Cimarron	30	36	35	39	30	31	27	41	32	26	30	36	24	38	22	36	32.1
----	Clark (S)	38	36	37	41	–	34	–	–	–	–	–	–	–	–	–	–	–
----	Colt	33	–	–	–	–	30	–	–	–	–	31	35	22	35	–	–	–
----	Karl	35	34	36	39	31	30	29	41	31	35	31	35	24	34	22	36	32.8
----	Lamar	–	–	–	–	–	–	–	–	–	–	35	–	26	–	26	–	–
----	Larned	38	43	45	47	38	40	33	49	36	–	36	–	27	–	28	–	–
----	Newton	35	38	41	41	34	32	31	45	31	35	32	37	24	36	24	40	34.8
----	Norkan	37	35	–	38	–	33	29	–	–	–	33	37	–	–	–	–	–
----	Rawhide	36	38	39	43	34	35	31	46	35	27	35	39	27	39	24	41	35.6
----	Redland	41	–	–	42	–	35	–	–	–	–	37	–	–	–	–	–	–
----	Scout 66	40	44	45	48	41	43	36	50	38	–	38	–	29	–	29	–	–
----	Siouxland	43	39	43	47	37	39	–	48	35	30	37	–	–	–	–	–	–
----	TAM 107	33	34	36	38	34	34	29	42	31	29	32	36	24	36	23	39	33.1
----	TAM 108	36	37	–	41	34	–	–	43	33	36	–	–	–	–	–	–	–
----	TAM 200	30	34	34	36	31	31	29	39	33	26	28	34	23	34	22	34	31.1
----	Triumph 64	–	41	–	–	37	–	34	49	–	–	–	–	–	–	–	–	–
Test Averages, bushels		35	36	37	40	33	33	30	43	33	32	33	37	25	35	24	37	---
L.S.D. (.05) **		2.3	1.7	1.7	1.7	1.5	2.6	1.7	3.3	2.2	2.1	1.6	1.8	2.3	3.5	1.5	1.7	---

* Upper L.S.D. group. Differences among those values marked with an asterisk at any one location are not statistically significant.

** Unless two varieties differ by more than the L.S.D. (Least Significant Difference), little confidence can be placed in one being superior.

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Table 11. Lodging percentages from 1991 Kansas Winter Wheat Performance Tests

Brand	Cultivar	Brown	Lab-ette	Riley	Har-vey	Repu-blic	Reno	Sta Dry.	Sta Irr.	Tho Dry.	Tho Irr.	Gre Irr.	Fin Irr.
AgriPro	Abilene	17	–	5	–	0	–	–	–	0	10	25	–
AgriPro	Bronco	–	–	–	–	0	–	18	–	0	–	–	–
AgriPro	Longhorn	–	–	–	–	–	11	–	–	–	–	–	–
AgriPro	Mesa	–	0	–	1	–	68	–	3	–	–	9	–
AgriPro	Sierra	1	0	0	2	0	4	5	1	0	3	5	0
AgriPro	Thunderbird	6	0	0	2	0	8	9	4	0	14	3	28
AgriPro	Tomahawk	6	0	18	1	0	38	6	6	0	7	33	43
AgriPro	Victory	8	0	20	2	0	88	–	9	–	29	–	–
AGSECO	7805	68	–	–	–	18	–	–	–	0	49	85	60
AGSECO	7833	27	–	30	–	0	–	–	6	0	23	–	45
AGSECO	7837	–	4	–	10	–	–	–	–	–	–	–	–
AGSECO	7846	58	3	18	9	5	85	19	6	0	13	59	35
AGSECO	7853	12	1	8	2	0	69	9	4	0	19	6	15
Greenbush	790 Exp	–	5	3	–	–	50	–	–	–	68	–	–
Greenbush	Voyager	10	0	28	0	0	25	5	4	0	30	25	58
HybriTech	Pacer (S)	3	0	–	–	–	–	–	–	–	–	–	–
MBS	8860 Exp	–	–	–	–	–	–	–	1	–	–	0	43
MBS	8905 Exp	–	–	–	–	0	46	–	–	0	–	–	–
MBS	90201 Exp	–	–	–	–	–	–	1	1	–	–	–	20
MBS	90202 Exp	–	–	–	–	0	–	–	–	–	–	–	13
MBS	90203 Exp	6	0	3	–	–	9	–	–	–	–	–	–
Merschman	Julie III (S)	2	0	–	–	–	–	–	–	–	–	–	–
Merschman	Katie IV (S)	–	0	–	–	–	–	–	–	–	–	–	–
Merschman	Katie V (S)	–	0	–	–	–	–	–	–	–	–	–	–
Pharaoh	Kleo Red	–	–	–	–	–	–	–	–	0	–	–	–
Pharaoh	Kleo White	–	–	–	–	–	–	–	–	0	–	–	–
Pharoah	Tut	–	–	–	–	–	–	–	–	6	–	–	–
Pioneer	2548 (S)	–	0	–	–	–	–	–	–	–	–	–	–
Pioneer	2551 (S)	–	0	–	–	–	–	–	–	–	–	–	–
Quantum	542	–	–	–	–	–	–	–	–	0	–	–	–
Quantum	549	–	–	–	–	0	–	–	–	0	–	–	–
Quantum	561	4	–	5	–	0	–	–	–	–	–	–	–
Quantum	562	–	–	–	–	0	–	–	–	0	2	8	18
Quantum	574	5	0	3	2	–	10	–	–	–	–	–	–
Quantum	577	–	3	–	2	–	11	–	–	–	–	–	–
Quantum	578	–	–	–	–	–	–	–	–	–	5	3	40
Quantum	589	–	–	–	–	–	–	–	–	–	5	3	30
Terra	HR 152	–	0	–	–	–	–	–	–	–	–	–	–
Terra	SR 200 (S)	–	0	–	–	–	–	–	–	–	–	–	–
Terra	SR 201 (S)	–	1	–	–	–	–	–	–	–	–	–	–
Terra	SR 202 (S)	–	0	–	–	–	–	–	–	–	–	–	–
Terra	SR 203 (S)	–	1	–	–	–	–	–	–	–	–	–	–
Terra	SR 87 (S)	–	0	–	–	–	–	–	–	–	–	–	–
----	2157	–	–	0	2	0	14	14	1	0	–	3	5
----	2158	5	0	8	2	0	61	14	4	0	9	38	30
----	2163	4	0	0	1	0	49	3	4	0	17	31	30
----	2172	2	1	28	1	0	54	6	5	–	–	11	43
----	2180	–	0	0	0	0	9	0	1	–	–	0	–
----	Arapahoe	12	–	88	–	13	–	–	–	0	44	75	–
----	Arkan	3	0	28	2	0	14	4	6	–	–	–	–
----	Caldwell (S)	6	0	0	–	0	–	–	–	–	–	–	–
----	Cardinal (S)	2	0	0	–	0	–	–	–	–	–	–	–
----	Centura	–	–	–	–	–	–	8	–	–	–	–	–
----	Century	83	1	55	6	0	93	14	6	–	–	–	–
----	Chisholm	20	1	–	–	–	–	11	–	–	–	–	–
----	Cimarron	49	0	18	5	0	98	6	4	0	20	15	28
----	Clark (S)	12	0	0	–	0	–	–	–	–	–	–	–
----	Colt	7	–	–	–	0	–	–	–	0	6	5	–
----	Karl	4	1	5	0	0	30	3	3	0	23	14	45
----	Lamar	–	–	–	–	–	–	–	–	0	–	–	–
----	Larned	60	6	58	4	50	88	9	–	0	–	–	–
----	Newton	16	0	13	4	0	71	6	8	0	24	14	35
----	Norkan	7	–	0	–	0	–	–	–	0	40	–	–
----	Rawhide	34	0	75	2	0	79	6	4	0	53	51	53
----	Redland	5	–	60	–	0	–	–	–	0	–	–	–
----	Scout 66	45	11	95	5	63	88	15	–	16	–	–	–
----	Siouxland	8	0	43	1	5	48	8	5	0	–	–	–
----	TAM 107	8	0	5	2	0	23	8	5	0	7	65	43
----	TAM 108	48	–	98	20	–	100	10	6	–	–	–	–
----	TAM 200	58	3	73	21	0	100	10	8	0	30	38	45
----	Triumph 64	–	–	–	10	–	98	–	–	–	–	–	–
Test Averages, bushels		16	1	24	5	4	52	8	5	1	21	28	34
L.S.D. (.05) **		20.6	3.0	22.1	3.7	11.0	35.7	6.5	4.4	3.0	23.4	23.3	26.7

* Upper L.S.D. group. Differences among those values marked with an asterisk at any one location are not statistically significant.

** Unless two varieties differ by more than the L.S.D. (Least Significant Difference), little confidence can be placed in one being superior.

Table 12a. Disease ratings from 1991 Kansas Winter Wheat Performance Tests 1/

Entrant or brand	Variety or hybrid	Leaf Rust BR 6/1	Leaf Rust LB 5/17	Leaf Rust RP 5/31	Leaf Rust RL 6/2	Leaf Rust SFI 5/23	Leaf Rust THI 6/12	Stem Rust THD 6/13	Powdery Mildew LB 5/1	Powdery Mildew RL 6/1	Soil Borne BR 4/5	Soil Borne RL 3/20	Soil Borne SFI 3/13	Leaf Blotch BR 6/1	Glume Blotch RL 6/1	Tan Spot BR 6/1	Tan Spot RL 6/2	Tan Spot THI 6/12	Wheat Streak HV 5/15
AgriPro	Abilene	4	–	7	5	–	4	1	–	7	1	1	–	6	8	4	8	6	–
AgriPro	Bronco	–	–	7	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
AgriPro	Longhorn	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
AgriPro	Mesa	–	3	–	–	6	–	–	9	–	–	–	1	–	–	–	–	–	5
AgriPro	Sierra	2	1	5	3	2	2	1	6	4	2	1	1	1	3	2	2	2	6
AgriPro	Thunderbird	5	4	6	4	3	5	1	6	1	1	1	1	6	7	6	9	7	5
AgriPro	Tomahawk	1	1	4	1	1	2	1	3	1	1	1	1	7	3	3	3	2	9
AgriPro	Victory	1	3	5	1	4	3	–	4	3	1	1	1	7	5	3	4	4	9
AGSECO	7805	7	–	7	–	–	7	1	–	–	9	–	–	6	–	9	–	9	–
AGSECO	7833	5	–	7	6	5	7	1	–	3	1	1	1	4	6	5	8	7	–
AGSECO	7837	–	1	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	9
AGSECO	7846	7	9	8	7	6	6	1	6	4	1	1	1	3	7	7	7	8	4
AGSECO	7853	2	2	7	6	3	4	4	2	1	2	1	1	7	6	5	7	4	3
Greenbush	790 Exp	–	1	–	2	–	2	–	4	3	–	7	–	–	6	–	8	6	–
Greenbush	Voyager	2	3	4	5	6	5	8	3	1	9	6	6	4	6	4	6	3	8
HybriTech	Pacer (S)	3	6	–	–	–	–	–	1	–	1	–	–	1	–	3	–	–	–
MBS	8860 Exp	–	–	–	–	5	–	–	–	–	–	–	1	–	–	–	–	–	–
MBS	8905 Exp	–	–	7	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
MBS	90201 Exp	–	–	–	–	4	–	–	–	–	–	–	1	–	–	–	–	–	–
MBS	90202 Exp	–	–	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MBS	90203 Exp	2	1	–	1	–	–	–	9	4	1	1	–	1	8	5	9	–	–
Merschman	Julie III (S)	2	3	–	–	–	–	–	2	–	1	–	–	1	–	2	–	–	–
Merschman	Katie IV (S)	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
Merschman	Katie V (S)	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
Pharaoh	Kleo Red	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Pharaoh	Kleo White	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Pharoah	Tut	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–
Pioneer	2548 (S)	–	2	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–
Pioneer	2551 (S)	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
Quantum	542	–	–	–	–	–	–	7	–	–	–	–	–	–	–	–	–	–	–
Quantum	549	–	–	6	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–
Quantum	561	2	–	5	3	–	–	–	–	3	1	1	–	2	6	2	3	–	–
Quantum	562	–	–	7	–	–	4	3	–	–	–	–	–	–	–	–	–	4	–
Quantum	574	2	2	–	4	–	–	–	6	4	3	3	–	3	5	2	3	–	7
Quantum	577	–	2	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	6
Quantum	578	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	4	–
Quantum	589	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	4	–
Terra	HR 152	–	8	–	–	–	–	–	7	–	–	–	–	–	–	–	–	–	–
Terra	SR 200 (S)	–	1	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
Terra	SR 201 (S)	–	1	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–
Terra	SR 202 (S)	–	1	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
Terra	SR 203 (S)	–	5	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–
Terra	SR 87 (S)	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–
----	2157	–	–	9	4	6	–	9	–	4	–	1	1	–	7	–	9	–	5
----	2158	2	1	5	5	4	3	8	5	4	1	1	1	3	6	3	9	4	5
----	2163	1	3	3	2	1	3	1	2	–	1	1	1	1	2	2	3	3	7
----	2172	2	1	4	4	2	–	–	6	7	1	1	1	2	4	3	7	–	5
----	2180	–	3	3	4	2	–	–	9	5	–	1	1	–	4	–	4	–	9
----	Arapahoe	2	–	4	1	–	3	1	–	6	6	5	–	2	3	3	5	3	–
----	Arkan	3	6	6	5	5	–	–	6	2	2	1	1	9	8	8	9	–	8
----	Caldwell (S)	2	3	5	4	–	–	–	2	1	2	1	–	1	4	2	4	–	–
----	Cardinal (S)	1	1	4	4	–	–	–	3	2	9	7	–	1	2	2	2	–	–
----	Centura	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
----	Century	8	7	8	7	7	–	–	2	–	8	9	7	3	8	9	8	–	7
----	Chisholm	4	7	–	–	–	–	–	7	–	8	–	–	6	–	9	–	–	–
----	Cimarron	4	6	7	5	5	5	1	6	7	9	7	9	5	9	9	9	8	9
----	Clark (S)	3	5	5	2	–	–	–	2	1	1	1	–	3	3	2	2	–	–
----	Colt	8	–	9	–	–	9	1	–	–	8	–	–	6	–	4	–	7	–
----	Karl	3	3	4	4	4	5	4	3	1	1	1	1	1	3	2	2	2	8
----	Lamar	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
----	Larned	7	6	7	8	–	–	1	4	3	9	7	–	7	7	5	8	–	7
----	Newton	9	9	8	8	7	9	1	7	4	1	1	1	8	4	6	8	8	6
----	Norkan	6	–	9	7	–	7	1	–	6	1	1	–	4	9	9	9	8	–
----	Rawhide	8	9	8	7	7	9	1	4	4	9	8	8	7	6	8	9	7	6
----	Redland	2	–	4	4	–	–	1	–	2	7	6	–	2	4	3	8	–	–
----	Scout 66	7	5	7	8	–	–	2	5	4	9	9	–	7	9	7	9	–	7
----	Siouxland	9	8	6	8	7	–	1	2	–	5	7	7	4	4	7	6	–	6
----	TAM 107	9	9	9	9	9	9	1	1	–	7	6	6	7	4	7	–	7	3
----	TAM 108	3	–	–	6	7	–	–	–	5	2	1	1	5	7	3	9	–	6
----	TAM 200	4	4	8	4	4	4	1	1	–	9	7	9	3	8	4	9	3	3
----	Triumph 64	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4
Test Averages		4	4	6	5	5	5	2	4	3	4	3	3	4	6	4	6	5	6
L.S.D. (.05) **		1.4	1.4	1.2	1.0	1.3	1.4	0.6	1.4	--	1.6	2.0	0.6	2.4	--	2.2	1.4	2.1	1.0
C.V. (%)		21.5	19.6	14.8	13.9	20.5	17.0	13.5	23.4	--	29.3	43.8	16.1	35.4	--	24.1	12.5	24.1	11.9

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Table 12b. Disease ratings, planted seed characteristics, and Hessian fly ratings.

Entrant or brand	Variety or hybrid	Green Leaf Area BR 6/1	RL 6/2	THI 6/12	Planted Seed T.K.W. (grams)	Test Weight (lb/bu)	Seeds /lb (1000)	Coleoptile Length (Inches) 2/ 1991	1990	Hessian Fly 3/
AgriPro	Abilene	5	6	5	30.3	58.9	15	–	3.2	8
AgriPro	Bronco	–	–	–	26.5	55.6	11	–	3.3	8
AgriPro	Longhorn	–	–	–	35.3	59.9	13	4.7	–	8
AgriPro	Mesa	–	–	–	32.8	59.0	14	–	3.0	7
AgriPro	Sierra	2	2	1	36.3	57.5	13	3.3	3.2	8
AgriPro	Thunderbird	6	7	5	31.8	61.5	14	–	4.2	8
AgriPro	Tomahawk	4	3	2	39.5	59.6	11	3.5	–	8
AgriPro	Victory	5	4	4	29.5	56.6	15	–	3.4	8
AGSECO	7805	8	–	7	36.0	57.9	13	–	3.8	8
AGSECO	7833	5	7	6	32.8	57.9	14	–	3.0	8
AGSECO	7837	–	–	–	30.0	59.6	15	–	3.1	8
AGSECO	7846	5	9	6	26.0	61.4	17	–	3.0	8
AGSECO	7853	5	7	3	37.0	57.0	12	–	3.0	8
Greenbush	790 Exp	–	7	5	26.5	58.4	17	3.3	–	8
Greenbush	Voyager	4	5	4	30.3	57.7	15	4.3	–	8
HybriTech	Pacer (S)	3	–	–	37.8	58.7	12	3.4	3.3	4
MBS	8860 Exp	–	–	–	32.3	62.7	14	3.2	3.2	5
MBS	8905 Exp	–	–	–	39.8	59.8	11	3.6	3.5	8
MBS	90201 Exp	–	–	–	35.8	63.0	13	3.3	–	8
MBS	90202 Exp	–	–	–	34.0	60.1	13	3.8	–	8
MBS	90203 Exp	4	7	–	34.5	60.3	13	3.9	–	8
Merschman	Julie III (S)	3	–	–	34.0	58.4	13	3.2	–	5
Merschman	Katie IV (S)	–	–	–	40.3	55.3	11	2.4	–	5
Merschman	Katie V (S)	–	–	–	36.3	--	13	2.9	–	8
Pharaoh	Kleo Red	–	–	–	39.3	56.3	12	5.0	4.9	1
Pharaoh	Kleo White	–	–	–	34.3	57.8	13	4.4	4.5	1
Pharaoh	Tut	–	–	–	31.5	60.9	14	–	4.3	8
Pioneer	2548 (S)	–	–	–	28.8	58.0	13	3.5	–	8
Pioneer	2551 (S)	–	–	–	29.5	57.3	15	–	3.4	5
Quantum	542	–	–	–	38.0	59.2	12	4.2	4.1	8
Quantum	549	–	–	–	40.0	58.5	11	3.5	3.5	8
Quantum	561	2	3	–	36.3	56.1	13	–	3.9	8
Quantum	562	–	–	5	27.8	56.0	16	–	3.3	8
Quantum	574	4	4	–	34.8	56.8	13	–	4.0	8
Quantum	577	–	–	–	38.0	55.6	12	3.9	3.7	8
Quantum	578	–	–	4	34.5	59.6	13	–	3.2	8
Quantum	589	–	–	4	34.8	59.4	13	3.2	3.2	8
Terra	HR 152	–	–	–	33.6	60.8	14	–	2.8	8
Terra	SR 200 (S)	–	–	–	39.5	57.2	11	2.8	3.0	8
Terra	SR 201 (S)	–	–	–	40.3	56.5	11	–	3.5	8
Terra	SR 202 (S)	–	–	–	37.8	57.0	12	3.3	–	8
Terra	SR 203 (S)	–	–	–	33.8	54.2	13	3.2	–	8
Terra	SR 87 (S)	–	–	–	37.0	58.9	12	–	3.2	5
----	2157	–	7	–	29.0	56.7	16	–	3.4	1
----	2158	4	8	3	29.1	58.1	16	3.9	–	1
----	2163	3	3	3	35.4	58.8	13	–	3.3	1
----	2172	3	6	–	35.2	61.1	13	–	3.2	2
----	2180	–	3	–	35.0	60.1	13	3.0	3.2	1
----	Arapahoe	4	4	4	26.9	58.7	17	–	3.3	7
----	Arkan	7	7	–	32.1	57.3	14	–	4.6	1
----	Caldwell (S)	3	4	–	32.1	59.4	14	–	3.1	2
----	Cardinal (S)	2	2	–	31.0	54.1	15	–	3.7	3
----	Centura	–	–	–	28.8	61.0	16	–	3.9	7
----	Century	8	8	–	24.0	58.1	19	–	3.4	5
----	Chisholm	7	–	–	30.7	56.3	15	–	3.2	5
----	Cimarron	7	8	6	28.9	59.3	16	3.5	–	8
----	Clark (S)	3	1	–	39.0	59.4	12	3.6	3.6	1
----	Colt	5	–	7	28.3	59.9	16	–	3.3	8
----	Karl	3	3	3	35.2	60.2	13	–	3.5	8
----	Lamar	–	–	–	39.3	63.0	12	–	4.6	8
----	Larned	7	9	–	34.3	61.9	13	–	4.3	1
----	Newton	7	9	7	31.9	58.5	14	–	3.5	9
----	Norkan	6	9	6	31.0	61.8	15	–	3.3	1
----	Rawhide	7	9	7	28.6	56.4	16	3.3	–	8
----	Redland	3	5	–	29.2	58.3	16	–	3.0	2
----	Scout 66	7	9	–	33.9	58.0	13	–	4.3	8
----	Siouxland	6	7	–	32.8	59.3	14	–	4.0	8
----	TAM 107	9	9	9	40.2	56.1	11	–	3.9	8
----	TAM 108	4	8	–	32.0	58.1	14	–	3.0	8
----	TAM 200	4	7	3	33.6	61.2	14	–	3.1	8
----	Triumph 64	–	–	–	37.7	59.0	12	–	3.7	8
Test Averages		5	6	5	33.0	58.0	14.0	3.6	–	6
L.S.D. (.05)**		1.1	1.0	1.0	--	--	--	0.2	–	--
C.V. (%)		13.5	10.5	12.7	--	--	--	3.7	–	--

** Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

1/ Disease ratings primarily by Robert L. Bowden, except for the Leaf rust rating in the Republic Co. and Stafford Co. tests – W.G. Willis, Powdery Mildew and Glume blotch in the Riley test – Rollin Sears, James P. Shroyer assisted with disease notes in the Thomas Co., Irrigated test.

For all ratings: 1 = Resistant, 9 = Susceptible. Date of rating below county code of test location.

Test location code:
BR = Cornbelt Experiment Field in Brown Co.
HV = Harvey Co. Experiment Field in Harvey Co.
LB = Southeast Branch Station in Labette Co.
RL = Ashland Research Farm in Riley Co.
SFI = Sandyland Experiment Field in Stafford Co. (Irrigated)
TH(D or I) = Northwest Kansas Branch Station in Thomas Co. (Dryland or Irrigated)

2/ Coleoptile lengths provided by T. Joe Martin, Fort Hays Branch Experiment Station.

3/Hessian fly ratings by J. Hatchett; 1 = Resistant, 9 = Susceptible. Tests conducted with the Great Plains strain of Hessian fly.

Bushels per acre yield in 1991 state wheat performance tests

	Labette	Riley	Reno	Thomas (irr.)
G790	44	44	50	57
Newton	42	35	48	55
Arkan	45	44	59	--
LSD(.05)	4.0	10.0	5.0	5.0
C.V.(%)	5.6	16.4	7.1	5.3

Goertzen Seed Research Tests in 1989, 1990, and 1991

	Yr.	County	Bu./Acre	
G790	1991	Reno	62.05	LSD (.05) 6.81
Newton	1991	Reno	54.80	St. Dev. 4.15
Arkan	1991	Reno	59.43	C.V. 6.83
				Trial Mean 60.75
G790	1991	Reno	58.82	LSD (.05) 6.12
Newton	1991	Reno	56.20	St. Dev. 3.72
Arkan	1991	Reno	59.4	C.V. 6.15
				Trial Mean 60.59
G790	1990	Reno	67.19	LSD (.05) 6.54
Newton	1990	Reno	50.79	st. dev. 3.98
Arkan	1990	Reno	_____	c.v. 6.42
				trial mean 61.93
G790	1989	Reno	35	17.2 % protein
Newton	"	"	36	14.6 % protein
Arkan	"	"	32	14.9 % protein

SELECTED DATA FROM 1989 YIELD TRIAL
HAVEN, KANSAS

1989 was a severe testing year with a sudden temperature drop in early February that caused much winter killing to many commercial as well as experimental wheats. Both Newton and Arkan checks were damaged but made good recovery. The drouth that followed also reduced the yields. The plot was fertilized expecting 60-80 bushel yields so protein readings are higher than expected.

VARIETY or EXPERIMENTAL	Bu./Acre Yields	PROTEIN % (as is moisture)
G542	46	16.5
G1857 (Haven)	39	16.7
G1600	39	17.4
G1093	38	16.1
Advantage	36	16.8
Newton (check)	36	14.6
Norkan (check)	36	16.3
G1113	36	16.9
G790	35	17.2
G1250 (Voyager)	35	16.1
G1598	33	17.6
G1759	33	19.2
Plainsman V	32	19.3
G1760	32	17.9
Arkan (check)	32	14.9

Location: 590 GSR, Haven Yield Trial No. 3
Conditions: Dryland
Plot size: 43.33 sq. ft.
Reps: 3

YIELD RANK	VARIETY	BU/A AVE.	LBS/A AVE.	K/H AVE.	J/M AVE.	% TEST AVE
* 1	G1744	72.95	4377.26	4906.26	663.22	117.795
* 2	G777	67.46	4047.40	4536.53	613.24	108.918
* 3	G1056	67.28	4036.92	4524.79	611.66	108.636
* 4	G790	67.19	4031.69	4518.92	610.86	108.495
* 5	G1745	66.85	4010.74	4495.45	607.69	107.932
6	G1853	66.32	3979.33	4460.24	602.93	107.086
7	G1857	66.32	3979.33	4460.23	602.93	107.086
8	Victory	65.71	3942.68	4419.15	597.38	106.100
9	G1742	64.75	3885.08	4354.60	588.65	104.550
10	G1747	64.66	3879.85	4348.73	587.86	104.409
11	G1750	64.32	3858.90	4325.25	584.68	103.845
12	G1598	61.76	3707.06	4155.06	561.68	99.759
13	G1600	61.44	3686.12	4131.59	558.50	99.196
14	G1725	61.44	3686.12	4131.59	558.50	99.196
15	G1655	60.74	3644.23	4084.64	552.16	98.068
16	G1850	60.13	3607.58	4043.56	546.60	97.082
17	G1743	59.95	3597.10	4031.82	545.02	96.800
18	G1751	59.69	3581.40	4014.21	542.64	96.378
19	G791	59.08	3544.74	3973.13	537.08	95.391
20	G1727	56.55	3392.90	3802.94	514.08	91.305
21	G1849	55.50	3330.07	3732.51	504.56	89.614
22	G1748	53.23	3193.94	3579.93	483.93	85.951
23	G463	52.27	3136.34	3515.37	475.20	84.401
24	Newton	50.79	3047.33	3415.60	461.72	82.006

Analysis of Variance

276173.60000000 = MSS			
41.50000000 = RSS	20.75000000 = RMS	2 DF	
2076.62500000 = TSS	90.28804000 = TMS	23 DF	
728.03130000 = ESS	15.82677000 = EMS	46 DF	
279019.80000000 = TOTAL SS		71 DF	

2.01 = T(.05)
6.54 = LSD(.05)
3.98 = Standard Deviation
6.42 = CV
72.95 = HIGHYIELD
50.79 = LOWYIELD
61.93 = TRIAL MEAN

9200033

Location: 1991 GSR, Haven Yield trial No. 2
Conditions: Dryland
Plot size: 43.33 sq. ft.
Reps: 3

YIELD RANK	VARIETY	BU/A AVE.	LBS/A AVE.	K/M AVE.	$/A AVE.	% TEST AVE
* 1	G1760	69.38	4162.59	4665.64	630.70	114.505
* 2	G1830	68.15	4089.28	4583.48	619.59	112.489
* 3	G2103	68.15	4089.28	4583.48	619.59	112.489
* 4	G1857	66.93	4015.98	4501.32	608.48	110.472
* 5	G53s8	65.10	3906.03	4378.07	591.82	107.448
* 6	G1093	64.93	3895.55	4366.34	590.24	107.160
* 7	G2104	64.49	3869.37	4336.99	586.27	106.439
* 8	G2102	64.14	3848.43	4313.52	583.10	105.863
* 9	GC3	63.27	3796.07	4254.83	575.16	104.423
10	G1250	62.40	3743.71	4196.14	567.23	102.983
11	G2105	60.48	3628.52	4067.03	549.78	99.814
12	G1598	60.21	3612.81	4049.42	547.40	99.382
13	ARKAN	59.43	3565.69	3996.61	540.26	98.086
14	G1821	59.25	3555.22	3984.87	538.67	97.798
15	G790	58.82	3529.04	3955.52	534.70	97.077
16	G1024	58.56	3513.33	3937.91	532.32	96.645
17	G1600	58.21	3492.38	3914.44	529.15	96.069
18	G1649	57.68	3460.97	3879.23	524.39	95.205
19	G1759	56.64	3398.14	3808.81	514.87	93.477
20	G1859	56.37	3382.43	3791.20	512.49	93.044
21	NEWTON	56.20	3371.96	3779.46	510.90	92.756
22	G1850	55.50	3330.07	3732.51	504.56	91.604
23	G1851	52.45	3146.81	3527.11	476.79	86.563
24	G1727	47.39	2843.13	3186.72	430.78	78.209

Analysis of Variance

264305.60000000 = MSS
1.25000000 = RSS
1959.71900000 = TSS
637.84370000 = ESS
266904.40000000 = TOTAL SS

.62500000 = RMS 2 DF
85.20517000 = TMS 23 DF
13.86617000 = EMS 46 DF
71 DF

2.01 = T(.05)
6.12 = LSD(.05)
3.72 = Standard Deviation
6.15 = CV
69.38 = HIGHYIELD
47.39 = LOWYIELD
60.59 = TRIAL MEAN

9200033

Location: 1991 GSR, Haven
Conditions: Dryland
Plot size: 43.33 sq. ft.
Reps: 3

YIELD RANK	VARIETY	BU/A AVE.	LBS/A AVE.	K/H AVE.	J/M AVE.	% TEST AVE
* 1	Victory	73.65	4419.15	4953.21	669.57	121.243
* 2	G1009	71.73	4303.96	4824.10	652.11	118.082
* 3	G53	67.37	4042.16	4530.66	612.45	110.900
4	G542	66.50	3989.86	4471.57	604.52	109.463
5	G62	65.80	3947.91	4425.02	598.17	108.314
6	G1113	63.18	3790.83	4248.96	574.37	104.004
7	G1093	63.09	3785.60	4243.09	573.58	103.861
8	G1760	62.83	3769.89	4225.49	571.20	103.430
9	G1857	62.48	3748.95	4202.01	568.02	102.855
10	G790	62.05	3722.77	4172.67	564.06	102.137
11	G1754	61.70	3701.82	4149.19	560.88	101.562
12	G1990	60.65	3638.99	4078.77	551.36	99.838
13	ARKAN	59.43	3565.69	3996.61	540.26	97.827
14	G1753	58.73	3523.80	3949.66	533.91	96.678
15	G781	58.03	3481.91	3902.71	527.56	95.529
16	G785	57.42	3445.26	3861.63	522.01	94.523
17	G1056	57.42	3445.26	3861.63	522.01	94.523
18	G1756	57.07	3424.32	3838.15	518.84	93.949
19	G1598	56.98	3419.08	3832.28	518.04	93.805
20	G1752	56.81	3408.61	3820.54	516.46	93.518
21	NEWTON	54.80	3288.18	3685.56	498.21	90.214
22	G33 Plainsman V	54.72	3282.95	3679.69	497.42	90.070
23	G1033	53.32	3199.17	3585.79	484.72	87.772
24	G787	52.19	3131.10	3509.50	474.41	85.904

Analysis of Variance

265703.30000000 = MSS
18.71875000 = RSS
2069.06200000 = TSS
790.96870000 = ESS
268582.10000000 = TOTAL SS

9.35937500 = RMS 2 DF
89.95924000 = TMS 23 DF
17.19497000 = EMS 46 DF
71 DF

2.01 = T(.05)
6.81 = LSD(.05)
4.15 = Standard Deviation
6.83 = CV
73.65 = HIGHYIELD
52.19 = LOWYIELD
60.75 = TRIAL MEAN

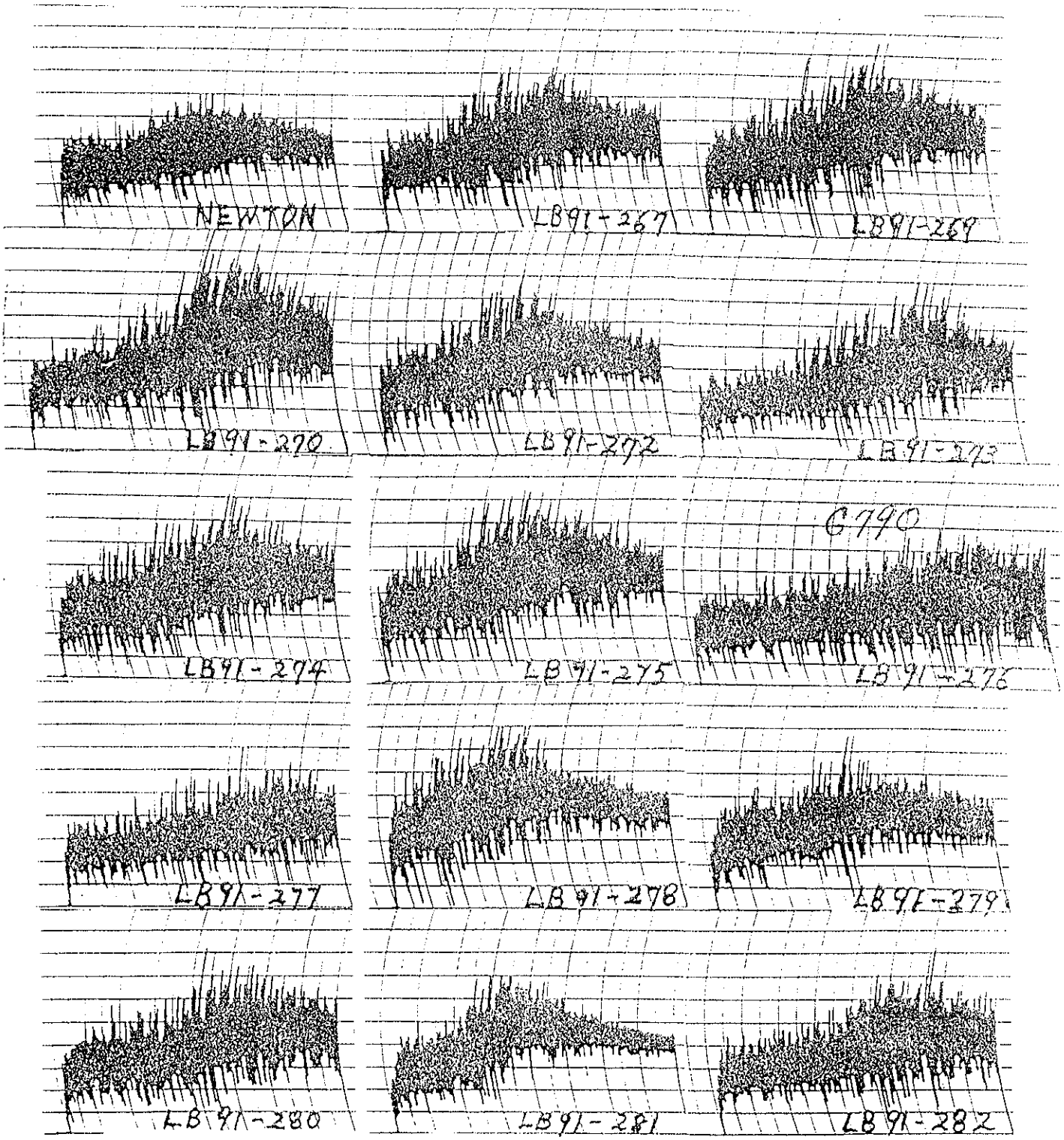


Fig. 1. Mixograms (10 of flour) for the Goertzen Seed Research Nursery wheat varieties harvested in 1991. Mixing time is the time (min) to the peak (point of minimum mobility). Mixing tolerance is the slope and width after the peak and stability of mixogram height on either side of the peak. Major arcs are at 1-min intervals.

Table III. Chemical and Mixograph Data for the Goertzen Seed Research Wheats Harvested in 1991[a,b]

Goertzen ID No.	FLOUR Ash (%)	FLOUR Protein (%)	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time[c] (min)	MIXOGRAPH Tolerance[d]
Newton	0.42	11.7	61.5	5.13*	8
LB91-267	0.40	14.2	64.7	5.00	8
LB91-269	0.42	14.0	64.3	5.13	8
LB91-270	0.40	16.0	68.0	6.50	8
LB91-272	0.39	14.2	64.1	4.88	8
LB91-273	0.43	13.3	64.6	6.50	8
LB91-274	0.44	13.6	64.0	5.38	8
LB91-275	0.44	14.8	64.4	4.66	8
G790 LB91-276	0.40	13.8	64.0	8.38 Q	8
LB91-277	0.34	12.4	60.3	6.75	8
LB91-278	0.40	13.9	63.1	4.00	8
LB91-279	0.46	12.4	62.0	4.88	8
LB91-280	0.39	12.7	61.9	5.88	8
LB91-281	0.42	14.0	63.3	3.75	7
LB91-282	0.38	13.5	62.8	6.00	8
LB91-283	0.38	13.4	62.8	4.66	8
LB91-284	0.36	15.7	67.5	4.50	8
LB91-285	0.40	14.6	65.6	5.50	8
LB91-286	0.37	14.9	66.1	2.75 Q	7
LB91-287	0.39	15.3	66.2	5.00	8
LB91-288	0.48	15.5	66.8	4.88	8
LB91-289	0.39	13.6	62.8	5.00	8
LB91-290	0.38	14.8	64.4	6.25	8
LB91-291	0.37	12.3	62.4	8.00 Q	8
LB91-292	0.38	15.2	64.6	5.38	8
(Average)	(0.40)	(14.0)	(64.1)	(5.39)	(7.9)

[a]Data expressed on a 14% moisture basis.

[b]S, Q, and U = satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfatory rating is inferred in the absence of a designated one. One unsatisfactory rating characterizes a variety as undesirable for hard winter wheat milling and breadmaking purposes.

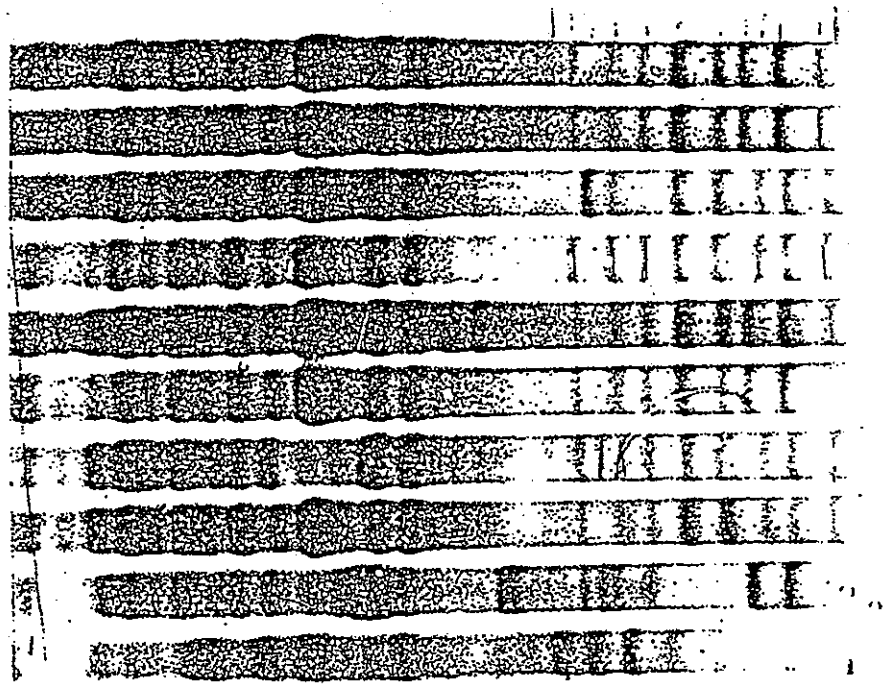
[c]Mixing times for samples having less than 12% protein would have been corrected to 12% protein. However, as this set of samples contained protein higher than 12% except for Newton, corrected times were same as those on as received basis except for 4.99 min instead of 5.13 min (*).

[d]Mixing tolerance was rated with numbers: 8 for S; 7 for S-Q; 6 for Q; 5 for Q-U; and 4 for U.

Mill Lab.

9200033

		Grain % Protein	% P. Flour	Test wt	TKW	% EXT. Flour	Grain Texture	Vol.
LB91-266	G62	15.44	13.71	60.2	28.2	72.8	OK	1015
267	G1113	15.79	14.09	60.6	28.2	69.4	OK	1080
268	G1009	15.49	14.47	59.8	29.2	72.8	OK	1035
269	G2542	15.3	14.0	59.5	28.3	74.1	OK	1070
270	G1759	17.06	15.39	59.9	32.8	74.7	OK	1095
271	G2110	15.16	13.85	60.2	33.4	74.7	OK	1025
272	G1857	15.16	13.95	61.0	29.7	75.7	OK	1115
273	G1093	14.54	13.24	60.9	33.3	74.7	OK	1100
274	G53	14.81	13.30	61.2	30.6	77.1	OK	1010
275	G1760	16.14	14.38	60.5	30.8	76.7	OK	1120
276	G790	14.76	13.72	59.8	29.7	76.6	OK	1085
277	G1420	13.97	12.78	61.0	34.1	66.0	OK	1125
278	G1317 (W)	14.97	13.22	60.3	30.0	76.8	"	1060
279	G1312 (W)	13.96	12.17	61.1	28.9	70.7	"	1065
280	G1323 (W)	13.73	12.59	59.8	27.9	72.6	"	1055
281	(W)	15.21	13.37	63.2	34.7	73.5	"	1065
282	G1990	14.80	13.26	61.1	32.4	74.5	"	1085
283	G1250	14.62	13.09	61.6	33.7	74.7	"	1025
284	G1056	16.62	14.56	60.9	34.9	67.8	"	1150
293	1056/1760	16.30	15.06	60.9	33.2	71.5	"	1110
294	1056/23	16.46	15.35	60.5	31.8	70.2	"	1125
295	1056/1753	16.63	15.40	60.3	31.8	70.3	"	1120
296	1980/1857	14.98	14.24	60.9	31.2	74.5	"	1095
297	1857/1759	16.03	14.75	60.7	30.6	75.3	"	1100



G-53 Advantage
G-1760
G-1250 Voyager
G-1990
G-1857 Haven
G-2542
G-790 Discovery
G-1759
G-56
G-7062

9200033

Table II. Chemical and Milling Data for the Goertzen Seed Research Wheats Harvested in 1991[a,b]

Goertzen ID No.	Wt/Bu[c] (lb)	Ash (%)	Protein (%)	Hardness Score[d] NIR	Hardness Score[d] Miller's Subjective	Flour Yield (%)	Milling Score[e]
Newton	60.0	1.43	13.1	73	5	70.5	80
LB91-267	60.9	1.67	15.5	64	5	70.8	88
LB91-269	59.7	1.60	14.6	89	6	73.7	95
LB91-270	59.8	1.50	17.1	87	6	73.9	89
LB91-272	61.2	1.46	14.8	76	6	74.4	90
LB91-273	61.1	1.43	14.1	79	6	74.6	88
LB91-274	61.8	1.44	14.4	84	6	76.7	88
LB91-275	61.2	1.50	15.7	88	6	76.1	88
G790 LB91-276	60.2	1.60	14.7	60	6	71.8	92
LB91-277	61.5	1.47	14.2	24 U	3 U	69.4 Q	82
LB91-278	60.7	1.51	15.0	77	6	70.0	85
LB91-279	61.3	1.43	13.3	83	6	72.6	81
LB91-280	59.9	1.41	13.8	56	6	71.8	86
LB91-281	62.6	1.53	15.5	74	6	72.4	80
LB91-282	61.5	1.42	14.2	81	6	73.6	91
LB91-283	62.0	1.44	14.4	81	6	74.7	90
LB91-284	61.0	1.60	17.2	41 U	4 S/A	69.3 Q	86
LB91-285	60.5	1.30	15.8	86	6	73.0	84
LB91-286	60.9	1.48	15.6	75	5	72.9	94
LB91-287	60.4	1.59	16.3	70	6	72.0	92
LB91-288	60.5	1.54	15.9	102	6	76.2	91
LB91-289	60.5	1.51	14.4	68	6	73.4	93
LB91-290	59.9	1.55	15.4	72	6	72.0	96
LB91-291	62.9	1.59	13.3	82	6	73.3	92
LB91-292	61.1	1.57	16.6	58	5	70.1	85
(Average)	(60.9)	(1.50)	(15.0)	(73)	(5.6)	(72.8)	(88)

[a]Data expressed on a 14% moisture basis.

[b]S, Q, U = satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfactory rating is inferred in the absence of designated one.

[c]Wt/Bu = weight per bushel.

[d]Wheat hardness scores were determined by NIR (Technicon 500) of bulk samples: the higher the value, the harder the wheat sample. Miller's subjective scores: 1-3 - too soft, unacceptable for hard wheat milling; 4-7 - acceptable for hard wheat milling (4 - softer than average; 5-7 - average); 8-10 - harder than average, would lengthen grinding time and could cause reduction in flour quality.

[e]Milling scores (MS) were derived from test weight (TW), flour yield (FY), and the ash and protein conversions. MS = 100 - {(TW - 60) + (82 - FY) + 100 (FA - WA/3.9) + 10 [(WP - 1) - FP]}: FA = flour ash; WA = wheat ash; FP = flour protein; WP = wheat protein.

14E Statement of the Basis of Applicant's Ownership of G790

The cross was made by Betty Goertzen, wheat breeder for Goertzen Seed Research, and the selection from this cross that became designated as G790 was made by Kenneth L. Goertzen, owner of Goertzen Seed Research. It has been evaluated by them for the past four years first in the nursery and then in yield trials and increase. Goertzen Seed Research will continue to maintain the Breeders Seed for G790