No. 200200265

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

University of Idaho

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE VARIETY. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Alturas'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty ninth day of April, in the year two thousand three.

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: University of Idaho

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME: ID0526

3. VARIETY NAME: Alturas

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*:
College of Agricultural and Life Sciences
University of Idaho
PO Box 442337
Moscow ID 83844-2337

5. TELEPHONE *(include area code)*: 208-397-4181

6. FAX *(include area code)*: 208-397-4311

FOR OFFICIAL USE ONLY

APPLICATION NUMBER: 200200265

FILING DATE: September 18, 2002

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)*
Edward Souza
University of Idaho
PO Box 870
1693 S. 2700 W.
Aberdeen, ID 83210

Holly L. Waters
Idaho Agricultural Experiment Station
College of Agricultural and Life Sciences
University of Idaho
P.O. Box 442337
Moscow ID 83844-2337

FEES RECEIVED

FILING AND EXAMINATION FEES: $ 2705.00
DATE 9/18/2002

CERTIFICATION FEE: $ 432.00
DATE 4-21-2003

MAH 4-21-2003

11. TELEPHONE *(Include area code)*: 208-397-4181

12. FAX *(Include area code)*: 208-397-4311

13. E-MAIL: esouza@uidaho.edu

14. CROP KIND *(Common Name)*: wheat

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. [X] Exhibit A. Origin and Breeding History of the Variety
b. [X] Exhibit B. Statement of Distinctness
c. [X] Exhibit C. Objective Description of Variety
d. [X] Exhibit D. Additional Description of the Variety *(Optional)*
e. [X] Exhibit E. Statement of the Basis of the Owner's Ownership
f. [X] Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be depositied and maintained in an approved public repository)*
g. [X] Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. 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)*
[X] YES *(If "yes", answer items 20 and 21 below)* [ ] NO *(If "no," go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? [X] YES [ ] NO
IF YES, WHICH CLASSES? [X] FOUNDATION [X] REGISTERED [X] CERTIFIED

21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? [ ] YES [X] NO
IF YES, SPECIFY THE NUMBER 1, 2, 3, *etc.* [ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

(If additional explanation is necessary, please use the space indicated on the reverse.)

22. 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 [X] 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.)*

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

24. The owners declare that a viable sample of basic seed of the variety will be 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	
Richard C. Heimsch			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Richard C. Heimsch			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Director, Associate Dean	8/26/02		

S&T-470 (2-99) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (6-98) which is obsolete. *(See reverse for instructions and information collection burden statement)*

Plant Variety Protection Application: Alturas

Exhibit A, Origin and Breeding History of the Variety

Alturas was derived from a cross, 'Whitebird' (PI 592982)/ 'Centennial' (PI 537303) made at the University of Idaho, Aberdeen Research and Extension Center in 1989. The cross, designated A89078S was advanced by the bulk method without intentional selection in the F_2 generation. In the F_3 generation, heads were selected from short plants and planted as $F_{3:4}$ headrows in 1993. From these headrows, the selection A89078S-10 was advanced to yield trials in southeastern Idaho in 1994. In 1997, A89078S-10 was designated IDO526 and entered into the Tri-State Spring Wheat Nursery. IDO526 was advanced the next year into the Western Regional Spring Wheat Nursery for two years of testing (1998 to 1999). In 1999, IDO526 was evaluated in the Pacific Northwest Wheat Quality Council and in Idaho on-farm extension trials. In 1999, 200 head selections were grown at Aberdeen, ID and selected for uniform plant type. Seed from headrows that were true-to-type were harvested and planted at Tetonia in 2001 to form breeder seed. Alturas has remained uniform and stable over eight generations of evaluation from 1994 to 2001. Alturas does not have identifiable phenotypic variants.

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Plant Variety Protection Application: Alturas

Exhibit B, Novelty Statement

Alturas is most similar to the soft white spring wheat 'Centennial'. The two cultivars may be distinguished based on the alleles of the high-molecular weight glutenin locus on chromosome 1A. Alturas carries the *Glu-A1a* at the *Glu-AI* locus in contrast to Centennial, which carries the *Glu-A1c*.

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

Form Approved - OMB No. 0581-005

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 collection of information is (0581-0055). The time required to complete this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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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.

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

EXHIBIT C
(Wheat)

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

NAME OF APPLICANT(S)	FOR OFFICIAL USE ONLY
University of Idaho	PVPO NUMBER 20020265
ADDRESS *(Street and No. or RD No., City, State, and Zip Code)*	VARIETY NAME
	TEMPORARY OR EXPERIMENTAL DESIGNATION

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:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) : _____

2. VERNALIZATION:

[1] 1=Spring 2=Winter 3=Other (SPECIFY) : _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[3] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[2] 1 = Erect 2 = Recurved [2] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][4] Number of Days Earlier Than Treasure *

[0][1] Number of Days Later Than Centennial *

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8. ANTHER COLOR:

[1] 1 = Yellow 2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0 2] cm Taller Than Centennial *

[0 3] cm Shorter Than Whitebird *

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

10. STEM:

A. ANTHOCYANIN

[1] 1= Absent 2=Present

B. WAXY BLOOM

[1] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)

[1] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER)

[1] 1= Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

2 [~~1~~] 1=Absent 2=Present

[9] cm Length

MAH 3/11/2003 per letter of 1-29-2003

11. HEAD (at Maturity):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[2] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY): _____

C. CURVATURE

[1] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR

[1] 1 = White 2 = Tan 3 = Other (SPECIFY) : _____

B. SHOULDER

[4] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[2] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

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12. GLUMES (at Maturity) *Continued*:

E. WIDTH

[1] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

E. Color

[3] 1=White 2= Amber 3= Red 4= OTHER (Specify)

F. TEXTURE

[2] 1=Hard 2=Soft

C. BRUSH

[1] 1=Short 2=Medium 3=Long

[1] 1 = Not Collared 2 = Collared

D. CREASE

[1] 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

G. PHENOL REACTION *(see instructions)*:

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

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[0] Stem Rust *(Puccinia graminis* f. sp. *tritici)*

[2] Stripe Rust *(Puccinia striiformis)*

[0] Tan Spot *(Pyrenophora tritici-repentis)*

[0] Halo Spot *(Selenophoma donacis)*

[3] *Septoria nodorum* (Glume Blotch)

[0] *Septoria avenae* (Speckled Leaf Disease)

[3] *Septoria tritici* (Speckled Leaf Blotch)

[1] Scab (*Fusarium* spp.)

[3] Leaf Rust *(Puccinia recondita* f. sp. *tritici)*

[2] Loose Smut *(Ustilago tritici)*

[0] Flag Smut *(Urocystis agropyri)*

[1] Common Bunt *(Tilletia tritici* or *T. laevis)*

[1] Dwarf Bunt *(Tilletia controversa)*

[1] Karnal Bunt *(Tilletia indica)*

[3] Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*

[0] "Snow Molds"

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14. Disease *(Continued)* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

2	"Black Point" (Kernel Smudge)	0	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
1	Barley Yellow Dwarf Virus (BYDV)	0	Rhizoctonia Root Rot *(Rhizoctonia solani)*
0	Soilborne Mosaic Virus (SBMV)	4	Black Chaff *(Xanthomonas campestris* pv. *translucens)*
0	Wheat Yellow (Spindle Streak) Mosaic Virus	0	Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
1	Wheat Streak Mosaic Virus (WSMV)		Other (SPECIFY)
	Other (SPECIFY)		Other (SPECIFY)
	Other (SPECIFY)		Other (SPECIFY)
	Other (SPECIFY)		Other (SPECIFY)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

1	Hessian Fly *(Mayetiola destructor)*		Other (SPECIFY)
1	Stem Sawfly *(Cephus* spp.)		Other (SPECIFY)
1	Cereal Leaf Beetle *(Oulema melanopa)*		Other (SPECIFY)
1	Russian Aphid *(Diuraphis noxia*		Other (SPECIFY)
0	Greenbug *(Schizaphis graminum)*		Other (SPECIFY)
0	Aphids		Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

Plant Variety Protection Application: Alturas

Exhibit D, Additional Description of Variety

Alturas is most similar in appearance to Centennial soft white spring wheat. Alturas has an unpigmented coleoptile and erect juvenile growth. Alturas has a recurved, twisted flag leaf and an awned, erect, mid-dense head, which is white-chaffed at maturity. Alturas is 85 cm tall, similar to 'Penawawa' and Centennial, yet 3 cm shorter than 'Alpowa' and Whitebird. Alturas is similar in heading date to 'Jubilee', on average in southern Idaho, Julian day 185. Alturas heads 1 d later than Centennial and 1 d earlier than Penawawa, Alpowa and Whitebird and 4 d earlier than 'Treasure'. Seed of Alturas is soft, white, eliptical, and plump, with a kernel type similar to Centennial, but approximately 1.8 mg per kernel larger. Based on field evaluations in Washington and Idaho, Alturas has adult plant resistance to stripe rust [caused by *Puccinia striiformis* (Westend.)], but moderate susceptibility to leaf rust [caused by *P. recondita* (Roberge ex Desmaz.)], and susceptibility to the Hessian fly [*Mayetiola destructor* (Say)]. Alturas has the high-molecular weight glutenin profile of *Glu-A1a*, *Glu-B1f*, and *Glu-D1d*.

Quantitative Data

Table 1. Performance of soft white spring wheats in southern Idaho research trials, 1995 to 2001.

Table 2a. Soft white spring wheat quality evaluations (9 irrigated environments), 1998-2001.

Table 2b. Milling and baking data of regional & commercial SWS breeding lines grown at Aberdeen, ID, 2000 & 2001.

Table 2c. Summary of alkali noodle color for soft white spring wheats, 5 Idaho environments, 2001

Table 3. Supplemental sucrose sequential SRCs, Aberdeen and Hazelton, 2001 Crop

Table 4. Western Regional Nursery grain yield, 1998 and 1999.

Table 5. Western Regional Nursery disease evaulations, from X. Chen, 1998 and 1999.

Table 6. Western Regional Nursery quality evaluations, Pullman Wheat Quality Laboratory, 1998 and 1999.

Table 7a to f. Soft white spring wheat performance in Idaho extension nursery trials, 1999 to 2001.

Table 8. Summary of soft white spring extension trials, Washington State University, 1999 to 2001.

Table 1. Performance of soft white spring wheats in southern Idaho research trials, 1995 to 2001.

	High yield trials (Over 120 bu/ac) bu/ac	Bingham County trials bu/ac	Magic Valley bu/ac	Tetonia irrigated bu/ac	Tetonia rain-fed bu/ac	All trials bu/ac	Test weight #/bu	Heading date Julian	Height in	Lodging %	Dockage %
Alturas	132	125	116	78	55	95.5	60.5	184.8	33	10	2.9
Jubilee	137	126	115	74	52	94.1	61.1	185.2	34	10	2.4
Penawawa	135	126	116	77	53	95.1	60.0	185.8	33	10	2.4
Alpowa	138	131	112	71	55	95.1	61.2	186.0	35	23	2.3
Centennial	127	118	111	72	49	89.7	60.8	183.2	33	16	4.4
Treasure	127	120	108	76	55	92.1	59.4	188.5	33	28	3.7
Whitebird	131	121	113	71	51	91.1	61.0	185.9	35	6	2.7
Std. Error	2.4	2.2	3.2	2	1.4	1.1	0.15	0.3	0.3	3	0.3
No. of trials	11	15	7	5	12	40	37	22	31	17	14

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Table 2a. Soft white spring wheat quality evaluations (9 irrigated environments), 1998-2001.

		SRC				Mill/Bake Evaluations				
ID	wxy	Water	Na2CO3	Sucrose	Lactic acid	Flour prot.	Break flour	Flour yield	Cookie dia	Top grd
		%					%		cm	0-9
Alturas	B-wxy	**48.1**	**59.9**	**89.5**	**98.6**	**9.5**	**41.5**	**65.2**	**8.70**	**3.7**
Whitebird	wt	49.1	60.7	85.6	84.4	9.3	44.9	64.9	8.82	4.0
Treasure	wt	49.1	61.0	86.9	91.4	9.3	45.7	64.8	8.82	4.1
Centennial	B-wxy	48.7	60.6	90.5	93.3	9.8	43.0	63.5	8.63	2.8
Alpowa	wt	50.8	63.4	93.5	101.8	9.6	41.9	61.4	8.53	2.4
Penawawa	B-wxy	49.8	63.7	96.2	96.1	9.9	42.2	60.3	8.47	2.4
Jubilee	wt	48.6	59.4	84.4	84.8	9.4	45.4	66.1	8.90	4.1
Challis	wt	47.4	59.8	87.0	98.8	9.7	44.2	66.3	8.72	3.3
Std. Err.		0.7	0.6	1.0	1.8	0.1	0.5	0.5	0.10	0.3

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Table 2b. Milling and baking data of regional & commercial SWS breeding lines grown at Aberdeen, ID, 2000 & 2001.

		Mill and sugar snap cookie					Solvent retention capacity			
Name	Cls	Flour protein %	Break flour %	Flour yield %	Cookie diameter cm	Top grain 1-5	Water %	Sodium carbonate %	Sucrose %	Lactic acid %
Commercial Cultivars										
Alturas	SWS	8.3	42.2	67.4	8.6	4	46.7	58.4	87.6	90.7
Penawawa	SWS	9.3	43.0	61.0	8.4	2	46.2	62.1	95.8	90.9
Treasure	SWS	8.2	43.9	67.0	8.9	4.5	48.0	60.5	85.9	85.0
Whitebird	SWS	8.3	42.3	66.2	8.9	5	47.0	59.3	82.4	77.4
Zak	SWS	8.5	44.0	62.8	8.8	3.5	44.3	58.2	86.1	80.4
Vanna	SWS	8.9	45.3	61.7	8.7	2	47.0	61.7	91.7	93.6
50-30	SWS	8.0	39.7	64.4	8.8	4.5	48.1	62.7	94.0	94.5
Jubilee	SWS	8.2	44.9	68.0	8.8	4.5	44.4	60.2	83.6	79.5
Club wheats										
IDO556	CLB	9.0	40.0	62.1	8.8	3	45.6	57.8	85.8	69.1
Breeding Lines										
IDO569	SWS	9.5	40.7	67.5	8.4	2	45.7	58.2	87.4	102.2
WA7877	SWS	9.7	41.6	62.0	8.3	1.5	46.9	61.9	87.1	72.5
WA7883	SWS	9.2	40.2	63.8	8.8	3	45.3	58.7	86.9	69.7
WA7884	SWS	8.6	41.9	63.0	8.6	2.5	49.2	63.2	94.2	93.6
WA7886	SWS	8.6	40.7	64.3	8.7	4	45.1	58.7	85.2	72.6
WA7887	SWS	7.9	42.4	65.3	8.7	4	46.5	59.2	85.2	87.8
WA7890	SWS	9.4	37.1	69.7	8.2	2	50.6	66.5	91.5	98.4

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Table 2c. Summary of alkali noodle color for soft white spring wheats, 5 Idaho environments, 2001

	Color coordinates @ 0 h			Color coordinates @ 24 h			Change in 24 h
	L*	a*	b*	L*	a*	b*	L*
Alturas	**87.6**	**-2.8**	**20.2**	**81.4**	**-0.7**	**18.9**	**6.3**
Whitebird	87.9	-3.2	21.1	81.7	-1.2	21.4	6.2
Treasure	87.9	-2.9	20.0	81.5	-0.9	19.9	6.4
Penawawa	87.3	-2.7	20.2	71.8	-1.0	16.1	15.5
Jubilee	87.2	-3.3	21.9	79.2	-1.1	19.8	8.0
Challis	87.3	-2.9	21.3	77.6	-1.2	19.4	9.7
Zak	87.0	-2.3	19.1	76.4	-0.9	16.5	10.6
Std. Error	0.2	0.1	0.3	0.6	0.2	0.5	0.5

Table 3 Supplemental sucrose sequential SRCs, Aberdeen and Hazelton, 2001 Crop

Ent	ID	Water	Na2CO3	Sucrose	Lactic acid	70% EtOH SRC	SRC Difference
1	**Whitebird**	**44.6**	**60.0**	**81.9**	**76.5**	**46.2**	**16.9**
2	**Treasure**	**45.4**	**60.5**	**83.7**	**85.2**	**45.1**	**21.9**
3	Centennial	46.1	61.1	88.5	89.7	43.3	24.6
4	Alpowa	47.7	63.1	90.1	95.2	45.1	29.8
5	Penawawa	46.7	64.7	96.2	93.3	42.9	27.9
6	**Jubilee**	**44.0**	**60.0**	**81.2**	**79.4**	**44.6**	**24.7**
7	Alturas	46.5	56.8	87.8	95.8	43.5	22.8
8	Challis	45.1	58.5	82.9	94.5	44.8	22.8
10	IDO556 (Club)	45.6	58.0	83.9	67.1	42.1	22.9
11	IDO569	47.5	59.3	88.6	102.5	42.7	24.9
13	IDO581	44.6	58.1	83.5	88.3	43.7	23.3
15	IDO582	47.8	59.6	84.4	94.7	46.1	23.2
	lsd	0.6	0.7	1.5	2.7	1.3	4.2
	Entry F	2.49 **	5.75 ***	4.25 ***	5.15 ***	4.98 ***	3.66 ***

SRC Difference calculated

Sucrose SRC - Ethanol SRC

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Table 4. Western Regional Nursery grain yield, 1998 and 1999

Entry	1999 grain yield 11 locations	1998 grain yield 10 locations	Two year average
	bu/ac	bu/ac	bu/ac
Alturas	81.9	79.1	80.5
Zak	82.9	77.8	80.4
Lolo	78.6	76.4	77.5
Jubilee	78.6	72.9	75.8
Penawawa	77.6	72.1	74.9
Klasic	65.6	63.8	64.7
Federation	66.9	55.8	61.4

Table 5. Western Regional Nursery disease evaulations, from X. Chen, 1998 and 1999

Entry	1998 Spillman farm, Pullman July 8		1998 Witlow farm, Pullman June 30		1998 Witlow farm, Pullman July 13		1998 Mt. Vernon June 12	
	%	type	%	type	%	type	%	type
Alturas	5	5	5	2=5	10	5	0	0
Zak	0	0	2	2	20	8	0	0
Lolo	0	0	1	2	0	0	0	0
Jubilee	20	5	5	2=5	20	5	2	2
Penawawa	10	5	10	2=5	5	5	20	5
Whitebird	20	5	5	2=5	20	5	10	2
Centennial	10	5	1	2	5	5	0	0
Federation	50	8	80	8	60	5=8	80	8

Entry	1999 Spillman farm, Pullman July 15		1999 Spillman farm, Pullman July 29		1999 Mt. Vernon May 26		1999 Mt. Vernon June 16		1999 Mt. Vernon July 8	
	%	type	%	type	%	type	%	type	%	type
Alturas	1	8	1	5=8		8	10	8	10	8
Zak	0	0	2	2=5		0	0	0	0	0
Lolo	0	0	0	0		0	0	0	0	0
Jubilee	0	0	1	2=8		8	2	2=8	2	2
Challis	2	5	2	5		8	10	8	20	8
Penawawa	1	5	1	5		8	20	8	40	7=8
Whitebird	0	0	0	0		0	0	0	0	0
Centennial	0	0	0	0		8	10	2=5	5	2=5
Federation	5	5	5	2=5		8	60	8	80	8

Table 6. Western Regional Nursery quality evaluations, Pullman Wheat Quality Laboratory, 1998 and 1999.

--- 1998 ---

	Test weight #/bu	Single kernel hardness 0 to 100	Single kernel weight mg	Flour yield %	Break flour yield %	Flour ash %	Milling score	Flour protein	Rapid visco-analysis units	Mixo-graph absorp. %	Mixo-graph type	Cookie diameter cm	Sponge cake volume ml
Federation	60.4	39.6	30.6	69.5	55.3	0.45	81.0	9.2	149	55	2M	9.23	1195
Penawawa	61.0	31.8	29.7	68.4	52.7	0.45	79.6	8.3	259	54.6	4L	9.45	1275
50-30	59.7	32.0	27.9	68.3	53.6	0.41	82.0	7.3	260	51.5	1L	9.32	1250
Jubilee	61.7	32.5	31.5	70.1	55.9	0.40	84.9	7.9	173	55.6	3L	9.73	1330
Alturas	62.5	26.0	35.2	71.3	54.9	0.43	84.5	8.0	233	53.5	3M	9.45	1280
Zak	61.9	26.9	35.8	70.8	56.2	0.40	85.8	7.7	162	53.7	4L	9.75	1280

--- 1999 ---

	Test weight #/bu	Single kernel hardness 0 to 100	Single kernel weight mg	Flour yield %	Break flour yield %	Flour ash %	Milling score	Flour protein	Rapid visco-analysis units	Mixo-graph absorp. %	Mixo-graph type	Cookie diameter cm	Sponge cake volume ml
Federation	60.6	38.6	35.3	66.5	45.5	0.37	82.2	10.9	112	56.1	2M	9.00	1200
Penawawa	62.3	19.2	39.4	66.9	46.6	0.31	86.6	9.8	206	55.1	2M	9.34	1275
Jubilee	62.8	32.4	34.1	68.5	49.6	0.30	89.2	9.3	146	51.4	2M	9.64	1310
Alturas	61.6	21.2	35.7	70.0	49.2	0.34	88.6	9.2	196	50.6	3M	9.24	1265
Zak	61.7	19.6	39.3	68.8	50.0	0.37	88.9	9.4	122	51.1	2M	9.82	1310

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Table 7a. Soft white spring extension trials, southern and eastern Idaho (Dist. III and IV), rain-fed trials, 1999 to 2001, 9 trials.

	Grain yield bu/ac	Test weight #/bu	Height in	Heading date Julian
Alturas	32.4	58.5	21	185
Alpowa	33.4	58.4	22	187
Centennial	29.3	59.0	21	184
Challis	33.5	57.9	22	185
Jubilee	32.7	58.3	22	187
Penawawa	28.9	58.4	20	185
Whitebird	32.0	58.1	22	186
Std error	1.0	0.7	0.4	1

Table 7b. Soft white spring extension trials, northern Idaho (Dist. I), rain-fed trials, 2001, 2 trials.

	Grain yield bu/ac	Test weight #/bu	Height in	Grain protein %
Alturas	69	61.4	30	10.1
Centennial	68	62.1	30	11.4
Challis	72	60.6	31	11.3
Eden	64	63.4	28	10.4
IDO556	65	63.7	28	11.9
Jubilee	64	62.2	33	11.6
Penawawa	65	61.8	30	11.3
Vanna	60	60.4	30	11.1
Wawawai	71	62.0	35	11.4
Zak	75	61.9	32	10.6
Std error.	3	0.2	1	0.4

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Table 7c. Soft white spring extension trials, eastern Idaho (Dist. III), irrigated trials, 1999 to 2001, 9 trials[1].

	Grain yield bu/ac	Test weight #/bu	Height in	Heading date Julian	Lodging %
Alturas	107	60.3	33.2	166	38
Alpowa	112	62.0	33.5	168	19
Centennial	104	60.4	33.3	166	62
Challis	108	59.9	34.1	167	50
Jubilee	106	61.0	34.2	167	24
Penawawa	107	60.7	33.2	168	8
Pomerelle	107	58.7	34.1	170	77
Treasure	106	58.4	33.3	171	42
Whitebird	103	61.1	35.2	169	6
Std. Error	3	0.33	0.5	0.4	17

1) Includes 2001 Simplot trials at Burley

Table 7d. Soft white spring extension trials, Idaho (Dist.II, III, IV), irrigated trials, 1999 to 2001 with average yields over 110 bu, 12 trials.

	Grain yield bu/ac	Test weight #/bu	Height in	Heading date Julian	Lodging %
Alturas	122	62.8	35.4	167	13
Alpowa	117	63.9	36.4	169	19
Centennial	118	63.0	35.6	166	14
Challis	124	62.4	36.5	168	23
Jubilee	120	63.4	36.6	168	10
Penawawa	121	62.8	35.9	169	19
Pomerelle	122	62.1	36.2	171	21
Treasure	119	61.3	36.0	171	29
Whitebird	117	63.3	37.4	169	12
Std. Error	2	0.2	0.3	0.3	5

Table 7e. Soft white spring extension trials, eastern Idaho (Dist. IV), irrigated trials, 1999 to 2001, 6 trials[1].

	Grain yield bu/ac	Test weight #/bu	Height in	Heading date Julian
Alturas	91	60.8	31	184
Alpowa	84	61.6	34	186
Centennial	92	61.8	31	183
Challis	88	60.6	32	185
Jubilee	81	61.2	33	185
Penawawa	85	61.4	30	184
Pomerelle	92	60.3	32	185
Treasure	90	59.5	32	186
Whitebird	84	61.0	33	185
Std. Error	2	0.5	1	0.6

1) Excludes on-station Aberdeen trials at Aberdeen REC.

Table 7f. Soft white spring extension trials, southwestern Idaho (Dist. II), irrigated trials, 1999 to 2001, 8 trials[1].

	Grain yield bu/ac	Test weight #/bu	Height in	Heading date Julian	Lodging %
Alturas	119	63.4	36		10
Alpowa	107	64.3	37		18
Centennial	112	64.0	36		13
Challis	116	63.1	36		21
Jubilee	115	64.1	37		7
Penawawa	112	63.7	36		18
Pomerelle	112	62.8	36		19
Treasure	112	62.4	37		25
Whitebird	111	64.0	37		11
Std. Error	3	0.3	0.5		4

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Table 8. Summary of soft white spring extension trials, Washington State University, 1999 to 2001

	Average grain yield Washington state 1999 to 2001	Average grain yield Washington state 2000 to 2001	- Washington State Yield Trials - 2001				
			Grain yield	Test weight	Heading date	Height	Protein
	bu/ac	bu/ac	bu/ac	lb/bu	Julian	in	%
Alturas	64.1	65.8	57.3	60.5	164	26.7	11.6
Alpowa	63.6	65.7	59.2	61.2	165	27.9	11.9
Challis	63.4	65.0	56.7	59.7	164	26.6	11.6
Wawawai	63.2	65.5	56.6	60.7	164	30.9	11.9
Zak	62.8	64.1	56.6	60.3	166	28.4	12.4
Edwall	59.6	59.7	54.0	58.2	164	26.4	11.8
Jubilee	59.6	62.7	54.6	60.9	164	27.9	12.3
Penawawa	59.0	60.7	51.8	59.9	164	25.2	11.9
Fielder	57.2	58.1	54.0	60.1	164	26.8	12.0
Calorwa	56.4	58.0	51.0	59.7	162	24.6	12.0
Eden		65.2	58.1	61.3	164	26.4	11.1
WA7887	65.0	66.7	58.7	59.9	164	28.9	11.8
WA7877	64.1	66.2	58.4	60.0	166	29.1	12.1
WA7884		68.3	58.9	60.7	166	28.1	11.6
LSD 95%	4.3	4.5	3.7	0.5	1	1.0	0.4

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

1. NAME OF APPLICANT(S)
University of Idaho
Idaho Agricultural Experiment Station
PO Box 442337
Moscow ID 83844-2337

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
IDO526

3. VARIETY NAME
Alturas

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*
College of Agricultural & LIfe Sciences
University of Idaho
PO Box 442339
Moscow ID 83844-2335

5. TELEPHONE *(include area code)*
208-397-4181

6. FAX *(include area code)*
208-397-4311

7. PVPO NUMBER
200200265

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

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

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

a. If 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 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 *(if needed, use reverse for extra space)*:
Alturas was derived from a single cross of two parents owned by the Idaho Agricultural Experiment Station. The cross was performed under the direction of Professor Edward Souza, an employee of the University of Idaho. Subsequent selection was also conducted by Dr. Souza. Under the terms of faculty contract, the intellectual property created by faculty is the property of the University of Idaho.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of 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 final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

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