No. 7900079

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## University of Nebraska and SEA, USDA

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 seventeen 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, MULTIPLYING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY 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 A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*[Waived]

COMMON WHEAT

'Bennett'

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 *this* 31st *day of* July *in the year of our Lord one thousand nine hundred and* eighty

*Attest:*

*Commissioner*
*Plant Variety Protection Office*
*Grain Division*
*Agricultural Marketing Service*

*Secretary of Agriculture*

FORM GR-470
(1-76)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
PLANT VARIETY PROTECTION OFFICE
NATIONAL AGRICULTURAL LIBRARY
BELTSVILLE, MARYLAND 20705

FORM APPR
OMB NO. 40-

# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

| 1a. TEMPORARY DESIGNATION OF VARIETY | 1b. VARIETY NAME | FOR OFFICIAL USE ONLY |
|---|---|---|
| NE73644 | Bennett | PV NUMBER 7900079 |
| 2. KIND NAME: Hard Red Winter Wheat | 3. GENUS AND SPECIES NAME: Triticum aestivum L. | FILING DATE 5-21-79 / TIME 3:30 |
| 4. FAMILY NAME (BOTANICAL): Gramineae | 5. DATE OF DETERMINATION: July 1973 | FEE RECEIVED $ 250.00 / $ 250.00 / $ 250.00 — DATE 5-21-79 / 5-21-79 / 6-16-80 |
| 6. NAME OF APPLICANT(S): Board of Regents, University of Nebraska and Science and Education Administration, U.S. Department of Agriculture | 7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code): Lincoln, NE 68508 / Washington, DC 20250 | 8. TELEPHONE A CODE AND NU 402-472-721 / 202-447-365 |
| 9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) Corporation & U.S. Government Agency | 10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION: Nebraska and Washington, DC | 11. DATE OF INC PORATION: February 15, 1869 |

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all pa

Dr. Howard W. Ottoson, Acting Dean
& Director
Agricultural Experiment Station
University of Nebraska-Lincoln
Lincoln, NE 68583

Mr. T. W. Edminster, Deputy Director
Agricultural Research, Science and
Education Administration
340-A Administration Building
USDA
Washington, DC 20250

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

[X] 13B. Exhibit B, Novelty Statement.

[X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*

[X] 13D. Exhibit D, Additional Description of the Variety.

14A. 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). (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations? [X] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyo breeder seed? [X] FOUNDATION [X] REGISTERED [X] CERTIFIED

15. Does the applicant(s) agree to the publication of his/her (their) name(s) and address in the Official Journal? [X] YES [ ] N

16. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be deposited upon request before issuanc a certificate and will be replenished periodically 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 variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of S tion 42 of the Plant Variety Act.

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

April 16, 1979
(DATE)

FOR THE BOARD OF REGENTS
Robert L. Lovitt
(SIGNATURE OF APPLICANT)
Robert L. Lovitt, Vice Chancellor for
Business & Fina

June 4, 1979
(DATE)

T. B. Kinney
(SIGNATURE OF APPLICANT)

# INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $250.00 fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, National Agricultural Library, Beltsville, Maryland 20705. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Give the date the applicant determined that he had a new variety based on (1) the definition in Section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give (1), the genealogy, including public and commerical varieties, lines, or clones used, and the breeding method. (2), the details of subsequent stages of selection and multiplication. (3), the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4), evidence of stability.

13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties; (1) identify these varieties and state all differences objectively; (2) Attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

13c Fill in the Exhibit C, Objective Description form for all characteristics, for which you have adequate data.

13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe; such as; plant habit, plant color, disease resistance, etc.

14A If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled or published or the certificate has been issued. However, if the applicant specifies "NO", he may change his choice. (See Section 180.15 of the Regulations and Rules of Practice.)

# EXHIBIT A

## Origin and Breeding History of Bennett

Pedigree: Scout/3/Quivira/Tenmarq//Marquillo/Oro/4/Homestead

Date of Cross: Cross 681422, 1968

Place: Agronomy Department, Nebraska Agricultural Experiment Station, Lincoln, NE

Breeding System: Mass pedigree

The breeding history of Bennett is summarized in Table 1. The decision to release NE73644 (C.I. 17723) under the name BENNETT was made by the Nebraska Agricultural Experiment Station on January 25, 1978*. Public release of information on Bennett as a variety occurred on June 15, 1978*. The North Central Region, Agricultural Research, Science and Education Administration, U.S. Department of Agriculture joined the Nebraska Agricultural Experiment Station in the release of Bennett.

Breeder seed of NE73644 was seeded in 1977 for the production of foundation seed. Ten bushels of breeder's seed was supplied to the Kansas and South Dakota Agricultural Experiment Stations. In 1978, 668 bushels of foundation seed were produced and released to Nebraska growers for the production of registered seed in 1979.

A very low percentage of slightly taller than average plants were observed and removed during seed multiplication of Bennett. The variety appears to be very stable genetically.

* Release statement attached

THE UNIVERSITY OF NEBRASKA–LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

TEACHING RESEARCH EXTENSION
Institute of Agriculture and Natural Resources

*Reply to:*
Department of Agronomy
Keim Hall
East Campus
(402) 472-2811

October 31, 1979

Mr. Larry W. Dosier
Plant Variety Protection Office
Grain & Seed Division, AMS, USDA
National Agricultural Library Bldg.
Beltsville, MD 20705

Dear Mr. Dosier:

SUBJECT: Wheat Application No. 7900079, 'Bennett'

1. The Board of Regents of the University of Nebraska incorporation date is February 15, 1869.

2. Exhibit A.

   Item 1. Criteria of selection. The cross from which Bennett was selected was made partly for combining stem rust resistance from the two parental lines. We were not completely successful but Bennett has better stem rust resistance than its parents. Of course, yield is always a criteria for selection.

   Item 2. Variants. Bennett was selected in the $F_2$ generation and might be expected to variable. However, it is surprisingly uniform and registered fields of Bennett in 1979 were noted as excellent in uniformity by the Nebraska Crop Improvement inspectors. Variants that were rogued out during increase were slightly taller than the average of the variety but Bennett was increased during two severe killing years and rogueing for height was difficult and may not have been very meaningful. Height variants, if actually present and for real, would be expected to be much less than one in 10,000.

3. Exhibit C.

   Item 1. Seed sample color. After our telephone conversation in July I checked the seed sample that we sent in to your office and it was variable for color. However, we suspected that it was due to field maturity differences observed as a result of winter damage. This was true in foundation seed again this past summer. However, three of us looked at the Bennett samples entered in the Nebraska Crop Improvement Certified Seed Show at this year's state fair and this variation in seed color was not evident in the large number of Bennett farmer samples entered. Therefore, the variety is not variable for seed color and hardness as suggested by the sample I submitted.



THE UNIVERSITY OF NEBRASKA–LINCOLN THE UNIVERSITY OF NEBRASKA AT OMAHA
THE UNIVERSITY OF NEBRASKA MEDICAL CENTER

Item 2. Seed crease. I would classify the seed crease of Bennett as mid-wide and mid-deep.

The reference to the other varieties is not very meaningful for most of us because we don't grow them.

4. The completed waiver form is enclosed.

Sincerely yours,

John W. Schmidt

John W. Schmidt
Professor

Enclosure

cc: Dr. H. W. Ottoson
Dr. T. W. Edminster

Table 1. Breeding history of Bennett hard red winter wheat.

| Year | Generation | Nursery | Disposition |
|---|---|---|---|
| 1968 | $F_0$ (2 seeds) | Cross 681422 made in greenhouse at Lincoln, NE. | To greenhouse for $F_1$ seed production. |
| 1969 | $F_1$ | Greenhouse, Lincoln, NE. | Advanced to $F_2$ nursery. |
| 1970 | $F_2$ | Bulk hybrid, Mead, NE. | Heads selected and advanced to headrow nursery. |
| 1971 | $F_3$ | Headrow nursery. | Row selected and advanced to preliminary observation nursery at Mead. |
| 1972 | $F_4$ | Observation nursery. | Line selected and advanced to observation nursery at Mead, Clay Center and Sidney. |
| 1973 | $F_5$ | Observation nursery at Mead, Clay Center and Sidney. | Plot 644 recognized as having merit and NE selection number 73644 assigned. Advanced to Nebraska Intrastate Nursery (NIN). |
| 1974 | $F_6$ | NIN, all locations. | Continued in NIN. |
| 1975 | $F_7$ | NIN, all locations. | Continued in NIN; entered in Outstate tests (OST), Southern and Northern Regional Performance Nurseries (SRPN and NRPN) and other tests. |
| 1976 | $F_8$ | NIN, OST, SRPN, NRPN, and other nurseries. | Continued in these tests. Advanced to Collaborative Milling and Baking tests. |
| 1977 | $F_9$ | Continued in above tests. Breeder seed increase. | Continued in tests. Breeder seed to Foundation plantings. |
| 1978 | $F_{10}$ | Continued in above tests. Foundation seed production. | Cereal accession number 17723 assigned and released as Bennett to growers. |

EXHIBIT B

Data Indicative of Novelty of Bennett

The Bennett variety is most similar to the Homestead variety, one of its parents.

The distinctive features of Bennett are:

1. A hard red winter wheat with:

   a. Excellent field resistance to current stem rust races in the Great Plains. Has SR2 from Hope for it exhibits some melanism (pseudo-black chaff). Superior to Homestead.

   b. Acceptable to excellent seedling resistance to almost all of the current stem rust races (see Table 2).

   c. Intermediate reaction to soil-borne mosaic virus (not as resistant as Homestead). Table 3.

   d. Low level of infection with powdery mildew.

   e. Susceptibility to Hessian fly and to leaf rust.

   f. Moderately short stature and good lodging resistance under Great Plains conditions (Table 4). Superior to Homestead.

   g. It differs morphological from the Homestead variety in (Tables 5 and 6):

      1) having a more compact spike somewhat shorter in length and slightly wider

      2) having a larger glume (both length and width)

      3) having shorter beaks than Homestead

      4) having kernels slightly heavier in weight, shorter and wider (Figure 1).

2. A hard red winter wheat with:

   a. Excellent milling yield.

   b. Intermediate dough handling properties (Table 7, Figures 2 and 3).

   c. Above average grain protein content.

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-5
(2-15-73)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Wheat)

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

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S): Board of Regents, University of Nebraska, and Science and Education Administration, U.S. Dept. of Agric.

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Lincoln, NE 68508 - Washington, DC 20250

FOR OFFICIAL USE ONLY
PVPO NUMBER: 7900079
VARIETY NAME OR TEMPORARY DESIGNATION: Bennett

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:** Meaningless in winter wheat
[ ][ ][ ] FIRST FLOWERING [ ][ ][ ] LAST FLOWERING

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

**5. PLANT HEIGHT** (*From soil level to top of head*):
[ ][9][6] CM. HIGH Mead, NE, 1978; 82 in 1977 S. Reg. Perf. Nursery
[ ][ ] CM. TALLER THAN ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS
[1][0] CM. SHORTER THAN ..... [2]

**6. PLANT COLOR AT BOOTING** (*See reverse*):
[3] 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][5] NO. OF NODES (*Originating from node above ground*)
[2][.1] 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:**
[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[1][2] MM. LEAF WIDTH (*First leaf below flag leaf*)
[2][3] CM. LEAF LENGTH (*First leaf below flag leaf*):

**11. HEAD:**

[3] Density: 1 = LAX 2 = DENSE 3 = middense

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

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

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

[0 7] CM. LENGTH (actual average = 6.6)

[0 9] MM. WIDTH (actual average = 9.4)

**12. GLUMES AT MATURITY:**

[3] 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.)

/1/ 1 = Glabrous 2 = Pubescent

[4] Shoulder share: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE
actually square to rounded

[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:**

[4] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL
4 = ovate to 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 [0 3] GM. PER 100 SEEDS

**17. SEED CREASE:** 4 - Similar to Scout

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
2 = 80% OR LESS OF KERNEL 'CHRIS'
3 = NEARLY AS WIDE AS KERNEL 'LEMHI'
12/28/79

[2] Depth: 4 = Similar to Scout
1 = 20% OR LESS OF KERNEL 'SCOUT'
2 = 35% OR LESS OF KERNEL 'CHRIS'
3 = 50% OR LESS OF KERNEL 'LEMHI'
12/28/79

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

[2] STEM RUST (Races) _____ [1] LEAF RUST (Races) _____ [0] STRIPE RUST (Races) _____ [0] LOOSE SMUT

[0] POWDERY MILDEW [0] BUNT [2] OTHER (Specify) soil-borne mosaic

**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 | Homestead | Seed size | Homestead |
| Leaf size | Homestead | Seed shape | Homestead |
| Leaf color | Homestead | Coleoptile elongation | Homestead |
| Leaf carriage | Homestead | Seedling pigmentation | Homestead |

## 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.

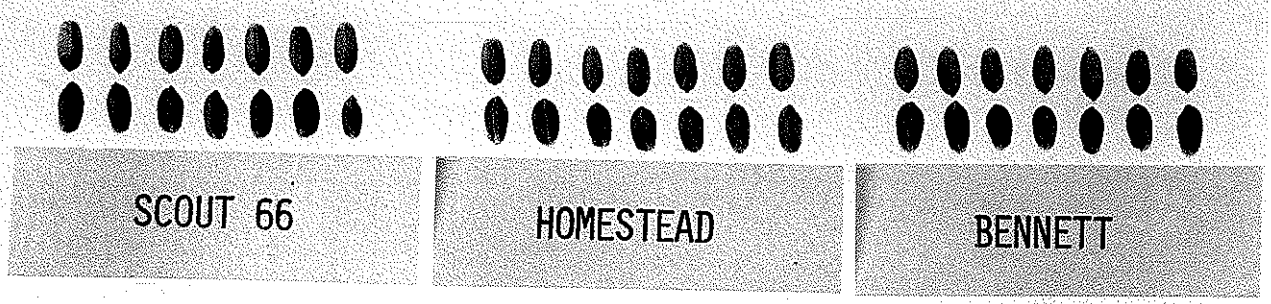


Figure 1. Representative kernels from Scout 66, Homestead, and Bennett hard red winter wheat varieties grown in Nebraska in 1978.

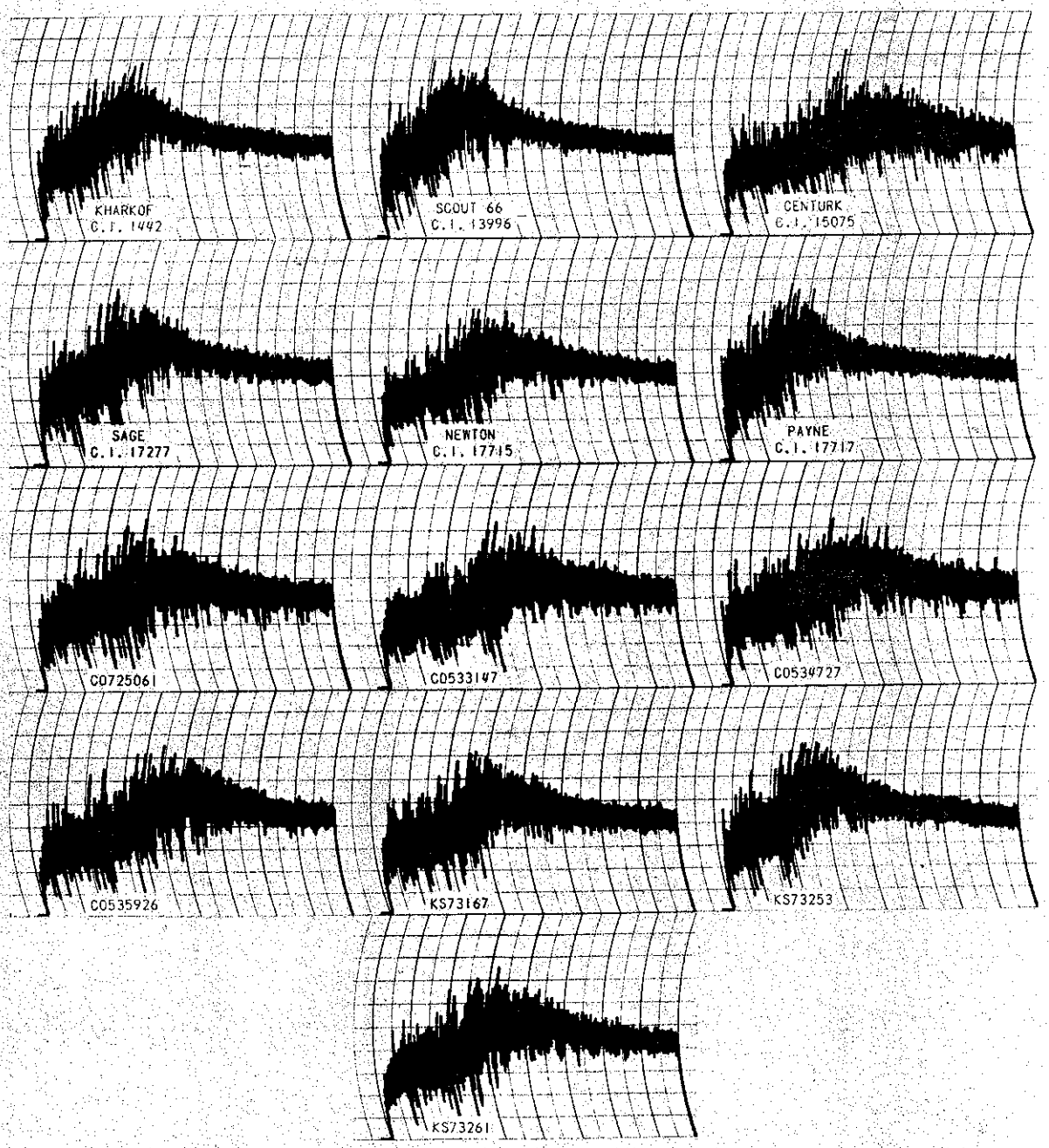


Fig. 2. Mixograms (10-g.) for the Southern Regional Performance Nursery composites of hard winter wheat varieties harvested in New Mexico, Texas, Oklahoma, Missouri, Kansas, Colorado, Nebraska, and Idaho in 1977. Mixing time is the time (min.) to the peak. Mixing tolerance is the slope and width after the peak and stability of mixogram height on either side of the peak. Major arcs are at 1-minute intervals.

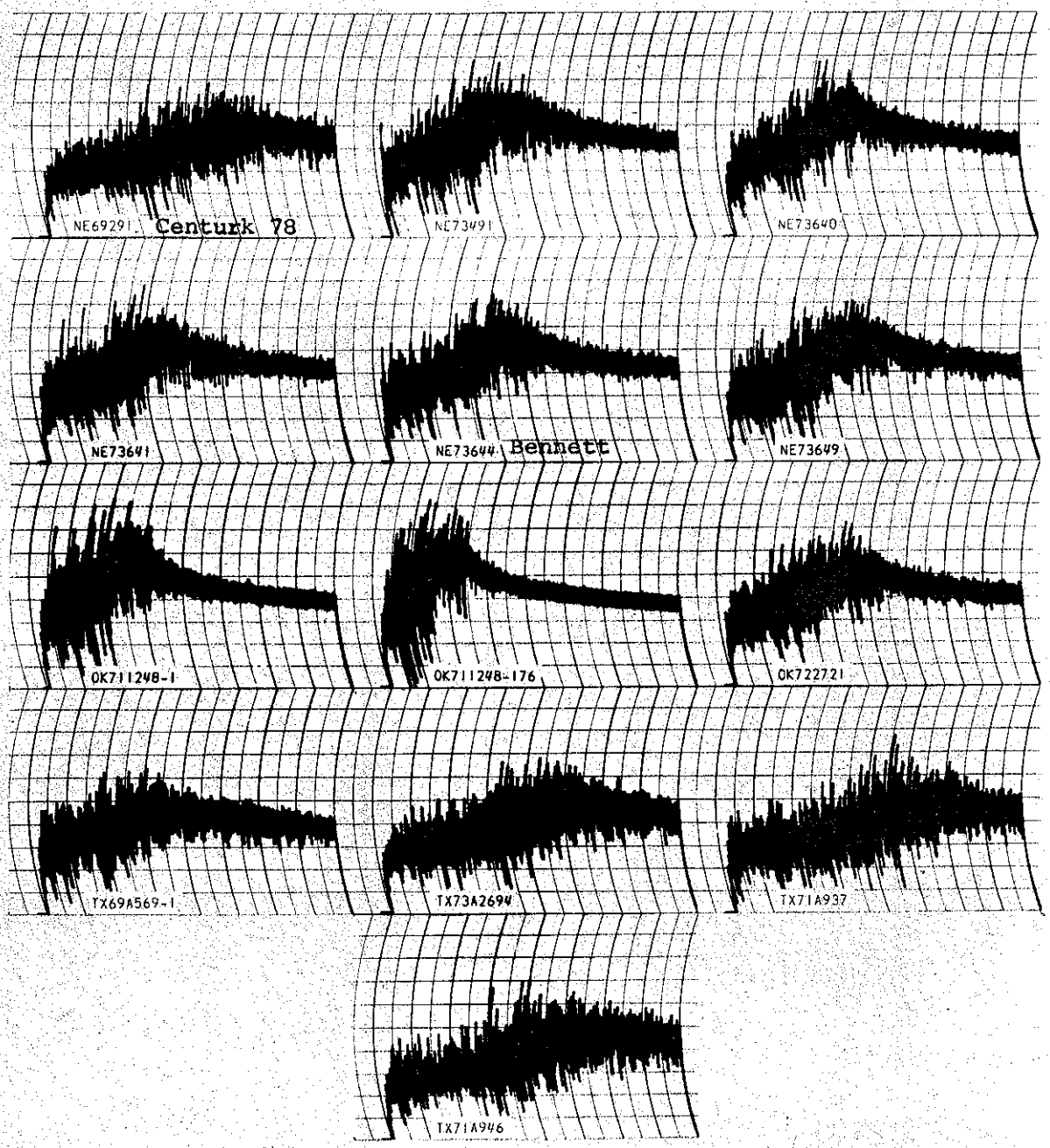


Fig. 3 Mixograms (10-g.) for the Southern Regional Performance Nursery composites of hard winter wheat varieties harvested in New Mexico, Texas, Oklahoma, Missouri, Kansas, Colorado, Nebraska, and Idaho in 1977. Mixing time is the time (min.) to the peak. Mixing tolerance is the slope and width after the peak and stability of mixogram height on either side of the peak. Major arcs are at 1-minute intervals.

Table 2. Seedling reaction of the 1977 Southern Regional Performance Nursery to isolates of *Puccinia graminis* f. sp. *tritici*.[1/]

| | | Isolates | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 72-4-1A | 74-21-1409A | 72-00-53A | 71-21-584B | 72-18-630B | 75-14-504C | 72-44-703C | 72-00-1370C | 59-14-19 | 75-45-1662A |
| | | Race | | | | | | | | | |
| | | 15-B2 | | 11-32-113 | | | | 151 | | 56 | ? |
| Entry no. | C.I. or Sel. No. | TNMH | TNMK | RTQQ | RHRS | RSHS | RPQQ | QSHS | QFBS | MBCT | DKCS | Speculative SR genes |
| 1 | 1442 | S | S | S | S | S | S | S | S | S | S | |
| 2 | 13996 (Scout 66) | ;1cN | S | ;1cN | S | S | ; | S | S | S | S | 17 |
| 3 | 17277 | ; | 2 | ; | 2 | 2 | ; | 2 | 2 | 2BN | 2- | 17, 24 |
| 4 | C0725061 | ; | S | ; | ;1 | S | ; | S | ; | ;1c | ;1c | 11, 17 |
| 5 | C0533147 | ; | ; | S | S | S | ; | S | ; | ; | 0 | 5, 6 |
| 6 | C0534727 | ; | S | ; | S | S | ; | S | S | S | 0 | 5, 17 |
| 7 | C0535926 | ; | ; | 2 | S | S | ; | S | ; | ; | 0 | 5, 6, + |
| 8 | KS73112 | S | S | S | S | S | S | S | S | S | 2⁻c | + |
| 9 | KS73167 | S | S | S | 2= | 2 | S | S | S | 2⁻ | 2⁻c | + |
| 10 | KS73253 | S | S | 2 | 2= | 2 | S | 2 | 2 | 2 | 2⁻c | + |
| 11 | KS73261 | S | S | 2 | 2= | 2 | S | 2 | S | 2 | S | + |
| 12 | 15075 (Centurk) | ; | ; | ; | 23c | 32 | ; | 32 | ; | ; | ; | 5, 6, 8, 9a, 17 |
| 13 | NE69291 (Centurk 78) | ; | ; | ; | 23c | 23 | ; | 23 | ; | ; | ; | 6, 17, 9a |
| 14 | NE73491 | ;1cN | S,; | ; | S | 23 | ; | 23 | S,; | ; | ; | Seg 6, 17, 9a |
| 15 | NE73641 | ;1cN | S | ;1cN | 23 | 23 | ; | 23 | 2c | S | 23,; | 17, 9a |
| 16 | NE73644 (Bennett) | ; | ; | ;1cN | 23c | 23 | ; | 23 | ; | ; | ; | 6, 17, 9a |
| 17 | NE73649 | ; | ; | ; | 23c | 23 | ; | 23 | ;,2c | ;,S | ; | 6, 17, 9a |
| 18 | OK711248-1 | 2 | 2 | ; | 2⁻ | 2 | ;1c | 2⁻ | ;1c | 2⁻c | 2= | 24, T |
| 19 | OK711248-176 | 2 | 2 | 2= | 2⁻ | 2 | ;1c | 2⁻ | 12⁻c | 2⁻c | 2= | 24, T |
| 20 | OK722721 | 2 | 2 | 2 | 2⁻ | 2 | 2 | 2⁻ | 2 | 2⁻c | 2= | 24, T |
| 21 | OK711092A | 2 | 2 | 2⁻ | 2⁻ | 2 | ;1c | 2⁻ | 2= | 2⁻ | 2= | 24 |
| 22 | TX69A569-1 | S | S | S | S | S | S | S | S | S | S | - |
| 23 | TX73A2694 | ; | ; | ; | S | S | ; | S | ; | ; | ; | 6, 17 |
| 24 | TX71A937 | ; | S,; | ; | S | S | ; | S | ; | ;,S | ; | Seg 6, 17 |
| 25 | TX71A946 | ; | ;,S | ;1cN | S | S | ; | S | ;,S | ;,S | ;1⁻c | Seg 6, 17 |
| 26 | TX71A30 | S | S | - | 2 | S | ;,S | 23 | S | S | 23,S | |
| 27 | TX71A106-5 | ; | S | ; | 23c | S | ; | 23 | 2 | S | 23 | 17, + |
| 28 | TX71A58-3 | ; | ; | ; | S | S | ; | S | ; | ; | ; | 6, 17 |
| 29 | TX71A407-6 | ; | ; | ; | S | S | ; | 23 | ; | ; | ; | 6, 17 |
| 30 | TX71A562-6 | ; | ; | ; | S | S | ; | 23 | ; | ; | ; | 6, 17 |
| 31 | TX71A687-5 | ; | ; | ; | S | S | ; | S | ; | S | 0 | 5 |
| 32 | NE73640 | 1cN | S,; | ; | S | S | ; | S | ;,2c | S,; | ; | Seg 6, 17, + |
| 33 | NK75V465 | ; | S | ;,S | S,;1 | 23 | ;,S | S | S | ;,S | 23,; | Seg 17, + |
| 34 | NK75V520 | S | S | S | S | S | S | S | S | 1c | ;1c | 9d |
| 35 | IL71-5838 | S | S | 2 | 23 | S | S | 2 | 2 | S | 23 | + |
| 36 | IL72-2489 | S | S | 2 | 2 | 2 | S | 2⁻ | 2⁻ | S | 2= | |
| 37 | NAPB 1307-76 | ; | S | ; | ;1c | 2 | ; | 2 | 2 | S,1c | ;1c | 11, 17, + |
| 38 | NAPB 1286-76 | ; | ; | ; | S | S | ; | S | ; | ; | ; | 6, 17 |
| 39 | NAPB 1291-76 | ; | ; | ; | S | S | ; | S | ; | ; | ; | 6, 17 |
| 40 | NAPB 1289-76 | ; | ; | ; | S | S | ; | S | ; | ; | 0 | 5, 6, 17 |

[1/] Data submitted by D. V. McVey, Cereal Rust Lab., St. Paul, Minnesota.



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EXHIBIT D (additional data)

Table 3. Field reaction to soil-borne mosaic virus for selected entries, 1977.

| Variety | Urbana, IL | | Manhattan, KS | Newton, KS |
|---|---|---|---|---|
| | Incidence | Response | Response | Response |
| Pawnee | 100 | S | MS | MS |
| Concho (Res. check) | 100 | MR | R | R |
| Bison (Susc. check) | 70 | S (rosetting) | S | MS |
| Bennett | 100 | MS | MR | MR |
| Centurk | 100 | MR | MS | MR |
| Centurk 78 | 100 | MR | S | MS |

Table 4. Summary of agronomic and yield data for the 40 lines grown in the 1977 Southern Regional Performance Nursery.

| Pedigree | C. I. or Sel. No. | Entry No. | Days to head from 1/1 | Plant height cm | Lodging 0-9 | Shattering 0-9 | Winter survival 0-9 | Coleoptile length mm | Leaf rust sev. % | Leaf rust resp. | Stem rust sev. % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of trials | | | 20 | 22 | 8 | 2 | 1 | 1 | 2 | 2 | 1 |
| SdySib/Tmp,TX62A4615-7//Ctk | TX71A562-6 | 30 | 134 | 78 | 1 | 1 | 8 | 72 | 1 | R | 0 |
| Short Wheat/Scout | TX69A569-1 | 22 | 132 | 77 | 0 | 1 | 8 | 85 | 5 | S | 1 |
| NAPB 1307-76 | --- | 37 | 131 | 79 | 1 | 1 | 8 | 76 | 2 | MS | 0 |
| II21183/C0652643//Lancer/ KS62136 | C0725061 | 4 | 132 | 79 | 1 | 1 | 7 | 71 | 26 | S | 0 |
| TAM W-101/Centurk | TX71A58-3 | 28 | 136 | 78 | 0 | 1 | 8 | 73 | 15 | S | 0 |
| Sdy Sib/Tcs, TX62A2642//Ctk | TX71A937 | 24 | 131 | 76 | 0 | 1 | 6 | 85 | 6 | S | 0 |
| Centurk | 15075 | 12 | 135 | 88 | 2 | 1 | 9 | 104 | 15 | S | 0 |
| Sage | 17277 | 3 | 134 | 90 | 3 | 1 | 8 | 111 | 9 | S | 0 |
| Centurk Selection | NE69291 (Centurk | 13 | 135 | 87 | 2 | 1 | 8 | 104 | 17 | S | 1 |
| CIMMYT/Scout | KS73112 78) | 8 | 133 | 80 | 1 | 1 | 7 | 82 | 9 | S | 0 |
| Tascosa/$T_1$//Parker | OK722721 | 20 | 134 | 83 | 1 | 1 | 7 | 96 | 5 | S | 0 |
| NAPB 1289-76 | --- | 40 | 136 | 91 | 1 | 1 | 9 | 104 | 24 | S | 0 |
| TAM W-101/Centurk | TX71A106-5 | 27 | 132 | 72 | 0 | 1 | 7 | 69 | 39 | S | 1 |
| CIMMYT/Scout | KS73261 | 11 | 131 | 76 | 1 | 1 | 6 | 90 | 11 | S | 1 |
| Centurk/Sturdy | NK75V465 | 33 | 134 | 77 | 1 | 1 | 8 | 80 | 0 | M | 0 |
| CIMMYT/Scout | KS73167 | 9 | 132 | 79 | 0 | 1 | 6 | 86 | 12 | S | 0 |
| 62A2782-8/Centurk | TX73A2694 | 23 | 134 | 81 | 0 | Tr | 7 | 79 | 1 | M | 3 |
| Buckskin Sib/Homestead | NE73640 | 32 | 133 | 83 | 1 | 1 | 8 | 99 | 12 | S | 0 |
| Palo Duro/Centurk | TX71A407-6 | 29 | 132 | 73 | 2 | 1 | 7 | 79 | 13 | S | 0 |
| NAPB 1291-76 | --- | 39 | 135 | 97 | 1 | Tr | 6 | 104 | 2 | MS | 0 |
| Triumph 64/$T_1$//Sturdy | OK711092A | 21 | 133 | 80 | 1 | Tr | 8 | 81 | 0 | R | 0 |
| Sdy Sib/Tcs, TX62A2642//Ctk | TX71A946 | 25 | 131 | 75 | 0 | 1 | 6 | 87 | 7 | S | 0 |
| Gage/TX65A1682 | IL72-2489 | 36 | 134 | 74 | 0 | 1 | 8 | 65 | 16 | S | 3 |
| CIMMYT/Scout | KS73253 | 10 | 131 | 77 | 0 | 1 | 5 | 86 | 9 | S | 0 |
| C0695552/Centurk | C0534727 | 6 | 132 | 83 | 1 | 1 | 8 | 95 | 7 | S | 1 |
| TAM W-101/Centurk | TX71A30 | 26 | 129 | 81 | 1 | 1 | 7 | 95 | 16 | S | 0 |
| NAPB 1286-76 | --- | 38 | 133 | 89 | 1 | 1 | 8 | 79 | 9 | S | 0 |
| Buckskin Sib/Homestead | NE73491 | 14 | 132 | 87 | 1 | 1 | 8 | 103 | 12 | S | 0 |
| Buckskin Sib/Homestead | NE73649 | 17 | 134 | 83 | 1 | 1 | 9 | 100 | 14 | S | 0 |
| C0695427/Centurk | C0535926 | 7 | 134 | 93 | 2 | 1 | 8 | 85 | 9 | S | 0 |
| Parker/TX65A1682 | IL71-5838 | 35 | 130 | 81 | 1 | 1 | 8 | 98 | 11 | S | 0 |
| Buckskin Sib/Homestead | NE73641 | 15 | 134 | 82 | 1 | 1 | 8 | 112 | 18 | S | 0 |
| C0695708/C0673410 | C0533147 | 5 | 135 | 91 | 2 | 1 | 9 | 94 | 18 | S | 0 |
| Buckskin Sib/Homestead | NE73644 (Bennett) | 16 | 134 | 82 | 1 | 1 | 8 | 107 | 16 | S | 0 |
| Tascosa/$T_1$//Sturdy | OK711248-176 | 19 | 136 | 81 | 0 | Tr | 8 | 87 | 2 | M | 0 |
| Scout 66 | 13996 | 2 | 133 | 93 | 3 | 1 | 8 | 112 | 16 | S | 0 |
| Tascosa/$T_1$//Sturdy | OK711248-1 | 18 | 136 | 80 | 1 | Tr | 7 | 89 | 3 | M | 0 |
| Sdy Sib/Kaw,TX65A1503//Ctk. | TX71A687-5 | 31 | 136 | 70 | 0 | 1 | 8 | 74 | 0 | M | 0 |
| Sturdy/Bison | NK75V520 | 34 | 131 | 71 | 0 | 1 | 7 | 96 | 2 | M | 3 |
| Kharkof | 1442 | 1 | 141 | 104 | 4 | 1 | 9 | 105 | 9 | S | 5 |

EXHIBIT D (additional data)

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Table 4. Concluded.

| C. I. or Sel. No. | Entry no. | Septoria tritici sev. % | Septoria tritici resp. | Septoria nodorum sev. % | BYDV 0-9 | Mildew sev. % | Mildew resp. | Phyto[1/] 0-9 | Protein % | Pearled off % | Average grain weight mg | Volume weight kg/hl | Yield kg/ha |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of trials | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 1 | 1 | 25 | 26 |
| TX71A562-6 | 30 | 42 | VS | 19 | 1.0 | 20 | MS | Tr | 11.93 | 31 | 29.4 | 72.9 | 3892 |
| TX69A569-1 | 22 | 33 | M | 10 | 3.0 | 50 | VS | 2.0 | 12.75 | 34 | 30.1 | 75.4 | 3701 |
| --- | 37 | 33 | VS | 12 | Tr | 60 | VS | 1.0 | 12.86 | 29 | 27.5 | 77.8 | 3696 |
| CO725061 | 4 | 32 | S | 7 | 1.5 | 15 | S | 2.5 | 12.37 | 28 | 27.2 | 77.5 | 3690 |
| TX71A58-3 | 28 | 27 | S | 18 | 2.0 | 35 | S | 1.0 | 12.52 | 29 | 28.6 | 75.0 | 3555 |
| TX71A937 | 24 | 45 | VS | 13 | 2.0 | 60 | VS | 2.0 | 13.17 | 34 | 27.6 | 75.0 | 3549 |
| 15075 (Centurk) | 12 | 27 | MS | 12 | Tr | 10 | MS | 0.5 | 12.68 | 29 | 27.8 | 76.3 | 3544 |
| 17277 | 3 | 30 | M | 7 | 2.0 | 30 | S | 3.0 | 13.80 | 36 | 34.6 | 76.7 | 3540 |
| NE69291(Centurk | 13 | 30 | S | 14 | 0.5 | 15 | MR | Tr | 12.16 | 26 | 27.0 | 76.8 | 3527 |
| KS73112 78) | 8 | 35 | S | 12 | 4.0 | 30 | S | 4.0 | 12.81 | 29 | 30.3 | 75.9 | 3522 |
| OK722721 | 20 | 28 | M | 11 | 2.0 | 60 | VS | 3.0 | 12.66 | 32 | 29.5 | 77.1 | 3519 |
| --- | 40 | 25 | MS | 12 | 1.5 | 5 | R | 1.0 | 12.93 | 25 | 26.7 | 76.7 | 3518 |
| TX71A106-5 | 27 | 33 | M | 11 | 1.5 | 55 | VS | Tr | 12.72 | 28 | 32.2 | 75.3 | 3518 |
| KS73261 | 11 | 32 | S | 10 | 2.5 | 30 | S | 3.5 | 13.49 | 30 | 30.1 | 77.3 | 3492 |
| NK75V465 | 33 | 37 | MS | 19 | 1.5 | 30 | S | 1.0 | 12.53 | 28 | 26.8 | 75.3 | 3487 |
| KS73167 | 9 | 33 | VS | 12 | 1.5 | 40 | VS | 3.0 | 12.99 | 29 | 29.1 | 77.1 | 3467 |
| TX73A2694 | 23 | 35 | M | 18 | 3.0 | 20 | MS | 1.0 | 13.15 | 33 | 28.6 | 76.9 | 3461 |
| NE73640 | 32 | 22 | M | 12 | 2.0 | 15 | MS | 1.5 | 13.32 | 33 | 32.5 | 76.4 | 3459 |
| TX71A407-6 | 29 | 50 | VS | 25 | 1.5 | 30 | S | Tr | 12.28 | 31 | 24.3 | 72.8 | 3448 |
| --- | 39 | 20 | MS | 18 | 1.0 | 10 | R | Tr | 12.70 | 34 | 31.8 | 75.6 | 3447 |
| OK711092A | 21 | 38 | MS | 16 | 2.5 | 70 | VS | 1.0 | 13.68 | 28 | 28.7 | 75.4 | 3434 |
| TX71A946 | 25 | 33 | VS | 11 | 2.0 | 60 | VS | 2.0 | 13.10 | 29 | 27.9 | 74.8 | 3423 |
| IL72-2489 | 36 | 35 | VS | 28 | 2.0 | 55 | VS | 1.0 | 12.93 | 31 | 27.7 | 74.5 | 3409 |
| KS73253 | 10 | 35 | S | 9 | 2.5 | 30 | S | 3.0 | 13.39 | 31 | 30.6 | 76.1 | 3400 |
| CO534727 | 6 | 38 | VS | 17 | 2.0 | 10 | MS | 0.5 | 13.32 | 34 | 31.5 | 75.1 | 3394 |
| TX71A30 | 26 | 27 | M | 9 | Tr | 55 | VS | Tr | 13.25 | 36 | 31.6 | 76.5 | 3390 |
| --- | 38 | 32 | MS | 13 | 3.0 | 10 | R | 1.5 | 13.31 | 27 | 25.9 | 75.9 | 3376 |
| NE73491 | 14 | 18 | MS | 11 | 4.5 | 10 | MR | 3.5 | 14.07 | 32 | 31.8 | 75.4 | 3368 |
| NE73649 | 17 | 18 | VS | 17 | 2.0 | 30 | S | 1.0 | 13.71 | 31 | 33.0 | 76.7 | 3368 |
| CO535926 | 7 | 35 | MS | 10 | 2.0 | 25 | S | 2.0 | 13.69 | 31 | 29.4 | 75.7 | 3363 |
| IL71-5838 | 35 | 40 | S | 14 | 1.5 | 45 | S | Tr | 13.13 | 31 | 29.2 | 78.2 | 3353 |
| NE73641 | 15 | 20 | MS | 13 | 3.0 | 10 | MS | 1.0 | 13.91 | 32 | 31.4 | 75.7 | 3331 |
| CO533147 | 5 | 38 | VS | 12 | 1.5 | 15 | VS | 1.0 | 13.35 | 32 | 27.5 | 77.6 | 3318 |
| NE73644 (Bennett) | 16 | 20 | S | 7 | 3.5 | 10 | MR | 2.5 | 13.57 | 33 | 33.8 | 75.7 | 3302 |
| OK711248-176 | 19 | 22 | M | 12 | 1.0 | 35 | S | Tr | 13.64 | 25 | 30.8 | 77.2 | 3285 |
| 13996 (Scout 66) | 2 | 23 | MS | 9 | 2.5 | 15 | MS | 3.0 | 13.55 | 34 | 33.8 | 76.6 | 3272 |
| OK711248-1 | 18 | 32 | M | 18 | 1.0 | 45 | VS | Tr | 13.47 | 31 | 34.3 | 76.5 | 3258 |
| TX71A687-5 | 31 | 47 | VS | 33 | Tr | 20 | MS | 1.0 | 13.03 | 28 | 26.2 | 74.4 | 3207 |
| NK75V520 | 34 | 43 | VS | 23 | Tr | 55 | VS | Tr | 14.49 | 31 | 29.9 | 75.4 | 3114 |
| 1442 | 1 | 22 | M | 6 | 2.5 | 20 | S | 2.0 | 13.99 | 32 | 27.5 | 74.6 | 2596 |

[1/] Phytotoxicity = plants sprayed with Diazanon causing differential leaf burn.

EXHIBIT D (additional data)

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EXHIBIT D (additional data)

Table 5. Comparative morphological data for winter wheat varieties at Mead, NE, 1978.

| Trait | Scout 66 | Homestead | Bennett | Centurk | Centurk 78 |
|---|---|---|---|---|---|
| Height:cm | 103.5 | 95.9 | 96.3 | 100.2 | 97.9 |
| Internode length:cm | 22.8 | 21.2 | 20.6 | 21.9 | 20.1 |
| Leaf length:cm | 25.4 | 25.6 | 22.7 | 23.7 | 23.5 |
| Leaf width:mm | 11.1 | 11.7 | 11.6 | 12.5 | 12.6 |
| Spike length:cm | 8.1 | 7.2 | 6.6 | 6.6 | 7.5 |
| Spike width:mm | 9.3 | 9.2 | 9.4 | 9.0 | 9.7 |
| Awn length:cm | 6.9 | 6.0 | 5.9 | 6.1 | 5.8 |
| Glume length:mm | 9.6 | 6.5 | 9.5 | 9.1 | 9.1 |
| Glume width:mm | 3.3 | 3.3 | 3.6 | 3.4 | 3.5 |
| Beak length:mm | 3.1 | 4.2 | 2.8 | 4.2 | 3.2 |

EXHIBIT D (additional data)

Table 6. Comparative average kernel data for winter wheat varieties grown at six 1/ locations in Nebraska.

| Trait | Scout 66 | Homestead | Bennett | Centurk | Centurk 78 |
|---|---|---|---|---|---|
| Kernel width (mm) | 2.7 | 2.7 | 2.8 | 2.5 | 2.5 |
| Kernel length (mm) | 6.3 | 6.3 | 6.2 | 5.8 | 5.8 |
| Kernel weight (1000 kernels, g) | 31.4 | 29.3 | 30.1 | 25.3 | 24.7 |

1/ Kernel weight average for 11 locations in Nebraska in 1978 except for Homestead. Homestead average is a percentage of the Bennett value at comparable locations.

EXHIBIT D (additional data)

Table 7. Chemical, Milling, and Baking Data for the Southern Regional Performance Nursery Composites of Hard Winter Wheat Varieties Harvested in New Mexico, Texas, Oklahoma, Missouri, Kansas, Colorado, Nebraska, & Idaho in 1977. 1/

| Variety | C.I. or Sel. No. | Wheat 2/ Wt. Per Bu. | Wheat 2/ Ash | Wheat 2/ Protein | Wheat 2/ Flour Yield | Flour 2/ Ash | Flour 2/ Protein | Bread-baking Data 2/ Absorption | Bread-baking Data 2/ Mixing Time 3/ | Bread-baking Data 2/ Crumb Grain | Bread-baking Data 2/ Loaf Volume As Rec'd | Bread-baking Data 2/ Loaf Volume Corrected To 12.5% P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | lbs. | % | % | % | % | % | % | min. | | cc. | cc. |
| Kharof | 1442 | 59.7 | 1.63 | 15.0 | 74.7 | .40 | 13.6 | 63.3 | $3\frac{3}{8}$ | S | 1030 | 954 |
| Scout 66 | 13996 | 61.0 | 1.57 | 13.9 | 76.8 | .40 | 12.9 | 60.9 | $3\frac{1}{4}$ | S | 995 | 967 |
| Centurk | 15075 | 60.7 | 1.55 | 13.6 | 75.4 | .40 | 12.4 | 63.2 | $5\frac{3}{8}$ | S | 968 | 975 |
| Sage | 17277 | 60.8 | 1.58 | 14.0 | 76.1 | .39 | 12.8 | 62.6 | $3\frac{7}{8}$ | S | 973 | 952 |
| Newton(KS73112) | 17715 | 60.1 | 1.63 | 13.4 | 74.3 4/ | .40 | 12.3 | 62.4 | $3\frac{7}{8}$ | S | 995 | 1010 |
| Payne (OK711092A) | 17717 | 59.7 | 1.68 | 14.3 | 76.1 4/ | .41 | 13.1 | 60.1 | $3\frac{1}{8}$ | S | 990 | 949 |
| II21183/CO652643/2/ Lcr/KS62136 | CO725061 | 62.0 | 1.58 | 13.0 | 74.2 | .40 | 11.9 | 60.7 | 4 | S | 933 | 976 |
| CO695708/CO673410 | CO533147 | 61.6 | 1.55 | 13.9 | 76.4 | .42 | 12.7 | 63.0 | 5 | S | 985 | 971 6/ |
| CO695552/Centurk | CO534727 | 60.0 | 1.59 | 14.0 | 76.8 | .39 | 13.0 | 61.4 | $5\frac{1}{8}$ | S | 996 | 961 6/ |
| CO695427/Centurk | CO535926 | 60.2 | 1.59 | 14.2 | 75.4 | .39 | 13.2 | 62.2 | $5\frac{1}{8}$ | S | 1053 | 1002 6/ |
| CIMMYT/Scout | KS73167 | 61.4 | 1.54 | 13.5 | 74.6 4/ | .39 | 12.4 | 61.5 | 4 | S | 1025 | 1032 7/ |
| " " | KS73253 | 60.8 | 1.55 | 13.8 | 74.6 4/ | .38 | 12.7 | 62.0 | $3\frac{5}{8}$ | S | 1037 | 1022 7/ |
| " " | KS73261 | 61.3 | 1.57 | 14.0 | 75.3 4/ | .38 | 12.9 | 62.4 | $4\frac{1}{8}$ | S | 1080 | 1048 7/ |
| Centurk Sel.(Centurk 78) | CI17724 | 60.8 | 1.50 | 13.4 | 75.2 4/ | .40 | 12.2 | 62.7 | 6 Q | S | 958 | 979 |
| Buckskin/Homestead | NE73491 | 60.2 | 1.58 | 14.6 | 76.8 | .39 | 13.3 | 62.3 | $4\frac{1}{4}$ | S | 1010 | 955 6/ |
| " " | NE73640 | 60.9 | 1.56 | 14.1 | 76.8 | .38 | 13.0 | 62.5 | $4\frac{1}{4}$ | S | 1016 | 980 6/ |
| " " | NE73641 | 60.5 | 1.59 | 14.5 | 76.4 | .36 | 13.2 | 61.6 | $4\frac{1}{4}$ | S | 975 | 929 |
| " " (Bennett) | CI17723 | 60.6 | 1.63 | 14.2 | 76.8 | .37 | 13.1 | 63.0 | $4\frac{1}{4}$ | S | 1008 | 966 6/ |



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EXHIBIT D (additional data)

Table 7. (cont.), page 2

| Variety | C.I. or Sel. No. | Wheat[2/] Wt. Per Bu. | Wheat[2/] Ash | Wheat[2/] Protein | Wheat[2/] Flour Yield | Flour[2/] Ash | Flour[2/] Protein | Bread-baking Data[2/] Absorption | Bread-baking Data[2/] Mixing Time[3/] | Bread-baking Data[2/] Crumb Grain | Bread-baking Data[2/] Loaf Volume As Rec'd | Bread-baking Data[2/] Loaf Volume Corrected To 12.5% P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | lbs. | % | % | % | % | % | % | min. | | cc. | cc. |
| Buckskin/Homestead | NE73649 | 61.0 | 1.56 | 14.3 | 76.4 | .38 | 13.1 | 62.8 | 4⅜ | S | 1028 | 985 6/ |
| Tascosa/$T_1$/2/Sturdy | OK711248-1 | 61.0 | 1.63 | 14.0 | 76.8 4/ | .42 | 13.0 | 60.5 | 3⅛ Q | S | 995 | 960 |
| " " | OK711248-176 | 62.0 | 1.59 | 14.2 | 76.9 4/ | .40 | 13.0 | 58.8 Q | 2⅝ U | S | 970 | 937 |
| Tascosa/$T_1$/2/Parker | OK722721 | 61.6 | 1.53 | 13.8 | 76.0 | .38 | 12.6 | 62.5 | 4 | S | 950 | 943 6/ |
| Short Wheat/Scout | Tx69A569-1 | 59.9 | 1.49 | 13.2 | 73.9 4/ | .38 | 11.8 | 62.7 | 4⅛ | S | 968 | 1021 |
| 62A2782-8/Centurk | Tx73A2694 | 61.8 | 1.64 | 13.6 | 74.3 4/ | .40 | 12.3 | 62.0 | 6⅜ Q | S | 980 | 995 |
| Sdy Sib/Tcs, Tx62A2642/ 2/Ctk | Tx71A937 | 60.2 | 1.57 | 13.6 | 76.5 4/ | .40 | 12.4 | 61.9 | 6¾ Q-U | S | 1023 | 1031 |
| " " | Tx71A946 | 60.2 | 1.60 | 13.4 | 75.8 4/ | .40 | 12.3 | 61.0 | 7⅛ Q-U | S | 1023 | 1039 |
| Tam W-101/Centurk | Tx71A30 | 60.1 | 1.53 | 13.9 | 76.2 4/ | .40 | 12.7 | 63.1 | 6 Q | S | 1021 | 1006 6/ |
| " " | Tx71A160-5 | 60.3 | 1.59 | 13.2 | 75.2 4/ | .46 | 12.0 | 64.0 | 4¼ | S | 948 | 984 |
| " " | Tx71A58-3 | 60.3 | 1.57 | 13.4 | 75.4 4/ | .45 | 12.1 | 62.3 | 4½ | S | 955 | 984 6/ |
| Palo Duro/Centurk | Tx71A407-6 | 58.0 | 1.60 | 13.0 | 76.6 4/ | .44 | 12.0 | 61.0 | 7¼ Q-U | S | 973 | 1010 |
| Sdy Sib/Tmp, Tx62A4615-7/2/Ctk | Tx71A562-6 | 58.1 | 1.59 | 12.8 | 75.1 4/ | .43 | 11.9 | 56.7 Q | 3⅜ | Q-S | 894 | 934 |
| Sdy Sib/Kaw, Tx65A1503/ 2/Ctk | Tx71A687-5 | 59.3 | 1.56 | 13.6 | 74.7 4/ | .40 | 12.5 | 62.1 | 3½ | Q-S | 897 | 897 |
| Centurk/Sturdy | NK75V465 | 60.2 | 1.56 | 13.3 | 74.3 4/ | .44 | 12.2 | 62.8 | 6⅜ Q | S | 1027 | 1051 6/ |
| Sturdy/Bison | NK75V520 | 60.1 | 1.58 | 15.1 | 77.0 | .52 Q | 14.1 | 60.7 | 3⅛ | S | 1053 | 944 6/ |

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EXHIBIT D (additional data)

Table 7. (cont.), page 3

| Variety | C. I. or Sel. No. | Wheat 2/ Wt. Per Bu. lbs. | Wheat 2/ Ash % | Wheat 2/ Protein % | Wheat 2/ Flour Yield % | Flour 2/ Ash % | Flour 2/ Protein % | Bread-baking Data 2/ Absorption % | Bread-baking Data 2/ Mixing Time 3/ min. | Bread-baking Data 2/ Crumb Grain | Bread-baking Data 2/ Loaf Volume As Rec'd cc. | Bread-baking Data 2/ Loaf Volume Corrected To 12.5% P cc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parker/Tx65A1682 | IL71-5838 | 62.3 | 1.60 | 14.0 | 75.7 4/ | .42 | 13.3 | 60.4 | $2\frac{5}{8}$ Q | S | 1020 | 964 |
| Gage/Tx65A1682 | IL72-2489 | 59.4 | 1.53 | 13.9 | 75.0 4/ | .41 | 12.6 | 61.7 | 3 Q | S | 989 | 982 |
| | NAPB 1307-76 | 61.8 | 1.60 | 13.3 | 75.4 4/ | .41 | 12.0 | 59.9 | $4\frac{1}{2}$ | S | 978 | 1016 6/ |
| | NAPB 1286-76 | 60.6 | 1.55 | 14.1 | 73.7 5/ | .42 | 12.6 | 63.2 | $5\frac{3}{8}$ | S | 1069 | 1061 |
| | NAPB 1291-76 | 60.3 | 1.54 | 13.7 | 75.7 4/ | .43 | 12.4 | 60.8 | $8\frac{3}{4}$ U | S | 1002 | 1009 |
| | NAPB 1289-76 | 61.0 | 1.57 | 13.8 | 75.6 4/ | .43 | 12.7 | 62.6 | $6\frac{3}{4}$ Q-U | S | 991 | 977 |

1/ Chemical data expressed on a 14% moisture basis.

2/ 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, in general, characterizes a variety as undesirable for hard wheat milling and breadmaking purposes. Crumb colors were satisfactory for all entries.

3/ Mixing time used in baking is evaluated in conjunction with other mixing properties obtained from the 10-g. mixogram.

4/ Softer than average hard wheat milling properties but entirely satisfactory.

5/ Questionable hard wheat milling properties--softer than normal.

6/ Promising overall quality characteristics.

7/ Particularly promising overall quality characteristics.



7900079

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Livestock, Poultry, Grain & Seed Division
National Agricultural Library
Beltsville, Maryland 20705

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 7900079
Variety and Kind - **'Bennett' hard red winter wheat**

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on each Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived.

It has been agreed that the certificate should be issued in the name(s) of:

**Nebraska Agricultural Experiment Station**

8/1/79
(Date)

Howard W. Ottoson
(Signature)
Dean and Director
Nebraska Agricultural Experiment Station

79-39

Seed Regulatory & Testing Branch
USDA, AMS, Livestock & Seed Division
Building 506, BARC-East
Beltsville, Maryland 20705
(301) 344 4430

12 SEP 1989

Larry Johnson
Route 3, Box 80
Quinter, Kansas 67752

In reply refer to:
FSA 89-0947

Dear Mr. Johnson:

We have information that you advertised, by variety name, uncertified seed of the Bennett variety of wheat.

Bennett is a variety protected under the Plant Variety Protection Act. The certificate of Plant Variety Protection for this variety indicates that the seed shall not be sold by variety name unless it is certified seed. Under Federal law, Title V of the Federal Seed Act, it is illegal to sell or offer for sale or advertise Bennett by variety name unless the seed is certified.

This warning is issued under Section 412 of the Federal Seed Act which provides that in certain circumstances a suitable warning may be issued instead of other action.

In addition to complying with the Federal Seed Act, persons handling seed of any protected variety are urged to exercise care to avoid infringing rights granted under Section III of the Plant Variety Protection Act.

Sincerely,

Stephen J. Nurst
Seed Marketing Specialist
Seed Regulatory and Testing Branch
Livestock and Seed Division

bcc: S. Bangert (KS)
✓K. Evans (PVPO)