No. 200000138

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Research and Development Institute, Inc.

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, [illegible] CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN [illegible]CING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY [illegible]TION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CL[illegible]RTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE R[illegible] STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'MTHW9420'

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 twelfth day of September, in the year two thousand one.

Attest:

Paul M. Zenkowski

Commissioner
Plant Variety Protection Office

[illegible]

Secretary [illegible]ulture

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

Form Approved - OMB No. 0581-005

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: Research and Development Institute, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME: MTHW9420

3. VARIETY NAME: MTHW9420

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*: 1711 West College, Bozeman MT 59715

5. TELEPHONE *(include area code)*: (406) 587-4479

6. FAX *(include area code)*: (406) 587-4480

FOR OFFICIAL USE ONLY

PVPO NUMBER: 200000138

FILING DATE: 1-31-00

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*: Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION: Montana

9. DATE OF INCORPORATION: Sept. 2, 1990

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Roger N. Flair
Research and Development Inst., Inc
1711 West College
Bozeman MT 59715

FEES RECEIVED

FILING AND EXAMINATION FEES: $ 2450.00 DATE 1-31-00

CERTIFICATION FEE: $ 320.00 DATE 6/15/01

11. TELEPHONE *(include area code)*: 406 587-4479

12. FAX *(include area code)*: 406 587-4480

13. E_MAIL:

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

15. GENUS AND SPECIES NAME OF CROP: Triticum aestivum

16. FAMILY NAME *(Botanical)*: Pooaceae

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

18. 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 ($2,450), 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)*

☒ 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 GENERATIONS?

☒ YES ☐ NO

21. IF "YES" TO ITEM 20, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

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 ☒ 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 ☒ NO

IF YES, PLEASE 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	
NAME *(Please print or type)*		NAME *(Please print or type)* Roger N. Flair	
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE President	DATE 1/25/00

18A. Origin and Breeding History of MTHW9420

MTHW9420 was an F_4 plant selection from the MT8182/MT8289. MT8182 was a selection from the variety Yding, which has the pedigree Ciano F67/Penjamo T 62//Gallo. MT8289 was a selection from the cross Tanager/Pichihuila. The parental lines of both MT8182 and MT8289 were developed by the International Maize and Wheat Improvement Center. Both parents had hard white kernels.

MTHW9420 was developed through single seed descent through the F_4 generation with no selection. Selection in F_4 and F_5 generations was for plant height, seed color, upright growth habit, maturity, and kernel protein. In subsequent generations, selection was practiced for these characteristics in addition to yield, test weight, baking quality, and noodle quality.

MT HW9420 has been tested at four to five locations in Montana since 1994. A head row/line row purification system was employed beginning in 1997 to increase the variety. *MTHW9420 has been stable and uniform based on observations of seed production fields over three growing seasons. Exceptional tall plants are observed at a rate of approximately 1 in 2000 plants if growing conditions are optimal.* This is similar to other semi-dwarf spring wheat varieties. Results presented in this document span six Montana locations from 1997-1999. These years allow direct comparison with ID377s, which is an important hard white wheat variety in the state. Prior to 1997, ID377s was not included in our trials.

18b. Statement of Distinctness.

MTHW9420 is most similar agronomically to the hard red spring wheat 'Hi-Line'. Both are semi-dwarf wheats with good yield potential. The distinction with Hi-Line is white versus red kernel color. Other hard white wheat varities currently grown in the area include Klasic and ID377s. MTHW9420 is distinct from Klasic due to higher yield potential in most areas of the state. Additionally, Klasic is a true dwarf plant, and as such is too short for many dryland areas of Montana. On the other hand, ID377s is a normal height plant, and is too tall from many areas of the state. The protein level and bread-making quality of MTHW9420 is also superior to ID377s.

18c. MTHW9420 is a semi-dwarf hard white spring wheat with good yield potential in both dryland and irrigated areas of Montana. Yield potential of MTHW9420 across five Montana locations is higher than Hi-Line and Klasic, and less than ID377s (Table 1). Test weight and heading date of MTHW9420 are similar to other hard wheats in the state (Table 1). MTHW9420 is a semi-dwarf, approximately 7 inches taller than Klasic, and *2.5* inches shorter than ID377s. Protein of MTHW9420 is lower than Hi-Line and Klasic, and greater than ID377s (Table 1). MTHW9420 yielded more than Klasic in all locations except Havre and Moccasin, and less than ID 377s in all locations except Sidney (Table 2). Percent protein of MTHW9420 was higher than ID377s in all locations except Havre, and less than Klasic in all locations except Kalispell (Table 6).

18d.

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

Form Approved - OMB No. 0581-0055

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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) Research and Development Institute, Inc.	FOR OFFICIAL USE ONLY PVPO NUMBER 200000138
ADDRESS (*Street and No. or RD No., City, State, and Zip Code*) 1711 West College Bozeman MT 59715	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):

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

7. EAR EMERGENCE:

[0][0] Number of Days Earlier Than Id377s *

[0][4] Number of Days Later Than Klasic *

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8. ANTHER COLOR:

[1] 1 = Yellow 2 = Purple

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

[1 8] cm Taller Than Klasic *

[0 8] cm Shorter Than ID377s *

MAH 4/23/01

* 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=Absent 2=Present

[37] cm Length

11. HEAD (at Maturity):

A. DENSITY

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

B. SHAPE

[1] 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

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

C. BEAK

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

D. LENGTH

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

12. GLUMES (at Maturity) *Continued*:

E. WIDTH

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

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13. SEED:

A. SHAPE

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

B. CHEEK

[2] 1=Rounded 2=Angular

E. Color

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

F. TEXTURE

[1] 1=Hard 2=Soft

C. BRUSH

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

[1] 1 = Not Collared 2 = Collared

D. CREASE

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

[2] 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)*:

[0] 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

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

[1] Stripe Rust *(Puccinia striiformis)*

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

[0] Halo Spot *(Selenophoma donacis)*

[0] *Septoria nodorum* (Glume Blotch)

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

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

[0] Scab (*Fusarium* spp.)

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

[0] Loose Smut *(Ustilago tritici)*

[0] Flag Smut *(Urocystis agropyri)*

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

[0] Dwarf Bunt *(Tilletia controversa)*

[0] Karnal Bunt *(Tilletia indica)*

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

[0] "Snow Molds"

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

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PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

0	"Black Point" (Kernel Smudge)	0	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
0	Barley Yellow Dwarf Virus (BYDV)	0	Rhizoctonia Root Rot *(Rhizoctonia solani)*
0	Soilborne Mosaic Virus (SBMV)	0	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)

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

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

Table 1. Agronomic Performance of MTHW9420 (1997-1999)

TABLE OF PAIRED T-TEST RESULTS

YIELD (BU/AC)

REFERENCE MEAN: HI-LINE 64.7 (N= 16)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
MTHW9420	MT8182/MT8	67.7	16	3.0	1.6	.136
MTHW9603	MT9112/MT9	69.3	16	4.7	1.8	.098
MTHW9701	CYMMIT204/	68.0	16	3.3	1.7	.118
MTHW9705	CYMMIT204/	69.0	16	4.3	4.3	.000
MTHW9706	CYMMIT204/	69.2	16	4.5	4.6	.000
MTHW9709	MT8182/FOR	65.0	16	.3	.2	.842
MTHW9710	MT8182/FOR	64.3	16	-.4	-.3	.783
MTHW9715	MT8289/LEW	63.1	16	-1.6	-1.4	.190
MTHW9716	KLASIC/PON	65.4	16	.7	.6	.582
PI486139	KLASIC	62.4	16	-2.3	-1.2	.261
ID377S	ID377S	72.0	16	7.3	3.2	.006

TEST WEIGHT (LB/BU)

REFERENCE MEAN: HI-LINE 60.4 (N= 16)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
MTHW9420	MT8182/MT8	59.9	16	-.6	-1.9	.076
MTHW9603	MT9112/MT9	58.8	16	-1.7	-3.3	.005
MTHW9701	CYMMIT204/	59.7	16	-.7	-2.1	.055
MTHW9705	CYMMIT204/	60.2	16	-.2	-.5	.621
MTHW9706	CYMMIT204/	60.2	16	-.2	-.6	.551
MTHW9709	MT8182/FOR	59.0	16	-1.4	-2.8	.014
MTHW9710	MT8182/FOR	60.3	16	-.1	-.4	.728
MTHW9715	MT8289/LEW	61.5	16	1.1	3.2	.006
MTHW9716	KLASIC/PON	61.0	16	.6	2.3	.035
PI486139	KLASIC	60.5	16	.1	.4	.713
ID377S	ID377S	60.6	16	.2	.6	.558

HEADING DATE

REFERENCE MEAN: HI-LINE 177.1 (N= 16)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
MTHW9420	MT8182/MT8	177.3 June 28	16	.1	.4	.666
MTHW9603	MT9112/MT9	178.3	16	1.2	3.9	.001
MTHW9701	CYMMIT204/	177.9	16	.7	2.7	.017
MTHW9705	CYMMIT204/	177.1	16	.0	.1	.945
MTHW9706	CYMMIT204/	177.3	16	.2	.8	.463
MTHW9709	MT8182/FOR	176.8	16	-.3	-1.2	.267
MTHW9710	MT8182/FOR	175.4	16	-1.7	-4.6	.000
MTHW9715	MT8289/LEW	177.0	16	-.1	-.3	.798
MTHW9716	KLASIC/PON	175.4	16	-1.8	-5.2	.000
PI486139	KLASIC	174.0	16	-3.2	-6.6	.000
ID377S	ID377S	177.5	16	.4	1.1	.301

TABLE OF PAIRED T-TEST RESULTS

PLANT HEIGHT (INCHES)

REFERENCE MEAN: HI-LINE 30.3 (N= 16)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
MTHW9420	MT8182/MT8	30.4	16	.1	.2	.868
MTHW9603	MT9112/MT9	33.0	16	2.7	6.4	.000
MTHW9701	CYMMIT204/	29.7	16	-.6	-1.9	.072
MTHW9705	CYMMIT204/	30.0	16	-.3	-.7	.478
MTHW9706	CYMMIT204/	32.3	16	2.0	5.1	.000
MTHW9709	MT8182/FOR	31.6	16	1.3	3.7	.002
MTHW9710	MT8182/FOR	30.5	16	.2	.3	.742
MTHW9715	MT8289/LEW	32.5	16	2.2	4.2	.000
MTHW9716	KLASIC/PON	31.2	16	.9	1.8	.087
PI486139	KLASIC	23.6	16	-6.7	-11.9	.000
ID377S	ID377S	32.7	16	2.4	6.8	.000

Grain protein (%)

REFERENCE MEAN: HI-LINE 13.9 (N= 16)

ID	NAME	ACTUAL MEAN	NO. OBS	MEAN DIFF	T-PAIRED VALUE	P-VALUE
MTHW9420	MT8182/MT8	13.3	16	-.6	-3.8	.002
MTHW9603	MT9112/MT9	12.9	16	-1.1	-6.1	.000
MTHW9701	CYMMIT204/	13.1	16	-.9	-5.9	.000
MTHW9705	CYMMIT204/	13.3	16	-.6	-4.1	.001
MTHW9706	CYMMIT204/	13.6	16	-.3	-1.8	.092
MTHW9709	MT8182/FOR	13.6	16	-.3	-2.2	.045
MTHW9710	MT8182/FOR	14.1	16	.2	1.1	.272
MTHW9715	MT8289/LEW	13.6	16	-.3	-2.3	.034
MTHW9716	KLASIC/PON	14.0	16	.0	.2	.882
PI486139	KLASIC	13.7	16	-.2	-.8	.457
ID377S	ID377S	13.0	16	-1.0	-5.1	.000

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Table 2. Yield of MTHW9420. Boz-Irr=Irrigated nursery at Bozeman; Sid Dry=Dryland Nursery in Sidney.

1997-1999 YIELD HARD WHITE NURSERY									
		BOZ IRR		HAVRE		SID DRY	KALISPELL		
			MTYR		MTYR		MTYR		MTYR
ID	PEDIGREE	YRS	ADJ1	YRS	ADJ1	YRS	ADJ1	YRS	ADJ1
PI549275	HI-LINE	3	91.39	3	46.04	3	48.65	3	77.17
BASE AVE		3	91.39	3	46.04	3	48.65	3	77.17
MTHW9420	MT8182/MT8289	3	100.28	3	41.75	3	51.67	3	90.51
MTHW9603	MT9112/MT9114	3	97.21	3	40.15	3	54.08	3	95.9
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	100.32	3	43.72	3	48.62	3	85.4
MTHW9705	CYMMIT204//PONDERA/MT8182	3	97.91	3	48.71	3	48.36	3	84.58
MTHW9706	CYMMIT204//PONDERA/MT8182	3	95.1	3	48.82	3	52.72	3	86.45
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	86.79	3	44.87	3	49.89	3	83.01
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	86.42	3	44.83	3	52.7	3	77.08
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	87.71	3	41.11	3	50.74	3	81.02
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	90.54	3	43.7	3	50.44	3	84.23
PI486139	KLASIC	3	92.2	3	43.62	3	40.24	3	78.64
ID377S	ID377S	3	105.09	3	47.56	3	49.35	3	96.99
AVERAGE		3	94.25	3	44.57	3	49.79	3	85.08

Table 2. (cont.)

1997-1999 YIELD HARD WHITE NURSERY									
		MOCCASIN		CONRAD DRY		PERCENT	OVERALL	TOTAL	
			MTYR		MTYR	OF	COMP.	STATION	
ID	PEDIGREE	YRS	ADJ1	YRS	ADJ1	CHECK	AVG	YEARS	RANK
PI549275	HI-LINE	1	48.3	3	65.57	100	64.67	16	9
BASE AVE		1	48.3	3	65.57	100	64.67	16	0
MTHW9420	MT8182/MT8289	1	45.43	3	61.63	104.66	67.68	16	6
MTHW9603	MT9112/MT9114	1	42.43	3	68.29	107.21	69.33	16	2
MTHW9701	CYMMIT204//MT8182/FORTUNA	1	49.1	3	68.24	105.15	68	16	5
MTHW9705	CYMMIT204//PONDERA/MT8182	1	53.63	3	70.46	106.66	68.98	16	4
MTHW9706	CYMMIT204//PONDERA/MT8182	1	52.13	3	68.6	107	69.2	16	3
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	1	47.17	3	66.27	100.47	64.98	16	8
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	1	55.07	3	63.52	99.42	64.3	16	10
MTHW9715	MT8289/LEW//MT8182/FORTUNA	1	41.17	3	62.2	97.56	63.1	16	11
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	1	50	3	63.22	101.13	65.4	16	7
PI486139	KLASIC	1	57.67	3	58.66	96.43	62.36	16	12
ID377S	ID377S	1	46.93	3	69.41	111.34	72.01	16	1
AVERAGE		1	49.09	3	65.51	103.09	66.67	16	0

Table 3. Test weight of MTHW9420. Boz-Irr = Irrigated Nursery at Bozeman; Sid-Dry = Dryland nursery in Sidney.

1997- 1999 TEST WEIGHT; HARD WHITE NURSERY									
		BOZ IRR		HAVRE		SID DRY		KALISPELL	
			COMP.		COMP.		COMP.		COMP.
ID	PEDIGREE	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG
PI549275	HI-LINE	3	62.53	3	59.11	3	59.92	3	61.38
BASE AVE		3	62.53	3	59.11	3	59.92	3	61.38
MTHW9420	MT8182/MT8289	3	62.57	3	57.21	3	59.28	3	61.33
MTHW9603	MT9112/MT9114	3	60.7	3	56.28	3	57.58	3	59.94
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	62.23	3	57.8	3	59.25	3	60.39
MTHW9705	CYMMIT204//PONDERA/MT8182	3	61.97	3	58.44	3	59.28	3	60.76
MTHW9706	CYMMIT204//PONDERA/MT8182	3	61.73	3	59.22	3	59.2	3	60.73
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	60.33	3	56.55	3	57.85	3	60.03
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	61.6	3	58.71	3	60.05	3	60.63
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	62.6	3	59.91	3	61.04	3	62.18
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	63.07	3	59.53	3	60.57	3	61.26
PI486139	KLASIC	3	62.7	3	58.99	3	61.07	3	60.41
ID377S	ID377S	3	62.63	3	58.33	3	59.65	3	61.98
AVERAGE		3	62.06	3	58.34	3	59.56	3	60.92

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Table 3. Cont.

1997- 1999 TEST WEIGHT; HARD WHITE NURSERY									
		MOCCASIN		CONRAD DRY		PERCENT	OVERALL	TOTAL	
			COMP.		COMP.	OF	COMP.	STATION	
ID	PEDIGREE	YRS	AVG	YRS	AVG	CHECK	AVG	YEARS	RANK
PI549275	HI-LINE	1	56	3	60.67	100	60.43	16	5
BASE AVE		1	56	3	60.67	100	60.43	16	8
MTHW9420	MT8182/MT8289	1	55.1	3	60.53	99.07	59.87	16	9
MTHW9603	MT9112/MT9114	1	53.17	3	61.13	97.23	58.75	16	12
MTHW9701	CYMMIT204//MT8182/FORTUNA	1	57.23	3	59.87	98.86	59.74	16	10
MTHW9705	CYMMIT204//PONDERA/MT8182	1	56.77	3	61.87	99.68	60.23	16	7
MTHW9706	CYMMIT204//PONDERA/MT8182	1	58.13	3	60.93	99.66	60.22	16	8
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	1	56.43	3	61.13	97.65	59.01	16	14
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	1	58.37	3	61.23	99.82	60.32	16	6
MTHW9715	MT8289/LEW//MT8182/FORTUNA	1	58.2	3	62.9	101.78	61.51	16	1
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	1	57.83	3	61.77	100.99	61.03	16	2
PI486139	KLASIC	1	56.17	3	61	100.19	60.54	16	4
ID377S	ID377S	1	56.97	3	61.83	100.35	60.64	16	3
AVERAGE		1	56.7	3	61.24	99.61	60.19	16	0

Table 4. Heading Date of MTHW9420. Boz-Irr=Bozeman Irrigated, Sid-Dry= Dryland Nursery in Sidney.

1997-1999 HEADING DATE, HARD WHITE NURSERY											
		BOZ IRR		HAVRE		SID DRY		KALISPELL		MOCCASIN	
			COMP.		COMP.		COMP.		COMP.		COMP.
ID	PEDIGREE	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG
PI549275	HI-LINE	3	183.67	3	175.33	3	169	3	174.78	1	182.67
BASE AVE		3	183.67	3	175.33	3	169	3	174.78	1	182.67
MTHW9420	MT8182/MT8289	3	184	3	175.67	3	167.78	3	174.78	1	184.67
MTHW9603	MT9112/MT9114	3	185.33	3	175.67	3	169	3	176.89	1	185.33
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	184.33	3	176.56	3	169.11	3	175.55	1	183
MTHW9705	CYMMIT204//PONDERA/MT8182	3	183.67	3	175.66	3	168	3	174.78	1	182
MTHW9706	CYMMIT204//PONDERA/MT8182	3	184	3	175.55	3	168.22	3	175.22	1	183
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	183.33	3	174.56	3	168.11	3	174.56	1	181
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	181.33	3	174.11	3	166.78	3	172.67	1	180
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	183	3	175.67	3	168.22	3	174.33	1	182.67
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	182	3	174	3	166.78	3	172.56	1	179.67
PI486139	KLASIC	3	179.33	3	174.11	3	164.67	3	170.89	1	179.33
ID377S	ID377S	3	183.67	3	175.78	3	168.56	3	175	1	184.67
AVERAGE		3	183.14	3	175.22	3	167.85	3	174.33	1	182.33

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Table 4. Cont.

1997-1999 HEADING DATE, HARD WHITE NURSERY							
		CONRAD DRY		PERCENT	OVERALL	TOTAL	
			COMP.	OF	COMP.	STATION	
ID	PEDIGREE	YRS	AVG	CHECK	AVG	YEARS	RANK
PI549275	HI-LINE	3	181	100	177.12	16	7
BASE AVE		3	181	100	177.12	16	0
MTHW9420	MT8182/MT8289	3	181.67	100.08	177.27	16	5
MTHW9603	MT9112/MT9114	3	182.33	100.67	178.31	16	1
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	182	100.41	177.85	16	2
MTHW9705	CYMMIT204//PONDERA/MT8182	3	182	100.01	177.14	16	6
MTHW9706	CYMMIT204//PONDERA/MT8182	3	181.67	100.11	177.31	16	4
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	182	99.81	176.79	16	9
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	180.67	99.04	175.42	16	10
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	182	99.94	177.02	16	8
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	180	99	175.35	16	11
PI486139	KLASIC	3	179	98.21	173.96	16	12
ID377S	ID377S	3	182	100.2	177.48	16	3
AVERAGE		3	181.36	99.79	176.75	16	0

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Table 5. Plant Height of MTHW9420. Boz-Irr=Irrigated nursery in Bozeman; Sid-Dry=Dryland nursery in Sidney.

1997-1999 PLANT HEIGHT HARD WHITE NURSERY											
		BOZ IRR		HAVRE		SID DRY		KALISPELL		MOCCASIN	
			COMP.		COMP.		COMP.		COMP.		COMP.
ID	PEDIGREE	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG
PI549275	HI-LINE	3	33.66	3	27.59	3	26.51	3	30.92	1	31.33
BASE AVE		3	33.66	3	27.59	3	26.51	3	30.92	1	31.33
MTHW9420	MT8182/MT8289	3	34.71	3	27.23	3	26.2	3	31.9	1	31
MTHW9603	MT9112/MT9114	3	36.13	3	28.98	3	28.65	3	34.86	1	33.33
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	32.59	3	26.73	3	25.37	3	31.11	1	30.33
MTHW9705	CYMMIT204//PONDERA/MT8182	3	32.68	3	27.35	3	25.98	3	31.52	1	32.67
MTHW9706	CYMMIT204//PONDERA/MT8182	3	34.93	3	29.1	3	28.35	3	34.48	1	33.33
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	34.89	3	29.22	3	26.95	3	33.9	1	32
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	33.35	3	27.63	3	27.25	3	31.71	1	33
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	35.26	3	27.98	3	27.73	3	35.15	1	32.33
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	34.84	3	26.89	3	27.52	3	33.6	1	33.33
PI486139	KLASIC	3	27.01	3	19.39	3	21.3	3	24.84	1	24
ID377S	ID377S	3	35.87	3	30.2	3	28.43	3	34.43	1	31.33
AVERAGE		3	33.83	3	27.36	3	26.69	3	32.37	1	31.5

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Table 5. Cont.

1997-1999 PLANT HEIGHT HARD WHITE NURSERY							
		CONRAD DRY		PERCENT	OVERALL	TOTAL	
			COMP.	OF	COMP.	STATION	
ID	PEDIGREE	YRS	AVG	CHECK	AVG	YEARS	RANK
PI549275	HI-LINE	3	32.56	100	30.31	16	9
BASE AVE		3	32.56	100	30.31	16	0
MTHW9420	MT8182/MT8289	3	31.67	100.23	30.38	16	8
MTHW9603	MT9112/MT9114	3	36.22	108.83	32.99	16	1
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	32.33	97.88	29.67	16	11
MTHW9705	CYMMIT204//PONDERA/MT8182	3	31.78	99.09	30.04	16	10
MTHW9706	CYMMIT204//PONDERA/MT8182	3	34.44	106.64	32.33	16	4
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	33.11	104.36	31.64	16	5
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	31.67	100.58	30.49	16	7
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	36.56	107.28	32.52	16	3
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	32.67	103.06	31.24	16	6
PI486139	KLASIC	3	25.22	77.79	23.58	16	12
ID377S	ID377S	3	34.89	107.79	32.68	16	2
AVERAGE		3	32.76	101.13	30.66	16	0

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Table 6. Percent protein of MTHW9420. Boz-Irr=Irrigated nursery at Bozeman. Sid Dry= Dryland Nursery at Sidney

	1997-1999 PROTEIN HARD WHITE NURSERY										
		BOZ IRR		HAVRE		SID DRY		KALISPELL		MOCCASIN	
			COMP.		COMP.		COMP.		COMP.		COMP.
ID	PEDIGREE	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG	YRS	AVG
PI549275	HI-LINE	3	14.17	3	15.03	3	14.17	3	13.37	1	16.2
BASE AVE		3	14.17	3	15.03	3	14.17	3	13.37	1	16.2
MTHW9420	MT8182/MT8289	3	13.7	3	14.13	3	13.67	3	12.47	1	15.6
MTHW9603	MT9112/MT9114	3	12.57	3	14.03	3	13.6	3	12	1	15.7
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	13.03	3	14.33	3	13.57	3	12.33	1	15
MTHW9705	CYMMIT204//PONDERA/MT8182	3	13.93	3	14.2	3	13.67	3	12.77	1	15
MTHW9706	CYMMIT204//PONDERA/MT8182	3	14.63	3	14.23	3	13.8	3	13.37	1	15.3
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	14.07	3	14.4	3	14.03	3	12.9	1	15.8
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	14.53	3	14.57	3	14.6	3	14.23	1	15.2
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	14.1	3	14.3	3	13.9	3	13.03	1	16.2
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	14.3	3	14.8	3	14.4	3	13.5	1	16
PI486139	KLASIC	3	14.17	3	14.4	3	15.1	3	12.43	1	15
ID377S	ID377S	3	13.5	3	14.27	3	13.3	3	11.67	1	15.8
AVERAGE		3	13.89	3	14.39	3	13.98	3	12.84	1	15.57

Table 6. Cont.

	1997-1999 PROTEIN HARD WHITE NUR						
		CONRAD DRY		PERCENT	OVERALL	TOTAL	
			COMP.	OF	COMP.	STATION	
ID	PEDIGREE	YRS	AVG	CHECK	AVG	YEARS	RANK
PI549275	HI-LINE	3	12.17	100	13.93	16	3
BASE AVE		3	12.17	100	13.93	16	0
MTHW9420	MT8182/MT8289	3	11.7	95.38	13.29	16	9
MTHW9603	MT9112/MT9114	3	11.17	92.33	12.86	16	12
MTHW9701	CYMMIT204//MT8182/FORTUNA	3	11.47	93.85	13.08	16	10
MTHW9705	CYMMIT204//PONDERA/MT8182	3	11.5	95.65	13.32	16	8
MTHW9706	CYMMIT204//PONDERA/MT8182	3	11.57	97.85	13.63	16	5
MTHW9709	MT8182/FORTUNA//PONDERA/MT8182	3	11.8	97.53	13.59	16	7
MTHW9710	MT8182/FORTUNA//PONDERA/MT8182	3	12.3	101.35	14.12	16	1
MTHW9715	MT8289/LEW//MT8182/FORTUNA	3	11.73	97.53	13.59	16	6
MTHW9716	KLASIC/PONDERA//PONDERA/MT8182	3	12.07	100.13	13.95	16	2
PI486139	KLASIC	3	12	98.38	13.71	16	4
ID377S	ID377S	3	11.13	93.05	12.96	16	11
AVERAGE		3	11.72	96.92	13.5	16	0

18e. MTHW9420 was developed by the Montana Agricultural Experiment Station ,and was licensed to Heartland Seed (Moccasin, MT).

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U.S. DEPARTMENT OF AGRICULTURE
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EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

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 APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Roger N. Flair, President Research & Development Institute, Inc.	MTHW9420	MTHW9420

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)*
1711 West College Bozeman, MT 59715	406-587-4479	406-587-4480
	7. PVPO NUMBER 200000138	

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? [ ] YES [X] 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)?
[X] 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)*:

Current Owner via assignment dated 4/15/99 from inventor/breeder.

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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