No. 200600007

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Texas 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 [illegible]PORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE [illegible]VE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE [illegible]OSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT [illegible]ED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY [illegible]E SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE N[illegible] GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SE[illegible]

*TRITICALE*

*'TAMcale 5019'*

*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 fourteenth day of February, in the year two thousand and six.*

*Attest:*

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

*Secretary of Agriculture*

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

**U.S. DEPARTMENT OF AGRICULTURE**
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**
*(Instructions and information collection burden statement on reverse)*

*The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.*

*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 OWNER
Texas Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
TX96VT5019

3. VARIETY NAME
TAMcale 5019

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Dr. Mark A. Hussey
Associate Director, TAES
2147 TAMU
College Station, TX 77843-2147

5. TELEPHONE *(include area code)*
(979) 845-4747

6. FAX *(include area code)*
(979) 458-4765

FOR OFFICIAL USE ONLY
PVPO NUMBER
200600007
FILING DATE
October 11, 2005

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
State of Texas Research Agency

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Janie Hurley
Technology Licensing Manager, Agriculture/Life Sciences
Technology Licensing Office
The Texas A&M University System
3369 TAMU
College Station, TX 77843-3369

FEES RECEIVED
FILING AND EXAMINATION FEES: $ 3652.00
DATE 10/11/2005
CERTIFICATION FEE: $ 768.00
DATE 01/19/2006

11. TELEPHONE *(Include area code)*
(979) 847-8682

12. FAX *(Include area code)*
(979) 845-1402

13. E-MAIL
jhurley@tamu.edu

14. CROP KIND *(Common Name)*
Triticale

16. FAMILY NAME *(Botanical)*
*Poaceae*

15. GENUS AND SPECIES NAME OF CROP
x Triticosecale Wittmack

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☑ NO

18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (*OPTIONAL*)
☐ YES ☑ NO
IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERICALIZATION. _____

19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED
(Follow instructions on reverse)
a. ☑ Exhibit A. Origin and Breeding History of the Variety
b. ☑ Exhibit B. Statement of Distinctness
c. ☑ Exhibit C. Objective Description of Variety
d. ☑ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☑ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☑ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☑ Filing and Examination Fee ($3,652), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*
☑ YES *(If "yes", answer items 21 and 22 below)* ☐ NO *(If "no", go to item 23)*

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES?
☑ YES ☐ NO
IF YES, WHICH CLASSES? [3] FOUNDATION [5] REGISTERED [7] CERTIFIED

22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☑ YES ☐ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
[3] FOUNDATION [5] REGISTERED [7] CERTIFIED
*(If additional explanation is necessary, please use the space indicated on the reverse.)*

23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☑ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☑ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

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

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

| SIGNATURE OF OWNER | | SIGNATURE OF OWNER | |
|---|---|---|---|
| NAME *(Please print or type)* Mark A. Hussey | | NAME *(Please print or type)* | |
| CAPACITY OR TITLE Associate Director, TAES | DATE 10/06/05 | CAPACITY OR TITLE | DATE |

*(See reverse for instructions and information collection burden statement)*

ST-470 (04-03) designed by the Plant Variety Protection Office using Word 2002.

INSTRUCTIONS

**GENERAL:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $3,652 ($432 filing fee and $3,220 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office**
**Telephone: (301) 504-5518**
**FAX: (301) 504-5291**
**Homepage:** http://www.ams.usda.gov/science/pvpo/pvpindex.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 http://www.ams.usda.gov/lsg/seed.htm.

**ITEM**

19a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety 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 are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

20. 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 this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

23. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

24. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

**22. CONTINUED FROM FRONT** *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

**23. CONTINUED FROM FRONT** *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

October 15, 2004 - Date of first sale of seed of 'TAMcale 5019' for commercial purposes (U.S.A.).

**24. CONTINUED FROM FRONT** *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

*According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours 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.*

*The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).*

*To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.*



ST-470 (04-03) designed by the Plant Variety Protection Office using Word 2002.

# Exhibit A

## Origin and Breeding History

'TAMcale 5019' (experimental designation TX96VT5019) is a dual-purpose winter triticale (× *Triticosecale* Wittmack). 'TAMcale 5019' is awned, white-glumed, and has good potential for both forage and grain production in the southern Great Plains.

'TAMcale 5019' is an $F_4$ derived line from the three-parent cross OAC Decade/NE86T637//NE86T653. Stephen Baenziger made the cross during the winter of 1989-90 and shared the $F_2$ bulk with David Worrall, Texas Agricultural Experiment Station (TAES) at Vernon, Texas, in 1992. OAC Decade is a spring triticale cultivar released from the Ontario Agriculture College. NE86T637 and NE86T653 are both experimental winter triticale lines from Dr. Baenziger's program. The $F_3$ and $F_4$ generations were grown as bulk populations on the TAES farm at Chillicothe in 1993 (year of harvest) and 1994, respectively. Random heads were harvested from the $F_4$ population and were planted as head-rows at Chillicothe in the fall of 1994. The line that became TX96VT5019 was visually selected for its forage potential and was grown as a single plot in 1996 and in replicated trials thereafter. The selection criteria were forage potential and grain yield. TAES, through its Texas Foundation Seed Service, increased TX96VT5019 in 2002 and 2003.

'TAMcale 5019' has been observed for 7 generations during testing and seed increase, and is stable and uniform. No variants have been observed.

**Exhibit B**

**Statement of Distinctness**

'TAMcale 5019' is awned, white-glumed, and has good potential for both forage and grain production in the southern Great Plains. It is medium height, medium-late maturing, and has winter hardiness similar to most commonly grown hard winter wheat cultivars. It has been extensively tested in the Rolling Plains of Texas and, based on field observations, is resistant to the prevalent races of leaf rust and stripe rust.

'TAMcale 5019' is most similar to 'Presto' triticale. Supporting data is attached in Tables 1 and 2. Agronomic data presented are from individual years at each location. Yield data contains the individual figures for each variety at each location in each year and 3-yr means. The distinct differences between 'TAMcale 5019' and 'Presto' are: (i) the flag leaf of 'TAMcale 5019' is twisted whereas the flag leaf of 'Presto' is not, (ii) the leaf carriage of 'TAMcale 5019' is recurved and the leaves of 'Presto' are drooping. The glumes of 'TAMcale 5019' are glabrous with a wanting shoulder and an acuminate beak and the glumes of 'Presto' are slightly pubescent with a rounded shoulder and an acute beak. These differences are documented in the attached objective description form for 'Presto'.

*Other Plant Characteristics:* The heading date of TAMcale 5019 at Chillicothe was similar to Lockett wheat (Table 1), but slightly earlier than Trical 102. This medium-late maturity is considered good for spring forage production and is still satisfactory for grain production. Plant height is less than the forage triticale cultivars, Hartman, Tallman, Trical 102, and Trical 2700 (Tables 1 and 2), and greater than Lockett wheat. No lodging was observed at the sites tested. Winter survival has been good at the sites tested, but data from locations with more severe winters is not available.

Table 1. Yield and Agronomic data from the Uniform Triticale Elite trial conducted during 2001-2003 at Chillicothe, Texas.

| *Lines/cultivar* | *Grain Yield* ----------*bu/a*---------- | | | | *Test Weight*[1] *(lbs/bu)* | *Height*[2] *(cm)* | *Heading*[3] *(DOY)* | *Forage Yield*[4] *(lbs/a)* |
|---|---|---|---|---|---|---|---|---|
| | *2001* | *2002* | *2003* | *Average* | | | | |
| Lockett* | 36.3 | 43.0 | 29.7 | 36.3 | 56.3 | 63 | 107 | 1264 |
| Chron | 30.2 | 43.8 | 30.4 | 34.8 | 51.3 | 79 | 108 | 2437 |
| G75008 | 34.0 | 41.5 | 41.7 | 39.1 | 54.7 | 83 | 102 | 1686 |
| G75012 | 32.1 | 45.7 | 37.5 | 38.4 | 54.5 | 90 | 102 | 1583 |
| Hartman | 30.4 | 37.8 | 22.8 | 30.3 | 50.2 | 97 | 110 | 1904 |
| **Presto** | **36.9** | **45.9** | **34.8** | **39.2** | **50.8** | **85** | **107** | **2148** |
| Tallman | 22.6 | 42.6 | 16.4 | 27.2 | 48.7 | 101 | 111 | 1856 |
| Trical 102 | 21.0 | 50.9 | 29.5 | 33.8 | 48.8 | 98 | 111 | 1731 |
| Trical 2700 | 37.7 | 38.6 | 28.1 | 34.8 | 50.8 | 96 | 109 | 2983 |
| Vero | 37.5 | 37.1 | 36.3 | 37.0 | 50.7 | 91 | 108 | 2580 |
| TX94D5792 | 39.1 | 44.3 | 33.2 | 38.9 | 51.3 | 84 | 107 | 1976 |
| TX94D7575 | 42.0 | 44.2 | 37.4 | 41.2 | 51.7 | 78 | 107 | 2166 |
| TX96D2433 | 30.7 | 45.7 | 35.5 | 37.3 | 49.4 | 74 | 106 | 2054 |
| TX97D6942 | 34.4 | 55.2 | 35.1 | 41.6 | 51.7 | 81 | 107 | 1497 |
| TX97D6943 | 26.2 | 40.4 | 34.4 | 33.7 | 50.4 | 82 | 107 | 2027 |
| TX97D6947 | 34.0 | 45.5 | 28.9 | 36.2 | 52.5 | 84 | 109 | 1967 |
| TX97D6957 | 28.8 | 42.7 | 31.3 | 34.3 | 52.6 | 76 | 111 | 1931 |
| TX98D920 | 36.4 | 43.5 | 37.6 | 39.2 | 51.5 | 90 | 105 | 2677 |
| TX98D924 | 35.4 | 45.1 | 35.0 | 38.5 | 51.9 | 82 | 107 | 1749 |
| TX98D955 | 40.0 | 44.1 | 34.8 | 39.6 | 51.6 | 80 | 107 | 1798 |
| TX99D4701 | 33.1 | 43.2 | 35.6 | 37.3 | 52.0 | 82 | 107 | 2657 |
| TX99D4702 | 36.2 | 45.9 | 35.1 | 39.1 | 52.5 | 81 | 106 | 2022 |
| **TX96VT5019** | **35.6** | **45.3** | **35.2** | **38.7** | **50.7** | **86** | **107** | **2231** |
| TX94VT6331 | 37.3 | 40.0 | 36.7 | 38.0 | 51.2 | 85 | 107 | 2407 |
| TX97VT8207 | 39.9 | 40.3 | 38.1 | 39.4 | 53.0 | 85 | 107 | 2165 |
| TX98VT8631 | 40.7 | 47.2 | 35.9 | 41.3 | 51.4 | 85 | 107 | 2341 |
| TX98VT8633 | 40.2 | 36.4 | 39.4 | 38.7 | 50.3 | 82 | 107 | 1249 |
| TX99VT3507 | 19.2 | 41.3 | 37.2 | 32.6 | 50.1 | 86 | 105 | 1869 |
| TX99VT3721 | 41.0 | 42.2 | 44.7 | 42.6 | 52.1 | 83 | 106 | 2672 |
| TX99VT3737 | 44.1 | 48.3 | 45.1 | 45.8 | 51.6 | 89 | 107 | 1932 |
| TX99VT3916 | 40.9 | 48.0 | 38.9 | 42.6 | 51.7 | 83 | 107 | 1793 |
| TX99VT3917 | 44.1 | 46.2 | 38.9 | 43.1 | 52.9 | 81 | 107 | 1676 |
| **Grand Mean** | 34.2 | 43.9 | 34.3 | 38.0 | 51.4 | 83.9 | 106.6 | 2111.1 |
| **LSD (5%)** | 10.2 | 13.8 | 7.4 | | | 6.7 | 1.4 | 928.5 |
| CV (%) | 18.3 | 19.4 | 13.2 | | | 4.9 | 0.8 | 27.1 |

* Hard Red Winter Wheat
[1] Three year average
[2] 2003 data
[3] 2003 data; DOY= Day of the Year, starting from January 1
[4] 2003 data; forage clipping date= 3/4/03

Table 2. Yield and agronomic data from the Uniform Triticale Elite trial conducted during 2002 at Bushland, Texas.

| *Line/cultivar* | *Grain Yield (bu/a)* | *Test Weight (lbs/bu)* | *Height (cm)* |
|---|---|---|---|
| Lockett[1] | 15.6 | 54.6 | 40 |
| Elbon[2] | 10.1 | 54.4 | 68 |
| Chron | 8.8 | 49.8 | 55 |
| G75008 | 19.2 | 51.5 | 59 |
| G75012 | 17.8 | 49.6 | 65 |
| Hartman | 8.8 | 50.3 | 70 |
| **Presto** | **14.9** | **52.2** | **72** |
| Tallman | 2.7 | 29.6 | 68 |
| Trical 102 | 7.1 | 49.1 | 74 |
| Trical 2700 | 6.5 | 47.0 | 70 |
| Vero | 11.0 | 48.9 | 65 |
| TX94D5792 | 12.8 | 50.6 | 64 |
| TX94D7575 | 12.3 | 50.8 | 60 |
| TX96D2433 | 12.3 | 46.1 | 52 |
| TX97D6942 | 9.9 | 51.2 | 61 |
| TX97D6943 | 10.3 | 50.9 | 60 |
| TX97D6947 | 8.5 | 50.2 | 62 |
| TX97D6957 | 12.7 | 50.3 | 52 |
| TX98D920 | 13.9 | 49.4 | 62 |
| TX98D924 | 11.7 | 50.9 | 66 |
| TX98D955 | 12.5 | 50.9 | 63 |
| TX99D4701 | 11.9 | 50.9 | 57 |
| TX99D4702 | 12.3 | 50.6 | 60 |
| TX01D064 | 11.7 | 50.5 | 64 |
| TX01D069 | 10.3 | 47.2 | 53 |
| TX01D072 | 10.6 | 47.5 | 54 |
| TX01D075 | 13.1 | 48.2 | 60 |
| TX01D077 | 12.0 | 48.8 | 56 |
| **TX96VT5019** | **15.9** | **50.6** | **61** |
| TX94VT6331 | 13.8 | 47.7 | 62 |
| TX97VT8207 | 13.6 | 52.0 | 70 |
| TX98VT8631 | 12.8 | 51.0 | 62 |
| TX98VT8633 | 13.2 | 51.0 | 63 |
| TX99VT3507 | 17.1 | 52.3 | 66 |
| TX99VT3509 | 12.7 | 50.1 | 63 |
| TX99VT3720 | 17.7 | 50.8 | 60 |
| TX99VT3721 | 16.3 | 51.0 | 65 |
| TX99VT3737 | 16.1 | 50.8 | 68 |
| TX99VT3916 | 15.5 | 52.0 | 63 |
| TX99VT3917 | 14.9 | 50.9 | 70 |
| **Grand Mean** | 12.5 | 49.8 | 62.1 |
| **LSD (5%)** | 2.7 | | 7.7 |
| CV (%) | 13.1 | | 7.6 |

[1] Hard Red Winter Wheat
[2] Rye

6

FORM APPROVED: OMB NO. 40-R3712

FORM GR-470-33
(8/75)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
BELTSVILLE, MARYLAND 20705

**EXHIBIT C**
(Triticale)

# OBJECTIVE DESCRIPTION OF VARIETY
# TRITICALE

| NAME OF APPLICANT(S) | VARIETY NAME OR TEMPORARY DESIGNATION |
|---|---|
| Texas Agricultural Experiment Station | TAMcale 5019 |
| ADDRESS (Street and No., or F.F.D. No., City, State, and Zip Code) | **FOR OFFICIAL USE ONLY** |
| 2147 TAMU, College Station, TX 77843-2147 | PVPO NUMBER 20060007 |

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. GROWTH HABIT:**

[3] 1 = SPRING 2 = INTERMEDIATE 3 = WINTER

[2] Juvenile Plant Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

[ ] Photoperiod: 1 = INSENSITIVE 2 = SENSITIVE

**2. PLOIDY:**

[1] 1 = HEXAPLOID 2 = OCTOPLOID 3 = OTHER (Specify) _____

[4][2] 2n CHROMOSOME NUMBER

**3. MATURITY (50% Flowering):**

[3] 1 = VERY EARLY 2 = EARLY 3 = MIDSEASON 4 = LATE 5 = VERY LATE

[0][4] DAYS EARLIER THAN..... [2]

[0][0] DAYS LATER THAN ..... [1]

1 = Lockett winter wheat 2 = Trical 102 3 =
4 = 5 =

**4. HEIGHT:**

[0][8][6] CM. HIGH

[1][2] CM SHORTER THAN.....

[2][3] CM. TALLER THAN.....

[4] 1 = DWARF 2 = SEMIDWARF 3 = SHORT
4 = MIDTALL 5 = TALL

[2] [1] 1 = Lockett winter wheat 2 = Trical 102 3 =
4 = 5 =

**5. PLANT COLOR AT BOOT STAGE:**

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

**6. STEM:**

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[4] Neck Hairiness: 1 = NONE 2 = SLIGHT 3 = MODERATE 4 = HEAVY

[1] Shape of Neck 1 = STRAIGHT 2 = WAVY 3 = OTHER (Specify) _____

**7. LEAVES:**

[2] Flag Leaf: 1 = NOT TWISTED 2 = TWISTED

[2] Waxy Bloom on Leaf at Boot: 1 = ABSENT 2 = PRESENT

[2] Leaf Carriage: 1 = UPRIGHT 2 = RECURVED 3 = DROOPING

[2][8] CM. LEAF LENGTH: 1st Leaf Below Flag Leaf

[2][4] MM. LEAF WIDTH: 1ST Leaf Below Flag Leaf

[1] Auricle Color: 1 = COLORLESS OR WHITE 2 = PURPLE 3 = OTHER (Specify) _____

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**8. HEAD:**

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

[1] Shape: 1 = FUSIFORM 2 = OBLONG 3 = CLAVATE 4 = ELLIPTICAL 5 = OTHER (Specify) _____

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

[1] Awn Color: 1 = WHITE 2 = YELLOW 3 = TAN 4 = BROWN 5 = BLACK

[1][0] CM. HEAD LENGTH [0][9] MM. HEAD WIDTH

**9. GLUMES AT MATURITY:**

[1] Pubescence: 1 = GLABROUS 2 = SLIGHTLY PUBESCENT 3 = PUBESCENT

[1] Color: 1 = WHITE 2 = YELLOW 3 = TAN 4 = BROWN 5 = BLACK

[3] Length: 1 = SHORT 2 = MIDLONG 3 = LONG [2] Width: 1 = NARROW 2 = MIDWIDE 3 = WIDE

[1] Shoulder: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE [3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

**10. COLEOPTILE COLOR:**

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

**11. SEED:**

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

[2] Smoothness: 1 = SMOOTH 2 = SLIGHTLY WRINKLED 3 = WRINKLED

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

[2] Brush Length: 1 = SHORT 2 = MIDLONG 3 = LONG

[ ] Phenol Reaction: 1 = IVORY 2 = FAWN 3 = LIGHT BROWN 4 = BROWN 5 = BROWN BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = BLACK 6 OTHER (Specify) _____

[3][3] GMS. PER 1,000 SEED

**12. DISEASE (0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Tolerant):**

[0] STEM RUST (Races) _____

[2] STRIPE RUST (Race) Field prevalent

[0] POWDERY MILDEW _____

[0] SEPTORIA

[ ] OTHER (Specify) _____

[2] LEAF RUST (Races) Field prevalent

[0] ERGOT

[0] BACTERIAL STRIPE

[0] YELLOW DWARF

[ ] OTHER (Specify) _____

**13. INSECT (0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Tolerant):**

[0] GREENBUG

[0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACE:

[0] GP [0] A [0] B [0] C

[0] D [0] E [0] F [0] G

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**14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:**

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| CHARACTER | VARIETY |
|---|---|
| PLANT TILLERING | Presto |
| WINTER HARDINESS | Presto |
| AREA OF ADAPTATION | Presto |
| SEED SHAPE | Presto |

## REFERENCES:

L.W. Briggle and L.P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, USDA.

W.E. Walls, 1965, A Standaridized 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 Analysis.

## COMMENTS:

Head carriage at maturity: Majority of heads are angled 30-45° (0° = upright head).

# Exhibit D

## Additional Description of Variety

*Yield:* TAMcale 5019 has been tested in the TAMU Uniform Triticale Elite (UTE) trial since 2001. Tables 1-3 present data from the UTE for three years from Chillicothe (Rolling Plains), one year from Bushland (High Plains), and one year from Ardmore, OK. Grain yield of TAMcale 5019 was similar to 'Lockett' wheat and the test weight was similar to other commercially available triticale cultivars. Lockett winter wheat was included as a check cultivar since it is commonly used as a winter forage crop in the Rolling Plains of Texas. Clipping data (Table 1) and a visual forage rating (Table 3) indicate that the forage production of TAMcale 5019 is much greater than that of Lockett.

he Rolling Plains Small Grains Forage Trial included TAMcale 5019 since 2001 and data is presented in Tables 4-7. Forage yields of TAMcale 5019 were significantly greater that those of Lockett in two out of six site-years (Tables 4-6) and averaged 40% greater across the six site-years (Table 7). Forage production was measured in both the fall and the spring in 2002. Fall forage production and spring forage production of TAMcale 5019 was similar when averaged across the two 2002 sites (Table 5). Commonly grown rye ('Bates'), barley ('TAMBAR 501'), and oat ('Dallas') cultivars were included in the 2002 and 2003 trials. Forage yields of TAMcale 5019 were similar to the rye, barley, and oat at both of the 2002 sites. In 2003, TAMcale 5019 produced significantly more forage than the barley and oat cultivar at the King site.

Table 4. Forage yield from the Rolling Plains Small Grains Forage trial conducted during 2001 at Old Glory, Texas.

| *Lines/Cultivar* | *Forage Dry Weight 4/23/2001 (lbs/A)* |
|---|---|
| TX94VT6331 | 6239 |
| **TX96VT5019** | **6222** |
| 5019+6331 Mix | 5928 |
| Txtri | 5573 |
| TAM 400 | 5443 |
| Coronado | 5284 |
| W97-234 | 4991 |
| TAM 302 | 4829 |
| Triplecale | 4742 |
| HG9 | 4741 |
| Jagger | 4614 |
| 2174 | 4437 |
| TAM 202 | 4322 |
| Thunderbolt | 4197 |
| **Lockett** | **4007** |
| Bradley | 3972 |
| **LSD (10%)** | 672 |
| CV (%) | 10 |

Table 5. Forage yield from the Rolling Plains Small Grains Forage trial conducted during 2002.

| *Lines/Cultivar* | *Forage Yield* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ----------*lbs/a*---------- | | | | | | | | |
| | ***Bellevue*** | | | ***Old Glory*** | | | ***Means Across Locations*** | | |
| | *17-Dec* | *12-Mar* | ***Total*** | *17-Dec* | *12-Mar* | ***Total*** | *17-Dec* | *12-Mar* | ***Total*** |
| **TX96VT5019 Triticale** | **484** | **668** | **1153** | **836** | **588** | **1424** | **660** | **628** | **1289** |
| Bates Rye | 648 | 472 | **1121** | 710 | 732 | **1443** | 679 | 602 | **1282** |
| TAMBAR 501 | 660 | 240 | **900** | 970 | 564 | **1534** | 815 | 402 | **1217** |
| TX94VT6331 Triticale | 379 | 300 | 679 | 846 | 856 | 1702 | 613 | 578 | 1191 |
| Mason (Soft Wheat) | 292 | 428 | **720** | 784 | 808 | **1592** | 538 | 618 | **1156** |
| Dallas Oats | 398 | 248 | **646** | 785 | 704 | **1489** | 592 | 476 | **1068** |
| Jagger | 399 | 328 | **728** | 704 | 672 | **1377** | 552 | 500 | **1053** |
| HG-9 | 360 | 296 | **657** | 866 | 520 | **1386** | 613 | 408 | **1022** |
| Cutter | 556 | 256 | **812** | 613 | 584 | **1197** | 585 | 420 | **1005** |
| Custer | 314 | 244 | **558** | 811 | 524 | **1335** | 563 | 384 | **947** |
| **Lockett** | **366** | **376** | **742** | **639** | **500** | **1139** | **503** | **438** | **941** |
| TAM 400 | 652 | 340 | **993** | 568 | 308 | **877** | 610 | 324 | **935** |
| 2174 | 383 | 308 | **691** | 602 | 484 | **1086** | 493 | 396 | **889** |
| Ogallala | 356 | 356 | **712** | 621 | 380 | **1001** | 489 | 368 | **857** |
| Marshall Ryegrass | 278 | 384 | **662** | 560 | 408 | **968** | 419 | 396 | **815** |
| Thunderbolt | 364 | 252 | **616** | 576 | 368 | **944** | 470 | 310 | **780** |
| **LSD (10%)** | NS | 142 | **NS** | NS | 198 | **390** | | | |
| **CV (%)** | 45 | 30 | **31** | 28 | 25 | **22** | | | |



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Table 6. Forage yield from the Rolling Plains Small Grains Forage trial conducted during 2003.

| *Lines/cultivar* | ***Forage Yield*** | | | |
|---|---|---|---|---|
| | ----------*lbs/a*---------- | | | |
| | ***Clay*** *4/1/2003* | ***Kent*** *3/28/2003* | ***King*** *3/28/2003* | ***Mean*** *3/28/2003* |
| Mason (Soft Wheat) | 133 | 3412 | 1315 | 1620 |
| TX94VT6331 Triticale | 171 | 2788 | 1889 | 1616 |
| Bates Rye | 123 | 2276 | 2422 | 1607 |
| Sturdy 2K | 120 | 3400 | 1217 | 1579 |
| Jagalene | 182 | 2894 | 1449 | 1508 |
| **TX96VT5019 Triticale** | **160** | **2423** | **1873** | **1485** |
| Cutter | 203 | 2599 | 1509 | 1437 |
| TAM 202 | 170 | 2350 | 1681 | 1400 |
| Weathermaster 135 | 146 | 2756 | 1234 | 1379 |
| **Lockett** | **170** | **2449** | **1483** | **1367** |
| HG-9 | 181 | 2833 | 948 | 1321 |
| TX96D093 Oat | 99 | 2215 | 1526 | 1280 |
| Dallas Oat | 152 | 2532 | 1139 | 1274 |
| 2174 | 205 | 2465 | 985 | 1218 |
| TAMBAR 501 Barley | 117 | 2090 | 1156 | 1121 |
| Lockett + Rye grass | 130 | 1921 | 1225 | 1092 |
| **LSD (5%)** | NS | 658 | 339 | |
| **Standard Deviation** | 54 | 475 | 245 | |
| **CV (%)** | 35 | 18 | 17 | |



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Table 7. Summary of three years of forage yield from the Rolling Plains Small Grains Forage trial.

| *Lines/cultivar* | *Forage Yield* | | | |
|---|---|---|---|---|
| | *lbs/a* | | | |
| | *2000/01* | *2001/02* | *2002/03* | *Average* |
| TX94VT6331 | 6239 | 1191 | 1616 | 3015 |
| **TX96VT5019** | **6222** | **1289** | **1485** | **2999** |
| **Lockett** | **4007** | **941** | **1367** | **2105** |
| HG9 | 4741 | 1022 | 1321 | 2361 |
| 2174 | 4437 | 889 | 1218 | 2181 |
| # lines tested | 16 | 16 | 16 | |
| **# sites tested** | 1* | 2** | 3*** | |

*Old Glory
**Bellevue and Old Glory
***Clay, Kent, and King



2006007

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

# EXHIBIT E
# STATEMENT OF THE BASIS OF OWNERSHIP

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

| 1. NAME OF APPLICANT(S) | 2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER | 3. VARIETY NAME |
|---|---|---|
| Texas Agricultural Experiment Station | TX96VT5019 | TAMcale 5019 |
| 4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)* | 5. TELEPHONE *(Include area code)* | 6. FAX *(Include area code)* |
| Office of the Director, TAES<br>2147 TAMU<br>College Station, TX 77843-2147 | (979) 845-4747 | (979) 458-4765 |
| | 7. PVPO NUMBER | 200600007 |

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** ☑ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** ☑ YES ☐ NO

10. Is the applicant the original owner? ☑ YES ☐ NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
☐ YES ☐ NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
☐ YES ☐ NO **If no, give name of country**

11. Additional explanation on ownership *(Trace ownership from original breeder to current owner. Use the reverse for extra space if needed)*:

TAES policy and handbook manual provide that all germplasm and varieties developed by its employees in the course of their duties are owned by TAES. A copy of this policy is provided for your records.

**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

*According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.*

*The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).*

*To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provide and employer.*

STANDARD PROCEDURE

# MANAGEMENT AND RELEASE OF NEW PLANT MATERIALS

## 1.00 PURPOSE AND BACKGROUND

The purpose of this document is to outline guidelines for the management and transfer of plant materials developed by the Texas Agricultural Experiment Station (Experiment Station) recognizing diversity in agronomic, horticultural, and industrial plant programs. The terms "plant material" and "seed" are intended to be all-inclusive, including vegetatively propagated plant materials, such as sprigs, rhizomes, or buds.

The Experiment Station, as part of the Texas A&M University System (System), and in cooperation with the Texas Agricultural Extension Service (Extension), conducts research in crop breeding and genetic improvement to benefit the public and support the educational mission of Texas A&M University (TAMU), including the development and release of improved germplasm and new crop cultivars.

The Experiment Station, part of the public agricultural research system, has a broad mission to serve agriculture, particularly farmers and the general public. Farm, commodity, and trade organizations are encouraged to provide suggestions to enhance crop improvement and the distribution of new plant materials. Plant materials are considered as intellectual property and are owned and managed by the Experiment Station, under System policies.

Three basic goals are summarized in Section 2.00 to guide release decisions. General guidelines and methods are outlined in Section 3.00 for transferring plant material for private and commercial uses. The classification of plant materials and types of releases is intended to assist both the breeder and seed users in understanding some alternatives in managing releases. Partnerships, joint incentives, and sharing of research materials are encouraged.

| DISTRIBUTION: | APPROVAL: Edward A. Hiler |
|---|---|
| ALL HANDBOOKS | EDWARD A. HILER |

## 2.00 GOALS IN PLANT MANAGEMENT AND RELEASE

Three general goals provide the basic criteria for the management of plant materials and release decisions. These goals include:

A. Maximize Public Benefit. Plant material must be utilized by farmers and consumers to benefit the public. Plant material must be increased and managed to retain genetic purity. Variety or designated names provide identity and recognition to the originator of the improved plant materials. Commercial production and the distribution of plant releases are essential for both large and small acreage crops. Protection agreements and licensing provisions are frequently necessary to complete research and assure transfer of materials to the private sector.

B. Assure Technology Transfer to the Private Sector. The Experiment Station serves as a primary producer and distributor of new plant materials and depends upon the private sector to increase and market seed. State and federal plant protection provisions, protected names, trademarks, and/or markers (such as biochemical identification) may be useful in transferring technology to the private sector.

C. Recover Costs and Generate Revenue. The generation of funds through seed sales, fees, and other business terms is essential to recover some development costs and protection expenses, maintain competitive science, and enhance future crop improvement research. Financial terms and license provisions on plant materials must be realistic and consistent with the biological potentials and business environment.

## 3.00 GENERAL GUIDELINES AND KEY PARTICIPANTS

A. General Guidelines are outlined below for the orderly equitable release, distribution, and protection of plant materials.

Partnerships and Cooperation. The Experiment Station is responsible for research in crop breeding and genetic enhancement and assuring the timely transfer of this work to agricultural, scientific and industrial communities. Cooperation among the faculty and between faculty and external scientific and industrial interests is essential. Private interests are increasingly providing resources for research, in return for some preferential access to plant products and new technology. The commercialization of research had been encouraged both by Legislative mandates to the Experiment Station and through actions by the Board of Regents to provide financial incentives to faculty and staff to develop products or services of commercial usefulness.

Plant Release Proposals - Early discussion with Texas Foundation Seed Service (TFSS), the Plant Review Committee (PRC), and the System Technology Licensing Office (TLO) is encouraged in planning a new release. The breeder generally assumes a lead responsibility for preparing and submitting the Release Proposal (outlined in Section 5.00). Plant material is considered to be owned and under the stewardship of the Experiment Station. If a decision is made to not release particular plant materials, then the disposition and use of that material remains the discretion of the Experiment Station.

Exchange and Distribution. Exchange of plant material for breeding and genetic research is encouraged for public institutions and private industry and may include regional testing, Extension trials, and cooperative evaluations. "Selected Plant Materials" (see Section 4.00) may be provided to private firms, public breeders, grown on private lands, or placed with a private producer for further commercial evaluation before it is formally released.

Transfer and Protection - The formal release and transfer of new plant materials will usually involve public notices of availability and may involve Requests for Proposals or expressions of interest from private firms and/or the transfer of intellectual property rights through the use of licenses and agreements. The Experiment Station, in conjunction with the Breeder and the TLO, will consider applications for the appropriate intellectual property protection such as Certificates of Plant Variety Protection, Plant Patents, or Utility Patents in facilitating the transfer and protection of new plant materials. Additionally, in some instances individual firms and/or industrial groups may enter into research or partnership agreements on intellectual property, to gain access to genetic products.

Distribution of any plant material should be documented to avoid premature release, unauthorized distribution, misunderstandings over ownership, or loss of intellectual property rights. Protection agreements during research help assure that private firms can acquire rights and marketing opportunities later and/or protect their investment in marketing new products. Material Transfer Agreements (MTAs) are to be used in providing material to private firms and public agencies for evaluation (with copies filed with Texas Foundation Seed Service and the Technology Licensing Office).

B. Roles of Key Participants

Scientific quality, summary of research, review of proposals, and technology transfer involve several individuals and groups working together. Successful plant release includes institutional flexibility to meet the needs of each crop or release. Roles of primary participants are outlined as follows:

Plant Breeders and other scientists provide the major leadership in research and the release of plant materials. Responsibilities include research planning, periodic reviews on future releases, assuring materials are adequately protected, preparation of release proposals, and suggesting ways to implement release. A team is frequently involved with a release and may involve several disciplines and recognition of co-worker contributions.

Cooperative evaluations are encouraged, particularly with Extension Specialists. The Plant Review Committee commonly looks for Extension participation on new variety releases. Breeders maintain Breeder Seed and may provide technical or advisory assistance to TFSS, TLO or commercial firms.

Department Heads and Resident Directors provide a key role in crop improvement programs by guiding coordination between disciplines, and helping assure the TFSS, TLO and others are aware of potential releases. These Administrative Heads provide a vital linkage in planning, implementation and guidance for the total crop improvement program.

Program Coordinators provide communication among the developers of plant materials, the seed industry, and crop producers on scientific progress and the transfer of new materials into crop productions. The Head of the Department of Soil and Crop Sciences and Resident Director of Research at the Texas A&M Agricultural Research and Extension Center at Beaumont serve as Program Coordinators for all field crops and turfgrass, while the Head of the Department of Horticultural Sciences serves as the Program Coordinator for fruit, vegetable, and nut crops, including emphasis on industry relationships. Activities of Program Coordinators include:

1. Effective communication among breeders, department heads, resident directors, and with industry and producer interests;
2. Development of new partnerships between the Experiment Station and industry/producer interests, plus industry relationships and liaison with industry associations;
3. Advising the Director on release and licensing issues, and interacting with the Technology Licensing Office as appropriate. The Coordinators will report to the Director of the Experiment Station in these roles.

The Texas Foundation Seed Service, located at Vernon, will be responsible for the production of foundation seed and assisting breeders in the production of breeder's seed, as requested, and/or where required by a contract or license agreement managed by the TLO. The operation is expected to be largely self-sufficient.

TFSS works with TLO, other Foundation Seed organizations, Crop Improvement Associations in other states, the Texas Department of Agriculture, USDA, and other state and federal agencies. When plant materials are licensed or managed under an agreement, TFSS works closely with the TLO.

TFSS works with a lead Extension Specialist to coordinate seed for county and regional field tests, manages the increase and distribution of foundation seed stock and handles revenues from seed sales and nonlicensed products.

The Plant Review Committee (PRC) is a standing internal committee appointed by the Director of the Experiment Station to oversee the orderly release of plant materials, provide guidance to TFSS and TLO, and to make recommendations to the Director of the Experiment Station on plant materials. Activities of the PRC include:

1. Establish technical review panels to evaluate release proposals.
2. Hold quarterly meetings to review release proposals and meet with breeders who are planning releases, and act on release proposals.
3. Provide recommendations to the TFSS, TLO and Director's Office on release proposals, cultivar names, and agreements on licensing and advise the Director of the Experiment Station on release and licensing issues. If a question arises between faculty on "proportional creativity" or royalty sharing, the PRC may make recommendations to the Experiment Station Director.

The Technology Licensing Office is involved in initial discussions and planning with breeders, unit heads, Program Coordinators, and TFSS on planned releases suitable for licensing. In conjunction with the Program Coordinators and breeders, the TLO provides leadership and initiative for the protection and management of intellectual property for new releases including the following services:

1. Management of license and royalty agreements;
2. Marketing of new selected plant materials to commercial firms;
3. Development and negotiation of license and evaluation agreements;
4. Management of intellectual property protection;
5. Advice on business strategies and intellectual property protection issues; and
6. Advises and keeps the Assistant Vice Chancellor for Administration (Agriculture) who represents the Experiment Station apprised of all services provided by the TLO in the management of new plant materials.

## 4.00 TYPES OF RELEASES AND PROTECTION

A. Classes of Material - Improved plant materials may result from genetic manipulation by plant breeding and/or molecular and cellular biology. For purposes of management and release, plant materials are classified as follows:

1. Genetic Stocks: Research in plant breeding, genetic and/or cellular and molecular biology may produce unique genetic characteristics or distinct genetic materials useful to other researchers. Examples include specific genetic characters, genes or gene constructs involving vectors, and promoters. An essential characteristic of genetic stocks is that they have no immediate commercial value.

2. Germplasm: Germplasm is commonly used to further research, with little value for increase or direct commercial use in its present form. However, some desirable characters may be immediately useful to breeders and industry in developing improved varieties in other research programs.

3. Breeding Lines: Breeding lines may contain useful characteristics of unique traits with apparent commercial value. Breeding lines may be increased in their present form, used for selection, or tested further before commercialization. The Experiment Station may choose to release some advanced materials as "breeding lines" rather than continue research for commercial applications as varieties or inbred lines.

4. Selected Plant Material: Selected plant materials may be transferred to public or private firms for cooperative research, usually under a protection agreement, for further development, feasibility studies, or commercial exploration.

5. Commercial Varieties or Parental/Inbred Line: These plant materials are released for direct commercialization as new varieties or production of hybrids; release depends on clear demonstration of performance or traits in several experiments over several years, locations and/or conditions.

B. Types of Releases and Transfer

Release of plant materials is based on several factors (such as crop species, means of propagation, and commercial potential). Flexibility is essential to meet specific economic, biological or industry needs. Alternatives for release and distribution of plant materials include:

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1. Unrestricted Unlimited Release - An Unrestricted Unlimited Release is intended for general uses of those plant materials with undefined uses or low commercial potential, without any restrictions on research or commercialization uses. One-time fees may be requested to recover costs.

2. Restricted Release - A Restricted Release designates specific uses for plant material, with an agreement with recipients, noting restrictions, applications, and mutual interests.

3. Limited Release - A Limited Release involves specific recipients, to enable selected firms to use plant materials. Agreements may be developed with a small number of firm(s), firms selected on the basis of their proposal, and/or provide a protected position for a single firm or organization to complete research and/or assume commercial development. Limited Releases are usually managed under a license or option agreement, with financial terms and performance expectations.

4. Unreleased Transfer - Some plant materials may not be immediately released but simply provided to others for additional research or commercial feasibility studies. "Selected Plant Materials" may be managed under a Material Transfer Agreement or an Option Agreement, until specific traits and usefulness are determined and a formal release is proposed.

C. Pre-release Protection is essential to clarify ownership and transfer uses and rights to others later. Material Transfer Agreements (MTAs) and other sample documents are available from TLO. A copy of all pre-release documentation (MTA's and other documents) should be provided by the breeders to the Technology Licensing Office, Foundation Seed Service and Program Coordinators.

Exchange of plant materials for research uses with other public breeders may be handled directly by the breeders, through an MTA with the (1) identification and quantity of materials being provided to a co-worker, (2) clarifying the anticipated uses for breeding and research purposes, (3) stating that the Experiment Station retains its ownership, and (4) obtaining written acknowledgment from the recipient.

Field testing and commercial scale evaluations are encouraged, involving other breeders, Extension Specialists, farmers or others. Most commonly seed for one season is provided for field trials and is not to be retained or transferred to others. An MTA should be completed with farms or cooperators to clarify expectations.

## 5.00 THE RELEASE PROPOSAL AND PROCESS

A. Release proposals are prepared by the breeders and summarize the background, current facts, and plant performance/traits. The release proposal may vary in detail, depending on the class of plant material (please see Section 4), however all release proposals should include these sections:

1. Background - information on the source, origin, or breeding history.
2. Performance and Traits - summary of key features, data, anticipated usefulness, and/or disclosure limitations or unknown features. This section may be brief for germplasm and more detailed for a variety (including details on yields, statistics, quality, host plant resistance, and regions of adaptation).
3. Seed production and availability - type and quantity of seed availability for increase or distribution.
4. Implementation - breeder's suggestion on notifications, release and distribution, and guidance for outreach (including protection as appropriate) and revenue sharing (for royalties, if others were involved in the creative development).

The Release Proposal should be prepared for internal review with sufficient data and information for a peer group to evaluate merits and make decisions. Alternatively, the Release Proposal may be prepared (or later converted) as a Station publication, to document research and provide technical information for others.

B. Registration Article (for submission to a professional journal) should be with the proposal for a new variety or germplasm release. Include a draft of the Experiment Station Leaflet for new varieties. The original and 15 copies of the entire package Release proposal, Registration Article, and Leaflet (as appropriate) should be submitted through the administrative head and Program Coordinator to the PRC (with one copy to the Foundation Seed Office) eight weeks before the quarterly PRC meetings. Additional information on preparing and submitting releases is available from the PRC Chair.

C. Revenue Distribution

Royalties or income generated form the commercialization of plant materials will be distributed to the inventors on all types of plant material, according to the TAMU System policy on intellectual property (System Policy 17.02, Patents). Scientists involved in the development of plant materials that generate royalties or income under a license or option agreement must agree in advance regarding proportionate contributions and sharing of expected income prior to the distribution of such income.

(This revision replaces Standard Procedure 1250A, dated August 3, 1992)

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