No. 7200138

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Cal-West Seeds, Inc.

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, IMPORTING 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 (7 U.S.C. 2541, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

AGROTRICUM

'W-21'

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* 15th *day of* November *in the year of our Lord one thousand nine hundred and* seventy-four

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(2-12-71)

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

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION W-21	2. KIND NAME Agrotricum	FOR OFFICIAL USE ONLY PVPO NUMBER 72138
3. GENUS AND SPECIES NAME Triticum vulgare x Agropyron elongatum	4. FAMILY NAME *(Botanical)* Gramineae 5. DATE OF DETERMINATION July, 1965	FILING DATE 5/10/72 TIME 10:45 A.M. FEE RECEIVED $750 CHARGES
6. NAME OF APPLICANT(S) Cal/West Seeds, Inc.	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)* P.O. Box 1428 Woodland, California 95695	8. TELEPHONE AREA CODE AND NUMBER 916-662-1763
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)* Cooperative	10. STATE OF INCORPORATION California	11. DATE OF INCORPORATION July 26, 194

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

I. J. Johnson, Research Director
Cal/West Seeds
P.O. Box 1428
Woodland, California 95695

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 12A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52, P.L. 91-577)*

[X] 12B. Exhibit B, Botanical Description of the Variety

[X] 12C. Exhibit C, Objective Description of the Variety

[X] 12D. Exhibit D, Data Indicative of Novelty

[X] 12E. Exhibit E, Statement of the Basis of Applicant's Ownership

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable. *(See Section 52, P.L. 91-577).*

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), P.L. 91-577) (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

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

14C. If "Yes," to 14B, how many generations of production beyond breeder seed?

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes 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 (P.L. 91-577).

(DATE) (SIGNATURE OF APPLICANT)

(DATE) (SIGNATURE OF APPLICANT)

FORM GR-470 (REVERSE)

U. S. DEPARTMENT OF AGRICULTURE
RECEIVED
MAY 1972
GRAIN DIVISION

INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $50.00 fee to U.S. Dept. of Agriculture, Consumer and Marketing Service, Grain Division, Hyattsville, Maryland 20782. Retain one copy for your files. All items on the face of the form are self-explanatory unles noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety.

12a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

12b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

12c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

12d Provide complete data indicative of novelty. Seed and plant specimens may be submitted and seeds submitted may be sterile. Where possible, include photographs of plant comparisons, chemical tests, etc.

12e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

AGROTRICUM VARIETY W-21

CAL/WEST SEEDS

EXHIBIT A

ORIGIN and BREEDING HISTORY

In 1961, Dr. C. A. Suneson, then Research Agronomist, U. S. Department of Agriculture and the California Agricultural Experiment Station, University of California at Davis offered seed of a bulk population from crosses between Triticum species and Agropyron species to Caladino Farm Seeds, Inc. (now Cal/West Seeds, Inc.) designated as CAS 10180. This bulk population was labelled as Triticum X Agropyron bulk. The description of the characteristics of this and other bulk populations are reported in the attached reprint from Crop Science 3:437-439, 1963. Pencilled notations on this reprint made by Dr. C. S. Qualset, (wheat breeder succeeding Dr. Suneson) give added explanations for these populations. As documented in the reprint, these bulk populations date to crosses made in 1946 with chromosome doubling with colchicine. These populations were maintained without pedigree selection and hence represent a broadbase germ plasm pool for subsequent pure line selection to extract true breeding lines.

In fall, 1962, when Cal/West had established its present research headquarters at Woodland, California seed of this bulk population was thinly seeded in 12 inch rows on approximately one-tenth acre of land with the objective of selecting individual plants superior in both forage and grain characteristics at the end of their second year growth in 1964. This background also was recorded in the 1966-1967 Planting Plan, copy attached.

In July, 1964, a single head was selected from each of 130 plants in this bulk population. The progeny rows from seed of these selections was planted in February, 1965. As would be expected on the basis of the number of generations since the crosses were made (F_{16} generation), each progeny row was phenotypically uniform and hence seed was harvested in bulk within each progeny row. On the basis of summer recovery notes after grain harvest in 1965, on winter forage growth in 1965-66 and further observation on summer survival after grain harvest in 1966, a total of 24 lines were chosen for an expanded testing program established at Woodland in December, 1966. (See copy of attached Planting Plan). Among these 24 lines there were wide differences in heading date, plant height, grain yields and summer recovery. The entry W-21 originating from the progeny row 5-12 in 1965 had the best combination of grain yields, summer recovery after grain harvest and forage growth during the rainy winter months.

Seed of W-21 and of other Agrotricum selections was provided to the Texas Agricultural Experiment Station at Bushland for evaluation of their possible use for winter grazing. These selections also were utilized by the Texas Agricultural Experiment Station as parents in crosses, as shown in the attached copy of the release statement for seed of these crosses.

In summary, W-21, is a pure line selection initially derived from a bulk population (CAS 10180) produced by the U.S. Department of Agriculture and the California Agricultural Experiment Station, Davis, California from crosses between species of Triticum and Agropyron and released to Cal/West Seeds in 1961. From this bulk population Cal/West Seeds selected and evaluated progenies dating from stands planted in 1962.

The selection designated W-21 is one of 130 original selections made in the F_{16} generation of the bulk population. It was determined to be a pure line variety in July, 1965.

The chromosome number of W-21 has been determined as $2^n=56$ and one of its parents is a hexaploid (42 chromosome) wheat. The other parent is a $2^n=14$ chromosome Agropyron, such as Agropyron elongatum, (See attached copy of letter from Dr. Kenneth Porter).

With 28 pairs of chromosomes there should be no abberant pairing, an important factor in genetic stability.

72138

CAL/WEST Seeds
P.O. Box 1428 • Woodland, California 95695 • Phone (916) 662-1763

December 27, 1973

Kenneth H. Evans, Examiner
Plant Variety Protection Office
Grain Division
USDA - Agricultural Marketing Service
6525 Belcrest Road
Hyattsville, Maryland 20782

Dear Mr. Evans:

I have purposely delayed in replying to your letter relative to our application No. 72138 W-21 Agrotricum since I was not exactly sure what you had in mind in making this request.

As indicated in our application, W-21 Agrotricum is a pure line selection tracing to an individual plant from a bulk population in approximately the F_{12} generation. Consequently, the progenies from this individual plant must be almost completely homozygous. There has been no evidence for variance in the reproduction of this variety and hence I cannot answer your question giving the type and frequency of variance except to state there has been no variance observed in the progeny of this particular line. I therefore would conclude by saying this is a stable line as would be expected on the basis of its background of breeding.

Very sincerely,

I. J. Johnson/gs

I. J. Johnson
Research Director

IJJ/gms

4

AGROTRICUM VARIETY W-21

CAL/WEST SEEDS

EXHIBIT B

BOTANICAL DESCRIPTION

As shown in Exhibit A, W-21 Agrotricum resulted from pure line selection out of a bulk population released by Dr. Suneson, Research Agronomist, USDA and the California Agricultural Experiment Station, Davis, California. Also shown in Exhibit A is evidence that the chromosome number of W-21 is 28 pairs (2^n=56), indicating its parentage was a hexaploid Triticum vulgare and a diploid Agropyron elongatum.

In developing the objective description for W-21 Agrotricum (see Exhibit C) the descriptive nomenclature for the classification of Triticum as given in Technical Bulletin 1278, Agricultural Research Service, U.S. Department of Agriculture, by L. W. Briggle and L. P. Reitz (1963) did not always clearly apply to this application. These deviations are noted here:

1 - Stem Characteristics

Hairs of the last internode of the rachis are present but very scanty and only on the edges of the nodes. The nodes of W-21 are distinct in having a reddish-brown color with a grayish-black pigmentation immediately below the node. Typical stems showing this characteristic have been supplied.

2 - Auricles

Although anthocyanin pigment is recorded as absent, there is a very faint presence which, for wheat varieties, perhaps would be considered as "absent". Hairs on the auricles are recorded as present, but are so few that they might (in wheat) be more nearly classified as absent. It would appear that the botanical description of the auricles of Agrotricum W-21 is intermediate between present or absent -- a difficult classification.

3 - Seed

The shape of the cheek is more closely related to the classical winter wheat rounded than to the spring wheat angular form. Although the majority of the seeds thresh free from their lemma and palea, on some grains they tend to partially adhere. Threshing characteristics of W-21 are distinctly more wheat-like than Agropyron-like. From the sample of seed submitted it is evident that the grain is larger and more slender than most winter wheat types.

Growth Habit:

Agrotricum W-21 is considered to be a perennial. Seedings made in fall, 1969, have produced grain crops in 1970, 1971 and a good stand persists for a grain harvest in 1972. As noted in Exhibit C, heading date is about 30 days later than wheat varieties when seeded in December -- a normal date in the Sacramento Valley. Second and third year stands usually head two weeks earlier than first year stands.

Following grain harvest in July, Agrotricum W-21 should be irrigated, since rainfall normally is absent from April to October in the Sacramento Valley. A second, but small, grain crop can be harvested in late September. In this respect W-21 differs from the bulk population as described by Suneson, Sharkawy and Hall (see reprint). Winter growth with normal winter rains is excellent, usually 12-18 inches of leafy growth from October to March. Plants are non-stoloniferous, as would be expected from its parentage.

Disease and Insect Resistance:

Under natural infestation there has been no foliar or head diseases eveident on W-21 since 1965. Since there have been no controlled infestation studies with the specific diseases named in Exhibit C, we have recorded "zero" for their reaction. As noted by Suneson, Sharkawy and Hall, the bulk population from which W-21 was selected "harbors most wheat diseases but has never been overcome by any of them at Davis".

Summary of Botanical Classification
(Following the classification for Common Wheats)

Spikes awned
Glumes white
Kernels red
Kernels long
Kernels hard
Perennial habit
Spike oblong
Plant late
Beaks acuminate
Shoulders square

FORM GR-470-3
(9-1-72)

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

EXHIBIT C
(Agrotricum)

OBJECTIVE DESCRIPTION OF VARIETY
AGROTRICUM

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S): Cal/West Seeds

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*: P.O. Box 1428, Woodland, Ca. 95695

FOR OFFICIAL USE ONLY
PVPO NUMBER: 72138
VARIETY NAME OR TEMPORARY DESIGNATION: W-21

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. TYPE:

[1] 1 = WHEAT-LIKE 2 = GRASS-LIKE

2. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[1][8][5] FIRST FLOWERING [1][9][2] LAST FLOWERING

3. MATURITY:

[ ][ ] NO. OF DAYS *EARLIER* THAN . . . . . [ ]
[3][0] NO. OF DAYS *LATER* THAN. . . . . [8]

WHEAT VARIETIES
1 = CHEYENNE 2 = ARTHUR 3 = SCOUT
4 = CHRIS 5 = LEMHI 6 = NUGAINES
7 = LEEDS 8 = OTHER *(Specify)* Inia 66

4. PLANT HEIGHT *(From soil level to top of head):*

[1][2][2] CM. HIGH

[ ][ ] CM. SHORTER THAN . . . . . [ ]
[2][5] CM. TALLER THAN. . . . . [8]

WHEAT VARIETIES
1 = CHEYENNE 2 = ARTHUR 3 = SCOUT
4 = CHRIS 5 = LEMHI 6 = NUGAINES
7 = LEEDS 8 = OTHER *(Specify)* Inia 66

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

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

6. ANTHER COLOR: 1 = YELLOW 2 = PURPLE

[1] 3 = OTHER *(Specify)* _____

7. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

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

[2] Hairiness of Last Internode of Rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][5] NUMBER OF NODES *(Originating from node above ground)*

[2][7] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

8. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT

9. LEAF:

[1] Hairs of First Leaf Sheath: 1 = ABSENT 2 = PRESENT

[1] Leaf Texture: 1 = SMOOTH 2 = ROUGH

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

[3][3] CM. LEAF LENGTH *(First leaf below flag leaf)*

[2] Waxy Bloom of Flag Leaf Sheath: 1 = ABSENT 2 = PRESENT

10. HEADS:

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

[1][9] CM. HEAD LENGTH

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

[1] Color at Maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
5 = BRONZE 6 = BROWN 7 = BLACK 8 = OTHER *(Specify)* _____

Application No. 72138
Agrotricum - 'W-21'

'W-21' is the only 56 chromosome variety of agrotricum with the following characteristics: 'W-21' is 30 days later and 25 cm. taller than 'Inia 66' wheat. The stems lack anthocyanin and waxy bloom. The internodes are hollow. The leaves are smooth and green in color. There is waxy bloom on the flag leaf and no hairs on the first leaf sheath. The heads are white, lax, and parallel. The glumes are long and narrow with square shoulders and acuminate beak. The coleoptile is purple in color. The seeds are elliptical and ~~amber~~ white with rounded cheeks, small short brush, and small embryos.

(Signature)

AGROTRICUM VARIETY W-21

CAL/WEST SEEDS

EXHIBIT D

DATA INDICATIVE OF NOVELTY

It is not possible to compare Agrotricum W-21 with other Agrotricum varieties, since no other varieties, to the knowledge of the applicant, are available in commercial seed channels. Comparison of W-21 with varieties of Triticum is not pertinent since Agrotricum and Triticum are not of the same kind.

Because Agrotricums are a relatively new kind of crop, the applicant has submitted the following specimens:

1. Spikes at maturity
2. Spikes at anthesis
3. Stems to show node color and pigmentation below the node
4. Grain sample

Since Agrotricums have originated from hybrids between several species of Triticum and Agropyron followed (usually) by chromosome doubling, there can be wide differences among them depending on parental varieties of Triticum and on species and specific plants used as parents from Agropyron. As noted by Suneson, Sharkawy and Hall (see reprint) the introgressing population from which W-21 was selected was a highly variable population. The pure line W-21 chosen from it is therefore only one of many lines that could have been selected. Agronomically, W-21 was one of the best selections from 130 lines initially evaluated from the bulk population CAS 10180.

AGROTRICUM VARIETY W-21

CAL/WEST SEEDS

EXHIBIT E

STATEMENT OF APPLICANT'S OWNERSHIP

Documents have been attached to show:

1. That the bulk population CAS 10180 was made available to the public. (see summary statement of attached reprint)

2. That Agrotricum W-21 was made available for experimental purposes to the Texas Agricultural Experiment Station by Cal/West Seeds and used by them as one of the parents in crosses with male sterile Concho and Sturdy wheats (see attached release statement).

3. That W-21 was one of 24 selections evaluated in replicated yield trials at Woodland, California by the applicant in 1966 and originated in 1965 from progeny row 5-12.
   (see copy of Planting Plan attached)

This exhibit also is to certify that Cal/West Seeds, Inc. is the owner of the variety of Agrotricum and that I. J. Johnson, its Research Director, made the initial plant selections from the bulk population CAS 10180 (previously described) in 1964 and determined that W-21 was a true breeding pure line in July, 1965. The progeny row 5-12 in 1965 has been designated W-21 since 1966.

11. GLUMES AT MATURITY:

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

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

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

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

12. COLEOPTILE COLOR:

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

13. SEEDLING ANTHOCYANIN:

[0] 1 = ABSENT 2 = PRESENT

14. JUVENILE PLANT GROWTH HABIT:

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

15. SEED:

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

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[1] Brush Size: 1 = SHORT 2 = MEDIUM 3 = LONG

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

[1] Brush Area: 1 = SMALL 2 = MEDIUM 3 = LARGE

[1] Embryo Size: 1 = SMALL 2 = MEDIUM 3 = LARGE

[0] Phenol Reaction: 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

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

[0 8] MM. LONG [0 3] MM. WIDE [3 4] GM. PER 1000 SEEDS

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

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

[0] POWDERY MILDEW [0] BUNT [ ] OTHER *(Specify)* _____

17. 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: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

18. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering		Seed size	
Plant carriage		Seed shape	
Leaf color		Coleoptile elongation	
Leaf carriage		Coleoptile pigmentation	
Leaf width		Root structure	

*Letter of June 5, 1974

INSTRUCTIONS

GENERAL: Foliage characteristics should be recorded at the booting stage of the plant.

The following publications may be used as a reference aid for completing this form:

(a) E. L. Smith, E. E. Sebesta, A. M. Schlehuber, and H. C. Young, Jr., 1960, Association of Certain Characters in a Collection of Wheat and Wheat Grass Hybrids, Technical Bulletin T-82, Oklahoma State University.

(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.

(c) 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.

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