No. 9400149

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Kansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, 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 TWENTY 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, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE VARIETY. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Ike'

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 twenty-ninth day of September in the year of our Lord one thousand nine hundred and ninety-five.

Attest:

Marsha A. Stanton

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

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)*: Kansas Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.: KS89H48

3. VARIETY NAME: Ike

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*:
Waters Hall
Kansas State University
Manhattan, KS 66506

5. PHONE *(include area code)*: (913) 532-6147

FOR OFFICIAL USE ONLY

PVPO NUMBER: 9400149

FILING — Date: April 8, 1994 — Time: ☐ A.M. ☐ P.M.

FEES RECEIVED — Filing and Examination Fee: $2,325.00 — Date: April 8, 1994

Certificate Fee: $275.00 $125.00 — Date: May 30, 1995 08/08/95

6. GENUS AND SPECIES NAME: Triticum aestivum

7. FAMILY NAME *(Botanical)*: Grumineae

8. CROP KIND NAME *(Common Name)*: Wheat

9. DATE OF DETERMINATION: 8-1-93

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*: University

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
Vernon A. Schaffer, Department of Agronomy
Kansas State University, Throckmorton Hall
Manhattan, KS 66506-5501

PHONE *(include area code)*:

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

- a. [X] Exhibit A, Origin and Breeding History of the Variety
- b. [X] Exhibit B, Novelty Statement.
- c. [X] Exhibit C, Objective Description of Variety.
- d. [X] Exhibit D, Additional Description of Variety.
- e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. [X] Seed Sample (2,500 viable untreated seeds) Date Seed Sample mailed to Plant Variety Protection Office _____
- g. [X] 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.)*
[X] 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?
[X] YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[X] FOUNDATION [X] REGISTERED [X] 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. _____)
[X] 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)
[X] NO

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
X George E. Ham	Associate Director of the Agricultural Experiment Station	
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

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Exhibit A. Origin and Breeding History of the Variety

Ike is an increase of a F_6 head row selected from the cross Dular/Eagle//2*Larned/Cheney/3/ Colt. The last cross was made at the Fort Hays Branch Agricultural Experiment Station during the winter of 1982-83. The F_1 through F_3 populations were grown in bulk at Hays during the 1984, 1985 and 1986 crop years. Head selections were made from the population and were grown as F_4 head-rows in 1987. Six head selections from the original F_4 head-row were made and grown in 1988 as F_5 head-rows. In 1988 six head selections from the F_5 head-row were made and grown in 1989 as F_6 head-rows. Seed from a single F_6 head-row was subsequently increased to produce breeders seed. Ike was evaluated in the Kansas Intrastate Nurseries in 1991 and 1992, it was also evaluated in the Southern Regional Performance Nursery in 1992 and the Kansas Wheat Performance Test in 1992 and 1993.

Ike is uniform. Variants are limited to slightly taller plants, red chaff plants, and slightly earlier heading plants at a frequency of less than 1 in 10,000. The variants as well as typical plants are commercially acceptable.

Ike is stable. When sexually reproduced, the variety remains unchanged in its essential and distinctive characteristics.

Exhibit B. Novelty Statement

The general appearance of Ike is most like Larned from heading to harvest maturity, except for the following items:

1. Ike is shorter than Larned (Appendix A, Table 10).

2. Ike has a shorter coleoptile than Larned (Appendix A, Table 12).

3. Ike has a mixing time (as measured with a mixograph) of 1 to 1.5 minutes longer than the mixing time of Larned (Appendix B, Table 4).

4. Ike is resistant to Soilborne Mosaic Virus. Larned is susceptible (Appendix A, Table 12).

FORM APPROVED: OMB NO. 0581-0055

EXHIBIT C
(Wheat)

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN AND SEED DIVISION
BELTSVILLE, MARYLAND 20785

OBJECTIVE DESCRIPTION OF VARIETY

WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Kansas Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Kansas State University
Waters Hall
Manhattan, KS 66506

FOR OFFICIAL USE ONLY

PVPO NUMBER
9400149

VARIETY NAME OR TEMPORARY DESIGNATION
Ike

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][3][2] FIRST FLOWERING

[2][3][8] LAST FLOWERING

4. MATURITY (*50% Flowering*):

[0][1] 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*):

[0][8][7] CM. HIGH

[0][7] CM. TALLER THAN .....

[0][9] CM. SHORTER THAN .....

[1] [2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES (*Originating from node above ground*)

[2][7] 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

[1][0] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][2] 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:

[1] Density: 1 = LAX 2 = DENSE

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

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

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

[6] CM. LENGTH

[1 1] MM. WIDTH

12. GLUMES AT MATURITY:

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

[2] 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

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

16. SEED:

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

[2] Cheek: 1 = ROUNDED 2 = ANGULAR

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

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

[3] 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)* _____

[6] MM. LENGTH

[3] MM. WIDTH

[3 0] 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'

[2] 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)

[2] STEM RUST *(Races)* _____

[2] LEAF RUST *(Races)* _____

[1] STRIPE RUST *(Races)* _____

[1] LOOSE SMUT

[1] POWDERY MILDEW

[0] BUNT

[2] OTHER *(Specify)* Soiborne Mosaic Virus

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

[0] SAWFLY

[0] APHID *(Bydv.)*

[1] GREEN BUG

[0] CEREAL LEAF BEETLE

[ ] OTHER *(Specify)* _____

HESSIAN FLY RACES: [2] GP [2] A [1] B [2] C [1] D [1] E [2] F [1] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Larned	Seed size	Larned
Leaf size	Larned	Seed shape	Larned
Leaf color	Larned	Coleoptile elongation	Newton
Leaf carriage	Larned	Seedling pigmentation	Larned

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.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

Exhibit D. Additional Description of the Variety

Area of Adaptation: Ike is best adapted to western Kansas. Its height and the lack of resistance to non-rust foliar diseases will limit its use in higher rainfall areas. Attached are the yield and test weight data from the 1992 western Kansas KIN, 1991 western Kansas KIN, 1990 Advanced Yield Test, and the 1992 Kansas Winter Wheat Performance Test Report of Progress 665. The area of adaptation for Ike can best be seen in the 1992 Kansas Wheat Performance Test data. At the seven eastern or south central Kansas locations, Ike averaged 45.9 Bu/A compared to Karl at 53.6 Bu/A, 2163 at 51 Bu/A and Tomahawk at 46.4 Bu/A. At the six western Kansas locations, Ike averaged 71 Bu/A while the yields of 2163, Karl, and Tomahawk were 64, 60.7, and 62.2 Bu/A, respectively. Averaged over all western Kansas locations from 1990 to 1992, Ike has performed 17% better than TAM 107, 11% better than TAM 200, and 9% better than 2163.

Milling and baking characteristics are similar to Larned except Ike has stronger mixing characteristics. Milling and bread making data are included for composites of the 1992 and 1991 Kansas Intrastate Nurseries. Also included are the data from the 1990 composites of the Advanced yield test. The Wheat Quality Council evaluated Ike in 1991 and their report is also attached.

Exhibit E. Statement of the Basis of Applicant's Ownership

The variety for which Plant Variety Protection is hereby sought was developed by Dr. T.J. Martin, an employee of Kansas State University Experiment Station. All rights to any invention, discovery, or development made by the employee while employed by Kansas State University Experiment Station were assigned by Kansas State University Experiment Station with no rights of any kind retained by the employee.

Table II. Chemical and Milling Data for the Eastern and Western Kansas Intrastate Nursery Composites of Hard Winter Wheat Lines Harvested in 1992.[a,b]

Wheat Line	Wt/Bu[c] (lb)	1000 Kernel Weight (g)	Ash (%)	Protein (%)	Kernel Sizing[d] L (%)	M (%)	S (%)	Hardness Score[e] NIR	USGMRL SKWCS	Millers' Subject.	Flour Yield (%)	Milling Score[f]
Eastern Composites												
Karl	59.2	28.6	1.51	13.1	52.0	46.7	1.3	51	66	6	72.7	91
Tam 107	55.0	25.6	1.56	12.2	33.0	64.2	2.8	58	75	6	71.0	88
2163	54.5	27.7	1.61	12.4	37.1	59.1	3.8	51	71	6	70.4	88
2180	55.8	25.0	1.54	13.7	33.3	64.2	2.5	75	81	6	71.3	88
Tomahawk	55.9	25.8	1.61	13.3	34.8	61.8	3.3	55	76	5	69.9	90
Sierra	56.5	22.5	1.65	13.3	29.1	64.8	6.1	61	80	5	70.3	88
Arapahoe	56.7	25.0	1.69	13.2	19.9	76.3	3.8	65	77	6	70.7	85
Tam 202	54.1	20.2	1.71	13.1	25.8	65.6	8.6	53	71	5	68.4	83
KS87H325-2	58.9	31.1	1.48	12.7	61.6	37.0	1.4	67	70	6	72.0	82
KS89H48	58.2	28.2	1.55	12.8	36.1	62.2	1.7	51	66	6	71.8	87
KS89H50-4	57.7	27.4	1.58	12.6	28.2	68.6	3.2	49	69	6	71.3	91
Karl 92	58.1	28.3	1.48	12.8	43.4	54.6	2.0	47	66	6	72.2	84
Abilene	56.2	19.7	1.69	13.5	8.3	84.1	7.6	51	71	5	68.5	87
KS84170E-8-2	57.6	29.1	1.62	13.5	49.2	48.7	2.1	41 Q	59	5	69.5	93
KS84170E-7-1	56.9	29.5	1.67	13.5	51.3	46.2	2.5	42 Q	61	5	68.4	91
KS84273BB-10-3	56.3	26.0	1.69	13.9	39.1	56.9	4.0	50	61	5	69.7	91
KS83364D-6	57.2	26.1	1.61	13.4	50.2	46.4	3.4	52	67	5	68.8	87
KS84W063-9-6	57.2	26.0	1.52	14.0	41.1	56.2	2.7	67	76	6	71.5	78
KS84W063-9-7	57.3	30.7	1.57	14.1	62.7	36.0	1.3	66	74	6	72.2	80
KS84W063-9-12	57.1	27.1	1.56	13.7	54.0	44.2	1.8	72	77	6	73.0	83
KS84W063-9-18	58.7	28.2	1.55	13.8	46.6	51.6	1.8	68	82	6	71.9	84
KS84W063-9-45	57.7	28.9	1.57	14.2	56.2	42.2	1.6	75	84	6	71.2	80
KS87807-11	56.7	28.7	1.49	13.3	55.0	62.0	3.0	48	60	6	70.6	90
KS87807-23	57.7	28.8	1.44	13.2	39.6	58.4	2.0	47	59	6	72.3	90
KS87822-2	58.2	25.9	1.51	13.0	40.0	57.6	2.4	62	76	6	72.9	90
(Average)	(57.0)	(26.8)	(1.58)	(13.3)	(41.1)	(56.6)	(3.1)	(57)	(71)	(5.7)	(70.9)	(87)

APPENDIX B

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Table II. (Continued)

Wheat Line	Kernel Wt/Bu[c] (lb)	1000 Weight (g)	Ash (%)	Protein (%)	Kernel Sizing[d] L (%)	M (%)	S (%)	Hardness Score[e] NIR	USGMRL SKWCS	Millers' Subject.	Flour Yield (%)	Milling Score[f]
Western Composites												
Karl	60.3	31.2	1.43	15.2	50.5	49.3	0.2	54	69	5	70.1	81
Tam 107	62.0	34.4	1.24	12.1	63.8	35.8	0.4	67	87	6	71.8	77
2163	59.5	29.8	1.32	12.4	43.6	56.0	0.4	59	82	6	71.0	80
2180	61.6	30.5	1.35	13.7	50.7	49.2	0.1	85	88	6	70.6	80
Tomahawk	60.5	29.3	1.40	13.7	54.5	45.0	0.5	56	82	5	70.7	81
Sierra	61.2	27.5	1.43	13.5	42.5	56.2	1.3	60	90	5	70.5	77
Arapahoe	59.6	27.6	1.50	13.3	32.7	66.7	0.6	65	89	6	71.5	83
Tam 202	61.8	30.6	1.44	12.3	54.8	44.5	0.7	63	96	6	72.5	80
KS87H325-2	61.9	32.1	1.38	13.4	71.0	28.8	0.2	80	92	6	71.6	80
KS87H48	61.5	31.3	1.30	13.0	47.2	52.7	0.1	52	84	6	73.1	80
KS87H50-4	61.7	29.7	1.35	13.0	35.6	63.5	0.8	45 Q	82	6	72.9	83
Karl 92	60.1	31.0	1.37	14.9	58.8	41.0	0.2	53	85	6	73.9	79
Abilene	60.5	32.7	1.48	15.1	62.3	37.3	0.4	57	83	6	74.2	83
KS841703-8-2	61.2	33.4	1.41	13.8	72.5	27.2	0.3	50	75	6	74.1	86
KS84170E-7-1	61.5	37.7	1.42	13.9	85.2	14.7	0.1	53	77	6	74.6	83
KS84273BB-10-3	61.1	31.2	1.41	14.0	60.3	39.2	0.5	56	78	6	74.7	83
KS83364D-6	61.6	34.6	1.39	14.0	76.3	23.2	0.5	57	78	6	74.5	80
KS84W063-9-6	60.9	32.3	1.40	14.8	70.7	29.0	0.3	66	82	6	74.0	80
KS84W063-9-7	60.4	32.6	1.40	14.2	74.2	25.5	0.3	70	85	7	72.6	76
KS84W063-9-12	60.6	31.3	1.32	13.8	66.7	33.0	0.3	74	90	7	75.3	79
KS84W063-9-18	60.6	30.9	1.37	14.4	59.0	40.5	0.5	72	86	7	73.8	79
KS84W063-9-45	59.9	33.2	1.40	13.9	72.3	27.0	0.7	75	94	7	73.9	79
KS87807-11	60.6	32.6	1.42	14.6	66.0	33.5	0.5	55	73	6	71.7	83
KS87807-23	59.7	31.7	1.41	15.5	51.4	47.8	0.8	53	71	6	73.9	78
KS87822-2	60.4	30.0	1.50	13.9	60.3	39.5	0.2	65	91	6	74.5	89
Larned	61.7	32.3	1.29	12.6	57.0	45.5	0.5	61	83	6	73.4	79
KS91H174	61.6	28.3	1.51	13.4	40.0	58.8	1.2	54	81	5	70.3	83
KS91H184	61.3	26.4	1.45	13.0	22.8	76.3	0.9	65	87	6	71.7	85
KS91H158	61.7	35.9	1.35	12.9	65.3	34.5	0.2	78	88	6	73.8	86
KS91H153	62.1	33.3	1.30	12.6	50.7	48.5	0.8	70	83	6	73.4	78
(Average)	(61.0)	(31.5)	(1.39)	(13.7)	(57.3)	(42.3)	(0.4)	(62)	(83)	(6.0)	(72.8)	(87)

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Table II. (Continued)

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

Eastern growing locations = Belleville, Caldwell, Hesston, Hutchinson, Manhattan, and St. John.
Western growing locations = Garden City (Dryland), Garden City (Irrigated), Graham, Hays, and Ness Co.

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

[c]Wt/Bu = weight per bushel.

[d]L = large kernels (overs of Tyler #7); M = medium kernels (overs of Tyler #9); S = small kernels (thrus of Tyler #9).

[e]Wheat hardness scores were determined by NIR (Dickey John, Instalab 600) of bulk samples and by the USGMRL Single Kernel Hardness Tester (SKHT) of each kernel: 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.

[f]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.

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Table III. Chemical and Mixograph Data for the Eastern and Western Kansas Intrastate Nursery Composites of Hard Winter Wheat Lines Harvested in 1992.[a,b]

Wheat Line	FLOUR Ash (%)	FLOUR Protein (%)	FLOUR Color Value[c]	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time As Rec'd (min)	MIXOGRAPH Mix Time Corr. (min)	MIXOGRAPH Mixing Tolerance[e]
Eastern Composites							
Karl	0.41	12.3	83	62.9	4.88	-	4
Tam 107	0.45	11.1	80	60.1	3.88	3.47	4
2163	0.47	11.4	82	60.7	2.88	2.68	3
2180	0.46	12.8	77	63.2	3.50	-	4
Tomahawk	0.41	12.0	81	62.6	3.50	-	4
Sierra	0.42	11.8	81	62.8	2.75	2.70	3
Arapahoe	0.48	11.9	80	62.8	4.38	4.35	4
Tam 202	0.48	11.5	80	61.9	5.38	5.08	4
KS87H325-2	0.45	11.4	80	61.6	4.63	4.32	4
~~KS89H40~~ Ike	0.41	11.4	83	62.9	4.50	4.20	4
KS89H50-4	0.40	11.5	84	63.0	5.00	4.71	4
Karl 92 20 Sept 1995	0.43	11.5	85	62.9	7.50	7.06	4
Abilene	0.44	12.3	82	64.7	4.13	-	4
KS84170E-8-2	0.40	12.7	85	61.8	2.50 U	-	2 Q
KS84170E-7-1	0.42	12.6	85	61.2	2.50 U	-	2 Q
KS84273BB-10-3	0.40	12.5	82	60.8	4.00	-	4
KS83364D-6	0.43	12.3	84	60.8	3.38	-	3
KS84W063-9-6	0.51	12.8	80	64.5	4.63	-	4
KS84W063-9-7	0.52	13.0	81	66.3	3.75	-	4
KS84W063-9-12	0.54	13.0	79	64.5	4.13	-	4
KS84W063-9-18	0.49	13.0	79	64.3	3.88	-	4
KS84W063-9-45	0.52	13.2	77	64.7	3.38	-	4
KS87807-11	0.42	12.5	84	64.7	6.00	-	4
KS87807-23	0.40	12.2	84	64.5	6.00	-	4
KS87822-2	0.45	12.3	81	64.3	4.38	-	4
(Average)	(0.45)	(12.0)	(82)	(63.0)	(4.22)	(4.12)	(3.7)
Western Composites							
Karl	0.43	14.1	81	67.7	3.38	-	4
Tam 107	0.41	11.0	83	63.8	4.00	3.51	4
2163	0.43	11.4	86	63.1	2.38 U	2.20	2 Q
2180	0.43	12.8	82	67.3	3.00	-	3
Tomahawk	0.40	12.4	81	68.0	3.63	-	4
Sierra	0.42	11.9	84	66.1	2.63 Q	2.61	4
Arapahoe	0.45	12.2	82	66.0	3.50	-	4
Tam 202	0.46	11.3	85	64.5	4.63	4.23	4
KS87H325-2	0.42	12.3	81	66.5	3.38	-	3

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Table III. (Continued)

Wheat Line	FLOUR Ash (%)	FLOUR Protein (%)	FLOUR Color Value[c]	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time As Rec'd (min)	MIXOGRAPH Mix Time Corr. (min)	MIXOGRAPH Mixing Tolerance[e]
KS87H48	0.42	11.8	83	66.1	3.63	3.56	4
KS87H50-4	0.41	12.0	84	66.1	4.50	-	4
Karl 92	0.45	13.6	79	67.6	3.63	-	4
Abilene	0.46	14.0	79	69.3	4.13	-	4
KS841703-8-2	0.45	13.1	85	65.5	2.13 U	-	1 Q-U
KS84170E-7-1	0.44	12.8	85	64.8	1.75 U	-	1 Q-U
KS84273BB-10-3	0.42	12.8	81	62.0	3.00	-	3
KS83364D-6	0.45	12.9	84	64.0	2.63 Q	-	2 Q
KS84W063-9-6	0.48	13.9	78	66.0	2.88	-	4
KS84W063-9-7	0.49	13.1	79	65.7	3.00	-	4
KS84W063-9-12	0.50	13.1	79	67.7	3.63	-	4
KS84W063-9-18	0.48	13.5	79	67.1	3.38	-	4
KS84W063-9-45	0.53	13.2	77	67.5	2.88	-	3
KS87807-11	0.43	13.7	84	68.3	5.38	-	4
KS87807-23	0.45	13.9	80	68.8	3.75	-	4
KS87822-2	0.45	13.3	80	64.8	3.00	-	4
Larned	0.44	11.6	84	66.1	2.88	2.75	3
KS91H174	0.41	12.2	85	65.0	4.63	-	4
KS91H184	0.41	12.0	83	64.3	3.75	-	4
KS91H158	0.38	11.8	81	64.1	4.38	4.28	4
KS91H153	0.41	11.3	82	64.0	4.38	3.99	4
(Average)	(0.44)	(12.6)	(82)	(65.9)	(3.46)	(3.40)	(3.5)

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

Eastern growing locations = Belleville, Caldwell, Hesston, Hutchinson, Manhattan, and St. John.
Western growing locations = Garden City (Dryland), Garden City (Irrigated), Graham, Hays, and Ness Co.

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

[c]Color values were obtained by an Agtron Photoelectric Colorimeter with a modified method (AACC Method 14-30) using flour samples rather than using slurry samples with Agtron certified calibration disks "63" for 0% setting and "97" instead of "85" for 100% setting.

[d]Mixing times for samples having less than 12% protein were corrected to 12% protein. (-) denotes the same mix time on as received (Rec'd) basis.

[e]Mixing tolerance was rated with numbers: 4 for S; 3 for S-Q; 2 for Q; 1 for Q-U; and 0 for U.

Table IV. Bread-Making Data for the Eastern and Western Kansas Intrastate Nursery Composite Flours of Hard Winter Wheat Lines Harvested in 1992.[a,b]

Wheat Line	FLOUR Protein (%)	Absorption (%)	Mix Time[c] As Rec'd (min)	Mix Time[c] Corr. (min)	Ascorbic Acid (ppm)	Crumb Grain[d]	Loaf Volume[e] As Rec'd (cc)	Loaf Volume[e] Corrected to 12.5% P (cc)	Loaf Volume[e] Regression (cc/%)
Eastern Composites									
Karl	12.3	66.6	5.63	-	50	3	945	957	69
Tam 107	11.1	68.3	5.00	4.47	50	3	910	1010	75
2163	11.4	65.2	3.63	3.37	50	3	870	942	68
2180	12.8	68.4	4.75	-	50	3	960	941	68
Tomahawk	12.0	64.6	3.88	-	50	3	875	907	64
Sierra	11.8	65.7	2.88	2.83	50	3	873	915	65
Arapahoe	11.9	65.7	4.88	4.85	50	3	815	847	58 U
Tam 202	11.5	70.5	6.88	6.50	50	3	950	1021	76
KS87H325-2	11.4	68.8	4.63	4.32	50	3	827	892	62
KS89H48	11.4	65.2	5.38	5.02	50	3	930	1007	74
KS89H50-4	11.5	66.1	6.13	5.78	50	3	950	1023	76
Karl 92	11.5	65.1	8.13	7.65	50	4	838	899	63
Abilene	12.3	66.2	5.00	-	50	3	938	952	69
KS84170E-8-2	12.7	64.1	2.63	-	50	2 Q	850	841	57 U
KS84170E-7-1	12.6	61.9	2.50	-	50	2 Q	828	824	55 U
KS84273BB-10-3	12.5	63.2	4.38	-	50	3	895	895	63
KS83364D-6	12.3	65.6	3.25	-	50	3	863	875	61
KS84W063-9-6	12.8	66.7	4.88	-	50	3	1003	985	72
KS84W063-9-7	13.0	68.2	4.25	-	50	2 Q	970	935	67
KS84W063-9-12	13.0	69.2	5.38	-	50	3	1025	990	73
KS84W063-9-18	13.0	68.6	4.38	-	50	3	970	935	67
KS84W063-9-45	13.2	70.9	4.25	-	50	3	1005	956	69
KS87807-11	12.5	67.9	7.88	-	50	3	965	965	70
KS87807-23	12.2	67.2	7.50	-	50	3	920	943	68
KS87822-2	12.3	66.5	4.50	-	50	2 Q	945	960	69
(Average)	(12.0)	(66.7)	(4.90)	(4.79)	(50)	(2.9)	(917)	(937)	(67)

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Table IV. Continued)

Wheat Lines	FLOUR Protein (%)	Absorption (%)	Mix Time[c] As Rec'd (min)	Mix Time[c] Corr. (min)	Ascorbic Acid (ppm)	Crumb Grain[d]	Loaf Volume[e] As Rec'd (cc)	Loaf Volume[e] Corrected to 12.5% P (cc)	Loaf Volume[e] Regression (cc/%)
Western Composites									
Karl	14.1	70.4	4.63	-	50	2 Q	1000	897	63
Tam 107	11.0	69.7	4.00	3.51	50	2 Q	845	945	68
2163	11.4	67.1	2.75 Q	2.54 U	50	2 Q	810	876	61
2180	12.8	70.6	4.50	-	50	3	935	913	65
Tomahawk	12.4	70.4	4.88	-	50	3	860	869	60
Sierra	11.9	68.9	3.25	3.23	50	3	880	916	65
Arapahoe	12.2	66.7	4.63	-	50	3	875	893	62
Tam 202	11.3	70.5	5.75	5.25	50	2 Q	920	1009	75
KS87H325-2	12.3	71.7	3.88	-	50	3	810	821	55 U
KS87H48	11.8	67.5	5.25	5.14	50	2 Q	935	983	72
KS87H50-4	12.0	68.4	5.75	-	50	3	928	959	69
Karl 92	13.6	71.6	5.75	-	50	2 Q	925	863	59 U
Abilene	14.0	73.1	6.50	-	50	2 Q	978	885	62
KS841703-8-2	13.1	65.2	2.38 U	-	50	2 Q	803	772	50 U
KS84170E-7-1	12.8	62.7	1.88 U	-	50	1 Q-U	768	754	48 U
KS84273BB-10-3	12.8	66.5	3.88	-	50	2 Q	878	859	59 U
KS83364D-6	12.9	66.5	2.75 Q	-	50	2 Q	870	848	58 U
KS84W063-9-6	13.9	71.4	3.75	-	50	3	980	893	62
KS84W063-9-7	13.1	71.1	3.25	-	50	3	983	942	68
KS84W063-9-12	13.1	70.2	5.38	-	50	4	1000	959	69
KS84W063-9-18	13.5	70.2	3.50	-	50	2 Q	965	904	64
KS84W063-9-45	13.2	72.7	4.00	-	50	2 Q	938	894	63
KS87807-11	13.7	71.9	7.50	-	50	4	1035	954	69
KS87807-23	13.9	61.5	5.25	-	50	3	985	895	63
KS87822-2	13.3	68.5	3.75	-	50	3	940	893	62
Larned	11.6	68.4	3.63	3.47	50	3	892	951	68
KS91H174	12.2	68.7	5.13	-	50	3	905	922	65
KS91H184	12.0	66.7	4.88	-	50	3	910	946	68
KS91H158	11.8	69.2	4.13	4.03	50	4	845	888	62
KS91H153	11.3	67.0	5.50	5.01	50	3	867	950	68
(Average)	(12.6)	(68.8)	(4.40)	(4.33)	(50)	(2.6)	(909)	(902)	(63)

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Table IV. (Continued)

[a]Data expressed on a 14% moisture basis. Flour protein contents were included in this table also for a reference.

Eastern growing locations = Belleville, Caldwell, Hesston, Hutchinson, Manhattan, and St. John.
Western growing locations = Garden City (Dryland), Garden City (Irrigated), Graham, Hays, and Ness Co.

[b]S, Q, and U = satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfactory 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 were corrected (Corr.) to 12% protein. (-) denotes the same mix time on as received (Rec'd) basis.

[d]Crumb grain was rated with numbers: 6 for outstanding (O); 5 for Excellent (E); 4 for Satisfactory (S); 3 for Q-S; 2 for Questionable (Q); 1 for Q-U; 0 for unsatisfactory (U).

[e]Corrected loaf volumes were calculated to the approximate average flour protein (P) content (12.5%) of this sample set. Regression value serves as a descriptor of the loaf volume potential of the progeny.

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Table 10. Chemical, Mixograph, and Glutomatic Data for the Eastern and Western Kansas Intrastate Nursery Composite Flours of Hard Winter Wheat Varieties Harvested in 1991.[a,b]

VARIETY	FLOUR			MIXOGRAPH			GLUTOMATIC[f]		
	Ash (%)	Protein (%)	Color Value[c]	Absorption (%)	Mix Time[d] (min)	Tolerance[e]	Wet Gluten (%)	Thrus (%)	Gluten Index
Eastern Composites									
Karl	0.40	14.2	81.5	63.5	4.88	8	33.1	0.6	98
Tam 107	0.39	12.6	81.0	61.3	4.38	8	32.0	0.6	98
Abilene	0.41	13.5	83.0	62.6	3.50	8	37.2	1.9	95
Mesa	0.40	12.4	84.5	61.0	3.00	7	35.6	2.3	94
2163	0.43	12.2	84.5	60.8	2.50 U	7	36.4	3.7	90
Tam 200	0.45	11.7	84.5	60.1	4.50*	8	29.0	0.6	98
Victory	0.39	12.5	83.5	62.2	3.00	7	38.2	3.5	91
2180	0.43	13.4	79.0	62.4	3.13	7	39.9	2.6	94
AGSECO 7846	0.33	12.1	85.5	60.6	2.63 Q-U	7	38.3	6.3	84
SIERRA	0.35	12.5	83.0	62.2	2.75	7	37.5	6.0	84
KS8010*-72-4	0.41	12.9	83.0	58.7	3.38	7	33.3	4.5	87
KS8010*-72-8	0.43	13.1	83.0	57.0 Q	3.00	7	33.9	5.1	85
KS831374-142	0.43	13.4	82.0	61.4	5.38	8	35.1	1.0	97
KS831374-74	0.44	13.6	81.5	61.2	5.00	8	34.6	0.3	99
KS87H325-2-1	0.45	12.9	79.0	59.7	3.13	7	33.5	4.8	86
KS88H12-1	0.43	12.9	81.5	60.7	3.63	8	37.9	2.7	93
KS88H12-2	0.44	12.9	83.0	59.7	3.50	8	37.9	2.1	95
KS89H19	0.37	13.4	81.5	63.4	5.88	8	36.4	2.1	94
KS89H20-1	0.40	13.5	82.5	62.1	6.50	8	34.5	0.9	97
KS89H20-2	0.39	13.5	82.0	63.6	6.75	8	34.3	0.5	99
KS89H33-2	0.38	12.7	85.0	60.4	3.63	8	37.3	6.1	84
KS89H48	0.36	13.1	83.0	62.0	3.63	8	36.9	2.5	93
KS89H50-1	0.37	13.3	83.0	63.3	4.63	8	36.6	1.0	97
KS89H50-4	0.37	13.3	83.0	62.8	5.00	8	35.7	1.1	97
KS89H54-3	0.39	13.5	79.0	61.6	3.00	7	38.0	4.2	89
KS89H123-5	0.40	13.1	81.5	59.0	3.88	8	36.2	2.5	93
KS89H130-4	0.38	12.6	82.5	60.3	4.38	7	34.8	2.1	94
KS89H130-5	0.38	12.6	81.5	60.3	4.38	8	33.5	2.7	92
KS89H132-4	0.39	12.9	83.5	60.7	4.50	8	35.5	3.3	91
KS89H185-1	0.39	13.7	80.0	62.8	5.63	8	35.1	1.6	96
KS89H185-4	0.38	13.6	80.5	63.2	6.00	8	35.3	1.3	96
KS89H185-5	0.36	13.6	81.0	63.2	5.63	8	34.0	1.0	97
KS89H190-2	0.34	13.1	84.0	59.0	3.50	8	35.1	3.0	92
KS89H190-5	0.34	12.8	84.5	60.1	3.88	7	35.5	1.6	96
KS89H191-1	0.33	12.8	85.0	60.6	3.88	7	34.8	1.0	97
(Average)	(0.39)	(13.0)	(82.5)	(61.2)	(4.17)	(7.6)	(35.5)	(2.5)	(93.1)

Table 10. (Continued)

VARIETY	FLOUR Ash (%)	FLOUR Protein (%)	FLOUR Color Value[c]	MIXOGRAPH Absorption (%)	MIXOGRAPH Mix Time[d] (min)	MIXOGRAPH Tolerance[e]	GLUTOMATIC[f] Wet Gluten (%)	GLUTOMATIC[f] Thrus (%)	GLUTOMATIC[f] Gluten Index
Western Composites									
Karl	0.39	14.6	81.0	64.0	4.25	8	37.5	0.7	98
Tam 107	0.40	12.0	81.0	61.5	3.50	8	31.5	0.7	98
Abilene	0.43	13.6	80.0	62.7	2.88	7	38.6	6.1	84
Mesa	0.42	13.1	82.0	62.0	2.50 U	6 Q	36.8	8.7	77 Q-S
2163	0.46	12.4	83.0	60.5	2.50 U	7	34.6	4.5	87
Tam 200	0.48	11.9	84.5	59.4	4.00*	8	30.1	1.2	96
Victory	0.42	12.6	82.5	59.3	2.50 U	7	39.3	4.5	89
2180	0.46	14.1	78.0	62.3	2.50 U	7	40.3	4.7	88
AGSECO 7846	0.38	11.9	86.0	58.4	2.25 U*	7	35.6	3.5	90
Larned	0.39	12.0	85.0	59.5	2.38 U	7	35.5	1.7	95
KS8010*-72-4	0.45	12.8	81.0	55.6 Q-U	3.00	7	32.7	3.6	89
KS8010*-72-8	0.45	12.4	82.0	57.0 Q	3.63	7	32.3	3.3	90
KS831374-142	0.45	13.8	81.5	62.0	4.38	8	35.1	0.3	99
KS831374-74	0.47	14.0	81.0	62.2	4.50	8	35.2	0.3	99
KS87H325-2-1	0.46	13.3	79.5	61.3	3.50	7	35.5	4.8	86
KS88H12-1	0.42	11.9	78.5	63.4	3.00*	8	36.6	1.3	97
KS88H12-2	0.47	13.1	80.5	63.0	3.00	8	40.6	2.6	94
KS89H19	0.41	13.4	80.5	65.4	4.00	8	36.0	0.3	99
KS89H20-1	0.42	12.8	83.5	60.1	4.75	8	31.1	0.1	100
KS89H20-2	0.41	13.3	82.5	65.3	4.75	8	33.4	0.3	99
KS89H33-2	0.42	12.7	85.0	61.9	3.50	8	33.9	0.7	98
KS89H48	0.42	13.1	81.0	61.5	2.88	7	37.8	3.7	90
KS89H50-1	0.41	13.4	81.0	62.9	3.88	8	33.7	1.2	97
KS89H50-4	0.43	13.3	83.0	62.8	3.75	8	35.4	0.8	98
KS89H54-3	0.49	13.5	81.5	59.6	2.13 U	7	36.7	3.1	92
KS89H123-5	0.51	13.4	82.5	59.4	3.00	7	37.0	4.6	88
KS89H130-4	0.46	12.9	83.0	60.2	3.25	8	37.1	4.7	87
KS89H130-5	0.45	12.8	83.0	60.5	3.66	8	36.1	2.2	94
KS89H132-4	0.47	12.9	83.5	60.7	3.38	8	36.9	2.7	93
KS89H185-1	0.40	13.3	84.5	62.3	4.50	8	36.2	1.8	95
KS89H185-4	0.41	13.3	83.5	62.3	3.63	8	33.9	0.8	98
KS89H185-5	0.42	13.2	84.0	62.2	3.63	8	33.7	0.6	98
KS89H190-2	0.41	12.9	85.0	60.7	3.63	8	35.8	2.1	94
KS89H190-5	0.43	12.9	85.5	60.2	3.63	8	36.2	4.4	88
KS89H191-1	0.40	12.7	87.5	60.9	3.75	8	36.8	2.7	93
(Average)	(0.43)	(13.0)	(82.5)	(61.2)	(3.43)	(7.6)	(35.6)	(2.6)	(93.0)

Table 11. Bread-Making Data for the Eastern and Western Kansas Intrastate Nursery Composite Flours of Hard Winter Wheat Varieties Harvested in 1991.[a,b]

VARIETY	FLOUR Protein (%)	BREAD-MAKING DATA: Absorption (%)	Mix Time[c] (min)	Ascorbic Acid (ppm)	Crumb Grain[d]	Loaf Volume[e] As Rec'd (cc)	Loaf Volume[e] Corrected to 13% P (cc)	Loaf Volume[e] Regression (cc/%)
Eastern Composites								
Karl	14.2	68.6	7.25	0	7	1177	1084	78
Tam 107	12.6	68.9	5.13	0	7	1084	1118	82
Abilene	13.5	65.6	5.00	50	8	1115	1078	78
Mesa	12.4	63.3	3.63	50	8	993	1038	74
2163	12.2	64.8	4.13	20	6 Q	1026	1090	79
Tam 200	11.7	65.4	6.38*	20	7	1074	1091	89
Victory	12.5	64.4	3.38	50	6 Q	917	951	65 Q
2180	13.4	67.4	4.38	50	7	1059	1031	73
AGSECO 7846	12.1	60.5	2.88 Q-U	50	7	965	1032	73
SIERRA	12.5	60.6	2.38 U	50	5 Q-U	910	943	64 Q
KS8010*-72-4	12.9	60.7	3.88	50	6 Q	1015	1023	72
KS8010*-72-8	13.1	60.6	3.63	20	7	1002	996	70
KS831374-142	13.4	67.0	8.25 Q	50	7	1051	1023	72
KS831374-74	13.6	67.0	8.88 Q	20	6 Q	1051	1010	71
KS87H325-2-1	12.9	66.2	4.38	50	7	1053	1062	76
KS88H12-1	12.9	64.2	4.75	50	8	1052	1061	76
KS88H12-2	12.9	64.7	5.25	20	8	1085	1094	79
KS89H19	13.4	68.4	7.25	20	8	1059	1031	73
KS89H20-1	13.5	69.0	12.13 U	20	7	1098	1061	76
KS89H20-2	13.5	68.7	10.50 Q	20	7	1095	1058	76
KS89H33-2	12.7	61.8	4.75	20	8	1035	1059	76
KS89H48	13.1	66.0	4.63	50	5 Q-U	1040	1034	73
KS89H50-1	13.3	66.4	5.88	50	6 Q	1170	1146	84
KS89H50-4	13.3	67.2	5.50	20	6 Q	1197	1172	87
KS89H54-3	13.5	65.8	3.25	50	5 Q-U	1080	1044	74
KS89H123-5	13.1	63.8	4.38	20	7	1050	1044	74
KS89H130-4	12.6	63.5	5.13	20	8	1034	1066	76
KS89H130-5	12.6	63.3	4.75	50	8	1005	1036	73
KS89H132-4	12.9	64.8	5.63	50	8	1060	1069	77
KS89H185-1	13.7	68.1	7.88	20	8	1075	1026	72
KS89H185-4	13.6	69.3	9.75 Q	20	7	1090	1047	75
KS89H185-5	13.6	68.3	8.50 Q	20	8	1065	1023	72
KS89H190-2	13.1	63.3	5.63	20	8	1032	1026	72
KS89H190-5	12.8	61.4	4.13	20	8	1010	1026	72
KS89H191-1	12.8	63.3	5.00	20	7	1005	1021	72
(Average)	(13.0)	(65.2)	(5.66)	(32)	(7.0)	(1052)	(1052)	(75)

Table 11. (Continued)

VARIETY	FLOUR Protein (%)	BREAD-MAKING DATA: Absorption (%)	Mix Time[c] (min)	Ascorbic Acid (ppm)	Crumb Grain[d]	Loaf Volume[e] As Rec'd (cc)	Loaf Volume[e] Corrected to 13% P (cc)	Loaf Volume[e] Regression (cc/%)
Western Composites								
Karl	14.6	69.8	7.75	20	6* Q	1172	1053	75
Tam 107	12.0	68.9	5.25	20	7	1022	1104	80
Abilene	13.6	64.9	4.38	20	7	1042	1001	70
Mesa	13.1	64.2	3.13	20	8	1060	1054	75
2163	12.4	63.6	3.38	20	7	973	1017	72
Tam 200	11.9	65.6	6.13*	20	7	1075	1172	87
Victory	12.6	63.2	3.25	20	7	867	892	59 U
2180	14.1	65.3	3.50	20	7	1045	972	67 Q
AGSECO 7846	11.9	59.7	2.50 U*	50	7	933	1012	71
Larned	12.0	61.1	3.00	50	7	965	1040	74
KS8010*-72-4	12.8	61.1	3.88	50	7	1013	1029	73
KS8010*-72-8	12.4	61.8	3.88	50	7	1002	1048	75
KS831374-142	13.8	68.1	7.75	20	8	1125	1065	76
KS831374-74	14.0	68.6	8.25 Q	20	8	1105	1033	73
KS87H325-2-1	13.3	69.5	4.63	50	7	1005	986	68 Q
KS88H12-1	11.9	65.1	4.88*	50	8	1042	1135	83
KS88H12-2	13.1	66.0	5.00	50	8	1050	1044	74
KS89H19	13.4	68.4	6.75	50	8	1012	986	68 Q
KS89H20-1	12.8	66.7	8.88 Q	50	8	1020	1036	73
KS89H20-2	13.3	68.7	8.38 Q	20	8	1075	1054	75
KS89H33-2	12.7	64.0	6.00	50	8	1030	1054	75
KS89H48	13.1	64.4	4.13	50	7	1068	1062	76
KS89H50-1	13.4	65.7	5.50	50	6* Q	1162	1130	83
KS89H50-4	13.3	66.6	5.38	50	7*	1142	1119	82
KS89H54-3	13.5	64.9	3.00	50	6 Q	1030	996	70
KS89H123-5	13.4	63.6	4.13	50	8	1025	998	70
KS89H130-4	12.9	63.2	4.88	50	7	996	1004	70
KS89H130-5	12.8	63.0	4.63	50	7	1043	1059	76
KS89H132-4	12.9	65.3	5.00	50	7	1019	1028	73
KS89H185-1	13.3	65.5	6.13	20	8	1039	1019	72
KS89H185-4	13.3	67.4	6.88	50	7	1037	1017	72
KS89H185-5	13.2	68.4	7.13	50	8	1043	1030	73
KS89H190-2	12.9	64.3	5.63	50	8	1013	1021	72
KS89H190-5	12.9	64.3	5.63	50	8	983	991	69 Q
KS89H191-1	12.7	64.1	5.25	50	7	1003	1026	72
(Average)	(13.0)	(65.3)	(5.25)	(40)	(7.3)	(1035)	(1037)	(74)

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Table 8. Chemical and bread–baking data for KS89H48 and checks. 9400149

	Flour		Bread–baking Data					
			Mix Time			Loaf Volume		Re–
	Pro– tein	Ab– sorp– tion	As Rec'd	Cor– rect– ed	Crumb Grain	As Rec'd	Cor– rect– ed	gres– sion Slope
	%	%	min	min		cc	cc	cc/%
1990 AYT								
Eastern								
KS89H48	12.8	65.2	3.63	3.63	Q–S	1028	969	74
TAM 107	12.1	68.4	4.5	4.5	Q–S	960	953	73
KARL	13.4	66.6	4.88	4.88	S	998	904	67
ABILENE	12.7	65	4.13	4.13	S	978	929	70
Western								
KS89H48	11.2	61.4	3.5	3.2	Q–S	933	991	77
TAM 107	10.7	64.8	3.6	3.1	Q	875	980	75
TAM 200	11.1	62.5	4.5	4	Q	955	1024	80
KARL	13.1	63.9	5	5	S	988	913	68
ABILENE	11.8	60.3	3.5	3.4	Q–S	925	939	71