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Form Approved - OMB No. 0581-0055

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

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).

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

1. NAME OF OWNER University of Idaho		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME IDO599	3. VARIETY NAME UI Stone
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) University of Idaho Office of Technology Transfer Morrill Hall 414, P.O. Box 443003		5. TELEPHONE (include area code) 208-885-4550	FOR OFFICIAL USE ONLY PVPO NUMBER 201300342 FILING DATE correct filing date is 4/3/13 law 4/9/2013
		6. FAX (include area code) 208-885-4551	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Land-Grant University	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) Karen Stevenson, Licensing Associate, University of Idaho, Office of Technology Transfer, Morrill Hall 414, P.O. Box 443003 Jianli Chen, Breeder, University of Idaho R & E Center, 1691 S 2700 W, Aberdeen, ID 83210		FILING AND EXAMINATION FEES: \$ 4,382.00 DATE 4/3/13 CERTIFICATION FEE: \$ DATE
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11. TELEPHONE (include area code) 208-885-4550	12. FAX (include area code) 208-885-4551	13. E-MAIL karens@uidaho.edu
14. CROP KIND (Common Name) Soft White Spring Wheat	16. FAMILY NAME (Botanical) Triticaceae	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.
15. GENUS AND SPECIES NAME OF CROP Triticum aestivum	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	

19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Exhibit F. Declaration Regarding Deposit g. <input checked="" type="checkbox"/> Voucher Sample (3,000 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) h. <input checked="" type="checkbox"/> Filing and Examination Fee (\$4,382), 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 ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input checked="" type="radio"/> YES (If "yes", answer items 21 and 22 below) <input type="radio"/> NO (If "no", go to item 23) <input type="radio"/> UNDECIDED
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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.)		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED
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.		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)
		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)

SIGNATURE OF OWNER 	SIGNATURE OF OWNER
NAME (Please print or type) Karen Stevenson	NAME (Please print or type) Jianli Chen
CAPACITY OR TITLE Licensing Assoc.	CAPACITY OR TITLE Assistant Professor
DATE April 2, 2013	DATE April 1, 2013

GENERAL INSTRUCTIONS: 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, F; (3) for a tuber reproduced variety, 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; and (4) payment by credit card or check drawn on a U.S. bank for \$4,382 (\$518 filing fee and \$3,864 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice). **NEW:** With the application for a seed reproduced variety or by direct deposit soon after filing, the applicant must provide at least 3,000 viable untreated seeds of the variety *per se*, and for a hybrid variety at least 3,000 untreated seeds of each line necessary to reproduce the variety. Partial applications will be held in the PVPO for not more than 90 days; then returned to the applicant as un-filed. 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 initiated and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a payment by credit card or check payable to "Treasurer of the United States" in the amount of \$768 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

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.)

Plant Variety Protection Office
Telephone: (301) 504-5518 **FAX:** (301) 504-5291
General E-mail: PVPOmail@usda.gov
Homepage: <http://www.ams.usda.gov/science/pvpo/PVPindex.htm>

SPECIFIC INSTRUCTIONS:

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that the permanent name of the application variety (even if it is a parental, inbred line) has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: U.S. Department of Agriculture, Agricultural Marketing Service, Livestock and Seed Programs, Seed Regulatory and Testing Branch, 801 Summit Crossing Place, Suite C, Gastonia, North Carolina 28054-2193 Telephone: (704) 810-8870. <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 replicated 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.)

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).)

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.

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Exhibit A – Origin and Breeding History

Pedigree and Breeding History

UI Stone is an F_1 -derived BC_1F_9 line from the backcross Pomerelle*2/Tui. Pomerelle (Souza et al., 1997a) was jointly released in 1996 by the Idaho, Washington, and Oregon Agricultural Experiment Stations and the USDA-ARS. Pomerelle was derived from the cross A771084-B/IDO246. The breeding line IDO246 is a sister line selection to 'Treasure' (PI 468962, Sunderman and O'Connell, 1988). Pomerelle has adult-plant resistance to stripe rust, moderate susceptibility to leaf rust (*P. triticina* Eriks.) and resistance to stem rust (*P. graminis* Pers.:Pers. f. sp. *Tritici* Eriks. & E. Henn.) (Souza et al., 1997a). Tui is a short, high yielding wheat released by the International Maize and Wheat Improvement Center (CIMMYT).

The initial cross of UI Stone was made between Pomerelle and Tui in a greenhouse in Aberdeen, ID in January 1994. The F_1 (A9442S) was planted in a field headrow in the spring of 1994. One F_1 plant was backcrossed to Pomerelle in the field in the summer of 1994. The BC_1F_1 (A94368S) were planted in the greenhouse in the fall of 1994. The seeds of individually harvested BC_1F_1 plants were planted in 4.5 m² plots in a field nursery inoculated with stripe rust in 1995. One BC_1F_2 plot, A94368S-B, was selected with better resistance to stripe rust and harvested in the summer of 1995 and planted in 1996 in a 4.5 m² F_3 plot in which fifty heads were selected. In 1997, the 50 F_4 heads were planted in 1.2-m headrows in Aberdeen, ID. Out of 50 F_5 headrows, seven were selected based on uniformity and performance in the summer of 1997. The seven selected lines were planted in a non-replicated observation trial in Aberdeen in the spring of 1998. Four of the seven F_6 lines (A94368S-B-4, 7, 30, and 38) were selected and advanced in a replicated preliminary yield trial in two locations (Aberdeen and Tetonia) in the spring of 1999. Two F_6 lines, A94368S-B-7 and A94368S-B-30, were selected and evaluated in elite yield trials in four locations (Aberdeen, Hazelton, Tetonia, and Moscow, ID) in 2000 and 2001. A94368S-B-7 was designated as IDO599 and entered into the tri-state trials in 2002 and the Western Regional Soft Spring Wheat Nurseries (WRSSWN) in 2003 and 2004.

Evaluation of Grain Yield and Agronomic Performance

IDO599 (UI Stone) has been officially evaluated since 2008 due to personnel changes in the breeding program from 2005 to 2007. Grain yield and agronomic performance of UI Stone were evaluated in the University of Idaho Spring Wheat Elite Yield Trials (UISWEYTs) in two irrigated locations (Hazelton and Aberdeen) in southern Idaho from 2008 to 2011; in the University of Idaho's State Extension Variety Trials (IDSWEVTs) in four irrigated locations (Rupert, Idaho Falls, Ashton, and Aberdeen) in southern Idaho from 2009 to 2011. Alturas, Alpowa, and UI Pettit were used as checks in the UISWEYTs and IDEVTs. UI Stone was simultaneously evaluated in the Western Regional Soft Spring Wheat Nurseries (WRSSWNs) from 2008 to 2010 across the states of Idaho, Oregon, Montana, and Washington. The cultivars Alpowa, Louise, Nick, and Alturas were used as checks in the WRSSWN trials. Grain yield, grain volume weight (GVW), days to heading (DTH) (50% of heads in the plot completely visible and counting from January 1), and plant height (PH, distance from ground to top of spike

excluding awns) were measured in most locations, while lodging (0–9; 0 = no lodging; 9 = 100% plants lodged) was recorded only when significant lodging was present in the field.

Evaluation of End-use Quality

Milling and baking quality of UI Stone were assessed using approved methods of the American Association of Cereal Chemist (AACC, 2000) by the Idaho Wheat Quality Lab at Aberdeen, ID in 2008-2010 and was officially evaluated by the Pacific Northwest Wheat Quality Council in 2010. UI Stone along with other lines were also tested at the Western Regional Genotyping Lab at Pullman, WA with DNA markers diagnostic for the high molecular glutenin gene GluD1 (5+10).

Evaluation of FHB Resistance

UI Stone and 46 other PNW spring wheat lines and two known spring resistance sources ‘Sumai3’ (PI 481542) and ‘CJW14’ (W14, PI 641164; Ward et al., 2006) were evaluated in two field and three greenhouse experiments. One field experiment was conducted by Charla Hollingsworth in a nursery at the Northwest Research & Outreach Center, Crookston, Minnesota in the spring of 2008 and another by William Grey at Montana State University in Bozeman, Montana in 2009. Deoxynivalenol (DON, ppm) content was tested on grain harvested from the 2008 field experiment. The three greenhouse (GH) experiments were conducted in Aberdeen, Idaho in 2010 and 2011. Disease severity for each line was calculated based on the mean of 3 to 10 infected spikes per entry. The 49 lines included in this GH evaluation were tested in 2008 at the Western Regional Genotyping Lab at Pullman, WA with DNA markers diagnostic for the presence of *Fhb1* using marker *UMN10* (Liu et al., 2008) and the quantitative trait locus (QTL) on chromosome 5AS using marker *Xbarc117* (Chen et al., 2006).

Evaluation of Resistance to Stripe Rust and Stem Rust

UI Stone was evaluated by X.M. Chen as single row plot (1.0 m long) for resistance to stripe rust under natural infections in both Pullman and Mt. Vernon, WA in 2003, 2004, 2008, 2009, and 2010 in either or both of two nurseries: the Southern Idaho Wheat Breeding Nursery and the Western Uniform Regional Nursery (WURN). Stripe rust races prevalent at these locations during those years in the PNW included PST-114, PST-116, PST-127, and PST-139 (Chen et al. 1995; Chen et al. 2010; Wan and Chen 2012). Stripe rust resistance was evaluated twice at Feekes growth stages 5-6 and 10.1-10.5 in Mt. Vernon and once at stage 10.1-10.5 in Pullman, WA when the susceptible check ‘Lemhi’ had about 30% severity at the early stage and greater than 80% severity at both locations at the late growth stage. Infection type (IT) was recorded based on the 0-9 scale as described by Line and Qayoum (1992), and severity (SEV) was recorded as percentage of foliage infected. In addition, UI Stone was evaluated in the greenhouse together with the other entries in the 2010 WURN at two temperatures profiles. One was the low temperature profile (diurnal temperature cycle gradually changing from 4°C at 2:00 am to 20°C at 2:00 pm) with 16 h light long day time with selected races PST-37, PST-45, PST-100, PST-116, and PST-127 in the seedling stage; while the other was the high temperature

profile (diurnal temperature cycle gradually changing from 10°C at 2:00 am to 30°C at 2:00 pm) with races PST-100, PST-116, and PST-127 in adult-plant stages (boot to flowering stage) (Chen 2005; Chen et al. 2010). In 2009, UI Stone was evaluated in a controlled greenhouse by X.M. Chen for resistance (unpublished data) to stem rust using a bulked isolate of stem rust collected from the Palouse region.

References

- American Association of Cereal Chemists (AACC). 2000. AACC approved methods, 10th ed. Am. Assoc. Cereal Chem., St. Paul, MN.
- Chen, J., C.A. Griffey, M.A. Saghai Maroof, E.L. Stromberg, R.M. Biyashev, W. Zhao, et al. 2006. Validation of two major quantitative trait loci for *Fusarium* head blight resistance in Chinese wheat line W14. *Plant Breed.* 125:99–101.
- Chen, X.M. 2005. Epidemiology and control of stripe rust [*Puccinia striiformis* f. sp. *tritici*] on wheat. *Can. J. Plant Pathol.* 27:314–337.
- Chen, X.M., L. Penman, A.M. Wan, and P. Cheng. 2010. Virulence races of *Puccinia striiformis* f. sp. *tritici* in 2006 and 2007 and development of wheat stripe rust and distributions, dynamics, and evolutionary relationships of races from 2000 to 2007 in the United States. *Can. J. Plant Pathol.* 32:315–323.
- Finney, P.L., and L. Andrews. 1986. Revised microtesting for soft wheat quality evaluation. *Cereal Chem.* 63:177–182.
- Gaines, C.S. 2000. Report of the AACC committee on soft wheat flour method 56-11, Solvent Retention Capacity Profile. *Cereal Foods World* 45:303–306.
- Guttieri, M.J., D. Bowen, D. Gannon, K. O'Brien, and E. Souza. 2001a. Solvent retention capacities of irrigated soft white spring wheat flours. *Crop Sci.* 41:1054–1061.
- Guttieri, M.J., J.C. Stark, K. O'Brien, and E. Souza. 2001b. Relative sensitivity of spring wheat grain yield to drought intensity. *Crop Sci.* 41:327–335.
- Kidwell K., G. Shelton, V. Demacon, J. Burns, B. Carter, X. Chen, C. Morris, and N. Bosque Perez. 2006a. Registration of 'Louise' wheat. *Crop Sci.* 46:1384.
- Kidwell, K., V. Demacon, G. Shelton, J. Burns, B. Carter, X. Chen, C. Morris and N. Bosque Perez. 2006b. Registration of 'Otis' wheat. *Crop Sci.* 46:1386.
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- Liu, S., M.O. Pumphrey, B.S. Gill, H.N. Trick, J.X. Zhang, J. Dolezel, et al. 2008. Toward positional cloning of *Fhb1*, a major QTL for *Fusarium* head blight resistance in wheat. *Cereal Res. Commun.* 36 (suppl. 6):195–201.
- Line, R.F., and A. Qayoum. 1992. Virulence, aggressiveness, evolution, and distribution of races of *Puccinia striiformis* (the cause of stripe rust of wheat) in North America, 1968–1987. *Tech. Bull. No. 1788.* USDA-ARS, Washington, DC.
- Mihuta-Grimm, L. and R. L. Forster. 1989. Scab of wheat and barley in southern Idaho and evaluation of seed treatments for eradication of *Fusarium* spp. *Plant Dis.* 73:769–771.
- Souza, E., J. M. Marshall, D.W. Sunderman, and K. O'Brien. 1997a. Registration of 'Pomerelle' Wheat. *Crop Sci.* 37:1010.
- Souza, E., J.M. Windes, D.W. Sunderman, and K. O'Brien. 1997b. Registration of 'Whitebird' wheat. *Crop Sci.* 37:1009.
- Souza, E., M. Guttieri, and R. McLean. 2003. Registration of 'Lolo' wheat. *Crop Sci.* 43:734.

- Souza E.J., M.J. Guttieri, and K. O'Brien. 2004. Registration of 'Alturas' wheat. *Crop Sci.* 44: 1477-1478.
- Sunderman D.W. and B. O'Connell. 1988. Registration of 'Treasure' wheat. *Crop Sci.* 28: 576.
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- Ward, R., G. Jiang, D. Huang, Q. Shen, Z. Yang, W. Lu, J. Shi, H. Zhu, Z. Chen. 2006. Registration of wheat germplasms CJ W14 and CJ 9306 highly resistant to Fusarium head blight. *Crop Sci.* 46:2326.

Seed Purification, Increase, and Availability

Seed-increase plots were planted each year from 2008 - 2011 in parallel with the yield trials. In spring 2008, 400 heads were selected from a seed-increase plot. These were threshed individually and planted in headrows in the spring of 2009. Uniform headrows were selected, harvested individually and compo sited to obtain breeder's seed. Ten kg of breeder seed was planted in Tetonia in the spring of 2010 and smaller amount of foundation seed was obtained. These seeds were planted in the spring of 2011 and a large amount of foundation seed was produced in the summer of 2011. Uniformity and stability of this cultivar were evaluated and stayed consistent during these years. A variance of up to 2, 4, and 7 red wheat seed per pound is allowed in foundation, registered, and certified classes of seed, respectively.

Copied from the Exhibit D

MAH 3-12-2014

Exhibit B – Statement of Distinctness

UI Stone is most similar to the soft white spring wheat Alturas (PI 620631, Souza et al., 2004). The two cultivars may be distinguished based on the alleles of the high molecular weight glutenin locus on chromosome 1D and the alleles of QTL associated with resistance to fusarium head blight (FHB) on chromosome 5A. Alturas has 5+10 in contrast to UI Stone, which carries 2+12 at the GluD1 locus. Based on marker analysis of *Xbarc117*, UI Stone has a PCR product of 245 bp, while Alturas has a PCR product of 239 bp. The two cultivars can also be distinguished by inoculation of FHB. UI Stone will show a reduced infection, while Alturas will show a high level of susceptibility to FHB. UI Stone is one to six days earlier than Alturas in diverse environments.

Reference:

Souza E.J., M.J. Guttieri, and K. O'Brien. 2004. Registration of 'Alturas' wheat. *Crop Sci.* 44: 1477-1478.

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**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Wheat (*Triticum* spp.)**

NAME OF APPLICANT (S) University of Idaho	TEMPORARY OR EXPERIMENTAL DESIGNATION IDO599	VARIETY NAME UI Stone
ADDRESS (Street and No. or RD No., City, State, Zip Code and Country) Karen Stevenson, Licensing Associate, University of Idaho, Office of Technology Transfer, Morrill Hall 414, P.O. Box 443003 Jianli Chen, Breeder, University of Idaho R & E Center, 1691 S 2700 W, Aberdeen, ID 83210 Enter your e-mail address: jchen@uidaho.edu		FOR OFFICIAL USE ONLY PVPO NUMBER

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g., 0 9 9 or 0 9) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____ . Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND: <u>1</u> 1 = Common 2 = Durum 3 = Club 4 = Other (Specify) _____	2. VERNALIZATION: <u>1</u> 1 = Spring 2 = Winter 3 = Other (Specify) _____
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3. COLEOPTILE ANTHOCYANIN: <u>1</u> 1 = Absent 2 = Present	4. JUVENILE PLANT GROWTH: <u>3</u> 1 = Prostrate 2 = Semi-Erect 3 = Erect
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5. PLANT COLOR: (Boot Stage) <u>3</u> 1 = Yellow-Green 2 = Green 3 = Blue-Green	6. FLAG LEAF: (Boot Stage) <u>2</u> 1 = Erect 2 = Recurved _____ 1 = Not Twisted 2 = Twisted _____ 1 = Wax Absent 2 = Wax Present
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7. EAR EMERGENCE:

178 Number of Days (Average)

4 Number of Days Earlier Than * Alpowa

Same As * _____

2 Number of Days Later Than * UI Pettit

*Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

8. ANTHOR COLOR: 1 1 = Yellow 2 = Purple

13. SEED:

1 A. SHAPE

- 1 = Ovate
- 2 = Oval
- 3 = Elliptical

1 B. CHEEK

- 1 = Rounded
- 2 = Angular

1 C. BRUSH

- 1 = Short
- 2 = Medium
- 3 = Long

2

- 1 = Not Collared
- 2 = Collared

1 D. CREASE

- 1 = Width 60% or less of Kernel
- 2 = Width 80% or less of Kernel
- 3 = Width Nearly as Wide as Kernel

1

- 1 = Depth 20% or less of Kernel
- 2 = Depth 35% or less of Kernel
- 3 = Depth 50% or less of Kernel

1 E. COLOR

- 1 = White
- 2 = Amber
- 3 = Red
- 4 = Other (Specify) _____

2 F. TEXTURE

- 1 = Hard
- 2 = Soft
- 3 = Other (Specify) _____

2 G. PHENOL REACTION

- 1 = Ivory
- 2 = Fawn
- 3 = Light Brown
- 4 = Dark Brown
- 5 = Black

400 H. SEED WEIGHT

g/1000 Seed (Whole Number Only)

2 I. GERM SIZE

- 1 = Small
- 2 = Midsize
- 3 = Large

14. DISEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

2 Stem Rust (*Puccinia graminis* f. sp. *tritici*)

Race: bulked races from Palouse region

0 Leaf Rust (*Puccinia recondita* f. sp. *tritici*)

Race: _____

2 Stripe Rust (*Puccinia striiformis*)

Race: PST-127

0 Loose Smut (*Ustilago tritici*)

Race: _____

0 Tan Spot (*Pyrenophora tritici-repentis*)

Race: _____

0 Flag Smut (*Urocystis agropyri*)

Race: _____

0 Halo Spot (*Selenophoma donacis*)

Race: _____

0 Common Bunt (*Tilletia tritici* or *T. laevis*)

Race: _____

0 *Septoria nodorum* (Glume Blotch)

Race: _____

0 Dwarf Bunt (*Tilletia controversa*)

Race: _____

0 *Septoria avenae* (Speckled Leaf Disease)

Race: _____

0 Karnal Bunt (*Tilletia indica*)

Race: _____

0 *Septoria tritici* (Speckled Leaf Blotch)

Race: _____

0 Powdery Mildew (*Erysiphe graminis* f. sp. *tritici*)

Race: _____

2 Scab (*Fusarium* spp.)

Race: F. culmorum, type II

0 "Snow Molds"

Race: _____

0 "Black Point" (Kernel Smudge)

Race: _____

0 Common Root Rot (*Fusarium*, *Cochliobolus* and *Bipolaris* spp.)

Race: _____

0 Barley Yellow Dwarf Virus (BYDV)

Race: _____

0 Rhizoctonia Root Rot (*Rhizoctonia solani*)

Race: _____

0 Soilborne Mosaic Virus (SBMV)

Race: _____

0 Black Chaff (*Xanthomonas campestris* pv. *translucens*).

Race: _____

0 Wheat Yellow (Spindle Streak) Mosaic Virus

Race: _____

0 Bacterial Leaf Blight (*Pseudomonas syringae* pv. *syringae*)

Race: _____

0 Wheat Streak Mosaic Virus (WSMV)

Race: _____

Other (Specify) _____

Race: _____

Other (Specify) _____

Race: _____

Other (Specify) _____

Race: _____

Other (Specify) _____

Race: _____

15. HOMOZYGOUS FOR SPECIFIC DISEASE RESISTANCE GENE

Stem rust NA
 Leaf rust NA
 Other _____

16. INSECT: PLEASE SPECIFY BIOTYPE (Where Needed) (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

- 0 Hessian Fly (*Mayetiola destructor*) General _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype A _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype B _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype C _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype D _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype E _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype F _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype G _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype H _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype I _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype J _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype L _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype M _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype N _____
- 0 Hessian Fly (*Mayetiola destructor*) Biotype O _____
- 0 Hessian Fly (*Mayetiola destructor*) (Specify) _____
- 0 Stem Sawfly (*Cephus* spp.) (Specify) _____
- 0 Cereal Leaf Beetle (*Oulema melanopa*) (Specify) _____
- 0 Russian Aphid 1 (*Diuraphis noxia*) _____
- 0 Russian Aphid 2 (*Diuraphis noxia*) _____
- 0 Greenbug (*Schizaphis graminum*) (General) _____
- 0 Greenbug (*Schizaphis graminum*) Biotype A _____
- 0 Greenbug (*Schizaphis graminum*) Biotype B _____
- 0 Greenbug (*Schizaphis graminum*) Biotype C _____
- 0 Greenbug (*Schizaphis graminum*) Biotype E _____
- 0 Greenbug (*Schizaphis graminum*) Other (Specify) _____
- 0 Aphids (Specify) _____
- 4 Other (Specify) Cereal cyst nematodes _____

17. HIGH MOLECULAR WEIGHT GLUTENIN SUBUNIT PROFILE (Check those that apply):

<table border="0"> <tr><td><input type="checkbox"/></td><td><u>Glu-A1</u></td></tr> <tr><td><input type="checkbox"/></td><td>1</td></tr> <tr><td><input type="checkbox"/></td><td>2*</td></tr> <tr><td><input type="checkbox"/></td><td>null</td></tr> <tr><td><input type="checkbox"/></td><td>1*</td></tr> </table>	<input type="checkbox"/>	<u>Glu-A1</u>	<input type="checkbox"/>	1	<input type="checkbox"/>	2*	<input type="checkbox"/>	null	<input type="checkbox"/>	1*	<table border="0"> <tr><td><input type="checkbox"/></td><td><u>Glu-B1</u></td></tr> <tr><td><input type="checkbox"/></td><td>6+8</td></tr> <tr><td><input type="checkbox"/></td><td>7+8</td></tr> <tr><td><input type="checkbox"/></td><td>7+9</td></tr> <tr><td><input type="checkbox"/></td><td>13+16</td></tr> <tr><td><input type="checkbox"/></td><td>13+19</td></tr> <tr><td><input type="checkbox"/></td><td>17+18</td></tr> </table>	<input type="checkbox"/>	<u>Glu-B1</u>	<input type="checkbox"/>	6+8	<input type="checkbox"/>	7+8	<input type="checkbox"/>	7+9	<input type="checkbox"/>	13+16	<input type="checkbox"/>	13+19	<input type="checkbox"/>	17+18	<table border="0"> <tr><td><input type="checkbox"/></td><td><u>Glu-D1</u></td></tr> <tr><td><input type="checkbox"/></td><td>2+11</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>2+12</td></tr> <tr><td><input type="checkbox"/></td><td>3+12</td></tr> <tr><td><input type="checkbox"/></td><td>5+10</td></tr> <tr><td><input type="checkbox"/></td><td>null</td></tr> </table>	<input type="checkbox"/>	<u>Glu-D1</u>	<input type="checkbox"/>	2+11	<input checked="" type="checkbox"/>	2+12	<input type="checkbox"/>	3+12	<input type="checkbox"/>	5+10	<input type="checkbox"/>	null
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<input type="checkbox"/>	3+12																																					
<input type="checkbox"/>	5+10																																					
<input type="checkbox"/>	null																																					

18. TRANSLOCATIONS (1=Present 2=Absent 3=Heterogeneous 4= Not Tested):

- 4 1BL/1RS
- 4 1A/1R
- 4 2NS/2AS
- 4 4DL/4AgS
- ____ OTHER (explain) _____
- ____ OTHER (explain) _____

19. IMIDAZOLINONE HERBICIDE TOLERANCE (1=Present 2=Absent 3=Not Tested):

3 Als-1

3 Als-2

3 Als-3

20. ADDITIONAL INFORMATION ON ANY ITEM ABOVE OR GENERAL COMMENTS:

WHEAT DESCRIPTOR ILLUSTRATIONS

Section Numbers Correspond to the Numbers of the Sections on the Form



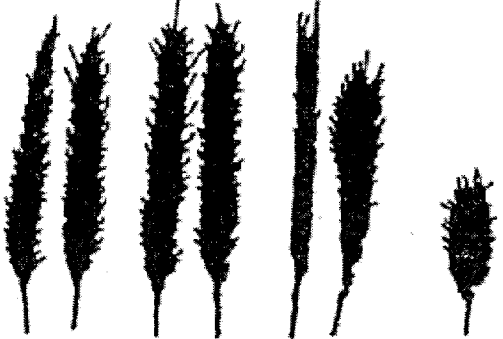

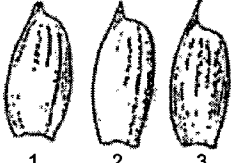
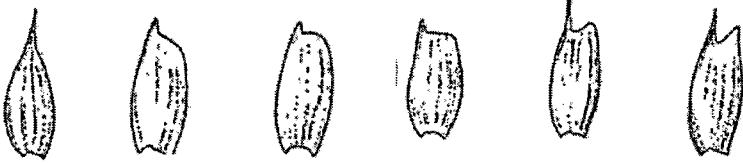


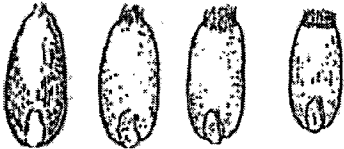
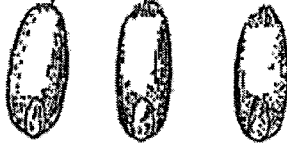



<p>4. EARLY PLANT GROWTH HABIT:</p>  <p>1 Prostrate 2 Intermediate 3 Erect</p>	<p>10. (D.) STEM INTERNODE X-SECTION:</p>  <p>1 Hollow 2 Semi-solid 3 Solid</p>	<p>11. (B.) SPIKE SHAPE:</p>  <p>1 Tapering 2 Oblong 3 Clavate 4 Elliptical</p>	
<p>11. (D.) AWNEDNESS:</p>  <p>1 Awnless 2 Apically Awnleted 3 Awnleted 4 Awned</p>	<p>12. (D.) BEAK SHAPE:</p>  <p>1 Obtuse 2 Acute 3 Acuminate</p>	<p>12. (C.) SHOULDER SHAPE:</p>  <p>1 Wanting 2 Oblique 3 Rounded 4 Square 5 Elevated 6 Apiculate</p>	
<p>13. (A.) SEED SHAPE:</p>  <p>1 Ovate 2 Oval 3 Elliptical</p>	<p>13. (B.) CHEEK SHAPE:</p>  <p>1 Rounded 2 Angular</p>	<p>13. (C.) BRUSH SIZE:</p>  <p>1 Small 2 Midsized 3 Large 4 Collared</p>	<p>13. (C.) BRUSH HAIR LENGTH:</p>  <p>1 Short 2 Medium 3 Long</p>
<p>13. (I.) GERM (EMBRYO) SIZE:</p>  <p>1 Small 2 Midsized 3 Large</p>	<p>13. (D.) SEED CREASE WIDTH:</p>  <p>1 Narrow 2 Mid-wide 3 Wide</p>	<p>13. (D.) SEED CREASE DEPTH:</p>  <p>1 Shallow 2 Mid-Deep 3 Deep</p>	

Exhibit D – Additional Description of the variety

General Description

UI Stone's juvenile plant growth is erect. At the boot stage, plants of UI Stone are blue-green and have re-curved flag leaves. Light pubescence is present on the stems and glumes. Coleoptiles are white and the anthers are yellow. Stem internodes are hollow, and peduncles are erect. UI Stone has awned, white chaffed, mid-dense, and tapering heads. UI Stone's kernels are white, soft, and ovate, with rounded cheeks, a shallow crease, and the brush length is midsized and short similar to the recurrent parent, Pomerelle. On the basis of four years data (2008-2011), UI Stone has an average kernel weight of 34.8 mg, similar to Alturas (34.0 mg) and slightly higher than Treasure (33.5 mg).

Grain Yield and Agronomic Performance

In the WRSSWNs trials (Table 1), UI Stone ranked among the top five cultivars for grain yield, with a 3-yr average (2008, 2009, 2010) of 4156.1 kg ha⁻¹ in rain-fed and 8043.1 kg ha⁻¹ in irrigated tests, respectively. Grain yield of UI Stone was similar to that of Alturas and Nick, but significantly higher than Alpowa and Louise in irrigated environments, while it was similar to Louise but significantly higher than Alturas, Alpowa, and Nick in rainfed environments. In all environments, grain volume weight (GVW) of UI Stone was lower than that of Alpowa but not significantly different from the other three check cultivars; days to heading of UI Stone was little earlier or similar to Nick but one to six days earlier than that of Alturas, Alpowa and Louise. Plant height of UI Stone was not significantly different from Alturas and Nick in all environments: however, it was 6 – 8 cm shorter than Louise in irrigated environments, and 4 cm shorter than Louise in rainfed environments.

In the UISWEYTs (data not shown), yield of UI Stone (8285.2 kg ha⁻¹) was not significantly different from Alturas (8399.5 kg ha⁻¹), Alpowa (7780.8 kg ha⁻¹), and UI Pettit (7538.7 kg ha⁻¹). GVW of UI Stone (78.1 kg hL⁻¹) was significantly higher than that of UI Pettit (76.1 kg hL⁻¹). UI Stone was two days later heading than UI Pettit but two and three days earlier than Alturas and Alpowa, respectively. UI Stone (95.5 cm) was 15.5 cm taller than UI Pettit and 2.5 cm shorter than Alpowa; but similar in height to Alturas (94.2 cm).

In the IDSWEVTs (<http://www.extension.uidaho.edu/cereals/>), the yield of UI Stone (7942.2 kg ha⁻¹) was not significantly different from Alturas (7780.8 kg ha⁻¹) but significantly higher than Alpowa (7599.3 kg ha⁻¹) and UI Pettit (7525.3 kg ha⁻¹). GVW of UI Stone (77.5 kg hL⁻¹) was not significantly different from the other three check cultivars. UI Stone was two days later heading than UI Pettit but two and four days earlier than Alturas and Alpowa, respectively. UI Stone (91 cm) was 10 cm taller than UI Pettit (81 cm), five cm shorter than Alpowa (96 cm) but similar in height to Alturas (91 cm).

End-Use Quality

Based on the baking data of five year-location environments in Hazelton and Aberdeen under irrigation in 2008-2010, UI Stone has good end-use quality for a soft white spring wheat. The flour protein of UI Stone (89.3 g kg⁻¹) was significantly higher than that of UI Pettit (84.7 g kg⁻¹), but not different from Alpowa (88.9 g kg⁻¹) and Alturas (88.1 g kg⁻¹). Flour yield (670 g kg⁻¹) and cookie diameter (8.7 cm) of UI Stone were similar to Alturas (662 g kg⁻¹ and 8.6 cm) and UI

Pettit (674 g kg^{-1} and 8.8 cm), but significantly higher than that of Alpowa (631 g kg^{-1} and 8.5 cm). Flour ash of UI Stone was significantly lower (3.5 vs 3.6 g kg^{-1}), while the break flour yield (423 g kg^{-1}) was not significantly different from that of the three check cultivars. UI Stone ($L^* = -7.7$) had good noodle color stability, similar to Alturas ($L^* = -7.6$) and UI Pettit ($L^* = -8.1$), and better noodle color stability (Chinese raw noodle) than Alpowa ($L^* = -10.8$) based on noodle color change between 0 and 24 h (L^* differential value). Lactic acid solvent retention capacity (97) of UI Stone was greater than UI Pettit (78) but less than Alturas (104) and Alpowa (104).

Resistance to FHB

Table 2 summarizes the overall FHB resistance of forty-nine lines evaluated over two field and three greenhouse experiments. The FHB resistance was characterized based on the mean data of each line. A DON content lower than 2 ppm and disease severities less than 25% in the field and greenhouse were regarded as being resistant reactions. Out of 49 lines evaluated, the nine PNW lines 'Whitebird' (PI 592982, Souza et al., 1997b), IDO629, 'Otis' (PI 634866, Kidwell et al., 2006b), 'Lolo' (PI 614840, Souza et al., 2003), UI Stone, IDO686, IDO668, IDO671, and 'Lassik' (PI 653535) and two resistant checks Sumai 3 and CJW14, showed good resistance in greenhouse and field inoculation experiments and lower DON accumulation in the field inoculation experiment in MN in 2008. UI Stone and the other eight resistant lines do not have any of the generally known resistance sources in their pedigrees. The results suggest that the nine resistant lines can be used as adapted resistance sources for the improvement of FHB resistance in spring wheat. Genetic analyses should be done to determine whether they have novel resistance genes.

Resistance to Stripe Rust and Stem Rust

UI Stone showed good resistance to stripe rust in the flowering stage at the Mt. Vernon, WA location from 2008 to 2011 (Table 3). UI Stone had IT scores ranging from 2 to 3 (mean 3) and SEV ratings ranging from 5 to 50% (mean 29%), while the susceptible check Lemhi had IT scores of 8 and SEV ratings of 80-100%. However, UI Stone showed a variable reaction (resistant to susceptible) at the Pullman, WA location over the four years it was tested. Based on the overall IT and SEV scores of the four years, resistance of UI Stone was better than UI Pettit, similar to Alpowa and Treasure but not as good as Alturas. UI Stone was moderately resistant to stripe rust in four of the six locations in WRUNs in 2008 and 2010 (data not presented). In greenhouse evaluations (data not presented), adult plants of UI Stone were resistant to race PST-127 (infection type 1 or 2), but moderately susceptible to PST-100 (infection type 6) and PST-114 (infection type 4 or 5); seedlings of UI Stone were also resistant to races PST-45 and PST-127. Based on both greenhouse and field assessments, UI Stone has a moderate level of resistance to stripe rust in most environments. UI Stone showed a resistant reaction to the bulked races of stem rust collected from the Palouse region, compared to Alpowa which was susceptible (Chen, personal communication). UI Stone also showed a very good tolerance to cereal cyst nematodes (Smiley, personal communication).

Seed Purification, Increase, and Availability

Seed-increase plots were planted each year from 2008 - 2011 in parallel with the yield trials. In spring 2008, 400 heads were selected from a seed-increase plot. These were threshed individually and planted in headrows in the spring of 2009. Uniform headrows were selected,

harvested individually and composited to obtain breeder's seed. Ten kg of breeder seed was planted in Tetonia in the spring of 2010 and smaller amount of foundation seed was obtained. These seeds were planted in the spring of 2011 and a large amount of foundation seed was produced in the summer of 2011. Uniformity and stability of this cultivar were evaluated and stayed consistent during these years.

U.S. Plant Variety Protection (PVP) with Title V option will be sought for UI Stone. Seed of UI Stone has been deposited in the National Plant Germplasm System, where it will be available for distribution upon expiration of PVP.

Recognized seed classes will include the foundation, registered, and certified seed classes. Foundation seed of UI Stone is distributed by the UI Foundation Seeds Program to licensed brokers. A variance of up to 2, 4, and 7 red wheat seed per pound is allowed in foundation, registered, and certified classes of seed, respectively. Licenses of UI Stone can be purchased from the UI Office of Technology Transfer.

References

- Kidwell K., G. Shelton, V. Demacon, J. Burns, B. Carter, X. Chen, C. Morris, and N. Bosque Perez. 2006a. Registration of 'Louise' wheat. *Crop Sci.* 46:1384.
- Kidwell, K., V. Demacon, G. Shelton, J. Burns, B. Carter, X. Chen, C. Morris and N. Bosque Perez. 2006b. Registration of 'Otis' wheat. *Crop Sci.* 46:1386.
- Souza, E., J. M. Marshall, D.W. Sunderman, and K. O'Brien. 1997a. Registration of 'Pomerelle' Wheat. *Crop Sci.* 37:1010.
- Souza, E., J.M. Windes, D.W. Sunderman, and K. O'Brien. 1997b. Registration of 'Whitebird' wheat. *Crop Sci.* 37:1009.
- Souza, E., M. Guttieri, and R. McLean. 2003. Registration of 'Lolo' wheat. *Crop Sci.* 43:734.
- Souza E.J., M.J. Guttieri, and K. O'Brien. 2004. Registration of 'Alturas' wheat. *Crop Sci.* 44: 1477-1478.
- Sunderman D.W. and B. O'Connell. 1988. Registration of 'Treasure' wheat. *Crop Sci.* 28: 576.
- Ward, R., G. Jiang, D. Huang, Q. Shen, Z. Yang, W. Lu, J. Shi, H. Zhu, Z. Chen. 2006. Registration of wheat germplasms CJ W14 and CJ 9306 highly resistant to Fusarium head blight. *Crop Sci.* 46:2326.

Table 1. Grain yield, volume weight, days to heading, and plant height of UI Stone soft white spring wheat compared with check cultivars evaluated under rainfed and irrigated conditions in the Western Regional Soft Spring Wheat Nurseries in 2008, 2009, and 2010.†

Cultivar	Grain Yield	Rank*	Volume Weight	DTH	PH
	kg ha ⁻¹		kg hL ⁻¹	d	cm
			<u>Irrigated</u>		
UI Stone	8043.1	A	76.0	175.8	92.2
Alturas	7753.9	AB	76.0	177.3	90.2
Alpowa	6953.7	BC	77.3	178.6	97.5
Louise	6604.0	C	76.5	177.1	99.6
Nick	7552.2	AB	76.4	176.2	92.2
Mean	7384.1		76.4	177.0	94.5
LSD (0.05)	981.9		1.4	1.3	4.1
CV (%)	11.0		0.9	0.6	3.2
Environment	6		5	5	5
			<u>Rainfed</u>		
UI Stone	4156.1	A	72.5	178.1	72.1
Alturas	3786.2	B	72.6	182.9	71.4
Alpowa	3806.4	B	73.8	184.6	73.9
Louise	3880.3	AB	72.5	181.7	75.9
Nick	3396.1	C	72.5	179.6	68.8
Mean	3806.4		72.8	181.4	72.4
LSD (0.05)	322.8		1.3	1.4	2.5
CV (%)	12.3		2.5	0.7	4.4
Environment	17		17	17	17

†Complete data summaries can be found at

<http://www.ars.usda.gov/Services/docs.htm?docid=3712> (verified 1 March, 2013).

*Different letters indicate significant differences among the five cultivars based on the LSD values.

Table 2. DON content and disease severity of two resistant checks and nine resistant spring wheat lines out of 49 evaluated in diverse environments over three years

Genotype	Class	DON	Severity	Severity (%)
		(ppm) Field*	(%) Field**	Greenhouse***
Sumai3	SRW	0.2	3.3	14.7
W14	SRW	0.2	4.0	6.9
Whitebird	SWS	0.4	8.8	23.0
IDO629	SWS	1.5	12.0	24.7
Otis	HWS	0.4	13.3	17.0
Lolo	HWS	1.1	15.5	23.7
UI Stone	SWS	0.8	16.8	16.1
IDO686	SWS	0.7	17.8	13.1
IDO668	SWS	0.4	19.5	25.5
IDO671	SWS	0.6	23.8	17.5
Lassik	HRS	2.0	24.4	20.0
Mean of 49 entries		2.2	25.7	31.8
CV%		62.6	44.9	55.7
LSD (0.05)		2.7	23.2	29.5

* DON content was tested using the grain harvested from MSU field nursery in 2009.

** Mean disease severity of MT (2009) and MN (2008) field nurseries.

*** Mean disease severity of three GH experiments in 2010 in Aberdeen, ID.

Table 3. Mean infection type (IT) and severity (%) of UI Stone (IDO599) and check cultivars in responses to stripe rust infection in different growth stages planted in Pullman and Mt. Vernon, WA from 2008 to 2011.

Cultivar	Pullman, flowering		Mt. Vernon, boot stage		Mt. Vernon, flowering	
	IT	%	IT	%	IT	%
	0-9 [†]	%	0-9	%	0-9	%
Lemhi	8	90	8	68	8	95
UI Pettit	7	43	6	26	6	60
Treasure	4	17	6	33	2	16
Alpowa	5	38	8	45	2	20
UI Stone	6	23	7	40	3	29
Alturas	2	14	7	28	3	10
Mean	5	37	7	40	4	38
LSD						
(0.05)	3	23	3	19	2	26
CV%	35.8	40.3	26.2	31.2	32.0	45.1

[†]Infection type as described by Line and Qayoum (1992).

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

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).

**EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP**

1. NAME OF APPLICANT(S) University of Idaho	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER IDO599	3. VARIETY NAME UI Stone
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) University of Idaho Office of Technology Transfer Morrill Hall 414, P.O. Box 443003	5. TELEPHONE (Include area code) 208-885-4550	6. FAX (Include area code) 208-885-4551
7. PVPO NUMBER		

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 a U.S. national or a U.S. based entity? 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):

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.

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT F
DECLARATION REGARDING DEPOSIT

NAME OF OWNER (S) University of Idaho	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) University of Idaho Office of Technology Transfer Morrill Hall 414, P.O. Box 443003	TEMPORARY OR EXPERIMENTAL DESIGNATION IDO599
		VARIETY NAME UI Stone
NAME OF OWNER REPRESENTATIVE (S) Jianli Chen, Breeder Karen Stevenson, Licensing Associate	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) Jianli Chen, University of Idaho R & E Center, 1691 S 2700 W, Aberdeen, ID 83210 Karen Stevenson, University of Idaho, Office of Technology Transfer, Morrill Hall 414, P.O. Box 443003	FOR OFFICIAL USE ONLY
		PVPO NUMBER

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.


Signature

April 1, 2013
Date