No. 7600022

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

North American Plant Breeders

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

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

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen 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, [illegible]ORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VA[illegible] THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT [illegible]42, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Atlas'

PLANT VARIETY PROTECTION OFFICE · U.S. DEPARTMENT OF AGRICULTURE

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 11th *day of* March *in the year of our Lord one thousand nine hundred and* eighty-two.

Attest:

Kenneth H. Evan

Acting
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

John R Block

Secretary of Agriculture

AGRICUL...
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION	2. KIND NAME	FOR OFFICIAL USE ONLY	
Atlas (Tested as NAPB 41)	Alfalfa	PV NUMBER 7600022	
3. GENUS AND SPECIES NAME	4. FAMILY NAME *(Botanical)*	FILING DATE 12/1/75	TIME 12:30 P.M.
Medicago sativa	FABACEAE ~~Leguminaceae~~ DCB	FEE RECEIVED $ 250 $ 250 $ 250.00	BALANCE DUE $ — $ $ 1/5/82
	5. DATE OF DETERMINATION March 1974		

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
North American Plant Breeders	P.O. Box 2955 5201 Johnson Dr. Mission, KS 66205 ~~P. O. Box 991 Little Rock, Arkansas 72203~~ KE	501-374-1652

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	Connecticut	March 9, 1973

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

~~Mr. Barry W. A. Greengrass, General Manager~~ Mr. Giles C. Dixon AND Dr. J. B. Moutray DCB
North American Plant Breeders
~~P. O. Box 991~~ P.O. Box 2955
~~Little Rock, Arkansas 72203~~ 5201 Johnson Dr.
Mission, KS 66205 KE

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

[X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

[X] 13B. Exhibit B, Botanical Description of the Variety

[X] 13C. Exhibit C, Objective Description of the Variety

[X] 13D. Exhibit D, Data Indicative of Novelty

[X] 13E. Exhibit E, Statement of the Basis of Applicant's Ownership

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

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

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? [X] FOUNDATION [ ] REGISTERED [X] CERTIFIED

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

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

December 2, 1975 (DATE) — Jim B Moutray (SIGNATURE OF APPLICANT)

December 2, 1975 (DATE) — (SIGNATURE OF APPLICANT)

EXHIBIT A

Origin and Breeding History

ATLAS

Beginning in 1971 Atlas was developed using an average of three cycles of phenotypic recurrent selection for anthracnose resistance followed by one cycle of selection for bacterial wilt resistance. Anthracnose screening was done in greenhouse benches using the basic technique (pure culture) described in ARS-NC-19. Bacterial wilt screening was done using the procedures described in ARS-NC-19. A minimum of two hundred plants per germplasm pool were intercrossed following each cycle of selection for anthracnose resistance. Sufficient numbers were screened (± 110,000 for total anthracnose program) so that plants were selected for vigor as well as anthracnose resistance. Final selections (1407) were made from the bacterial wilt nursery in November, 1973, keeping approximately the top 8% based on resistance and general desirability.

Approximately 50% of the parentage traces to the hardy germplasm pool predominately Titan, Vernal and Weevlchek, and 50% to the Flemish germplasm pool predominately Anchor and Saranac. Numerous selections were also made from many other sources including Beltsville 1An4, 2An4, and 3An4. The Flemish and hardy germplasm pools were first combined for the production of breeder seed.

Breeder seed (2 crops) of Atlas was produced on the 1407 parent clones in the greenhouse (16 hour daylength) at Brookston, Indiana, between November 16, 1973 and August 30, 1974. This original production is sufficient for the life of the variety and is held in controlled storage. This will ensure stability of the variety. Certified seed will be produced only from breeders or foundation seed. Seed produced from certified seed will not be recognized as Atlas.

AMENDED EXHIBIT A

ATLAS: Origin and Breeding History

It is confirmed that during seed production no variants beyond the limits defined under Exhibit C have been found and that the multiplication procedure will ensure that the seed being sold as Atlas will not have shifted in characteristics beyond accepted limits for alfalfa varieties.

ADDENDUM TO EXHIBIT A

ATLAS - - UNIFORMITY

It is also confirmed that:

"ATLAS MEETS PRESENTLY ACCEPTABLE LEVELS
OF UNIFORMITY FOR ALFALFA VARIETIES."

NORTH AMERICAN PLANT BREEDERS

Aug. 1, 1978
Date

Giles E. Dixon
Research Director

EXHIBIT B

Botanical description of Atlas

Atlas exhibits good seedling vigor, upright growth, fast recovery after cutting and fall growth similar to Saranac. Atlas is moderately uniform in plant type (leaf size, stem size, fall dormancy) with some plants showing either Flemish or northern hardy characteristics with most intermediate.

Atlas flowers 2-3 days earlier than Vernal and 2-3 days later than Citation. Flowers are mostly shades of purple with a few blues and very few cream.

Bacterial wilt resistance is similar to Vernal with anthracnose resistance in the 50% range. Resistance to downy mildew is moderate with leafhopper yellowing tolerance slightly above Saranac. Forage yield is high with seed yield similar to Titan.

FGIS (GR) 470-32
(3/75)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY

Alfalfa (Medicago sativa L. complex)

NAME OF APPLICANT(S)
North American Plant Breeders

ADDRESS (*Street and No., or R.F.D. No., City, State, and Zip Code*)
P. O. Box 991
Little Rock, Arkansas 72203

VARIETY NAME OR TEMPORARY DESIGNATION
Atlas

FOR OFFICIAL USE ONLY
PVPO NUMBER
7600022

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0|8|9] or [0|9]) when number is either 99 or less or 9 or less.

NOTE: For single plant data a minimum of 100 plants is suggested

1. PRIMARY AREA OF ADAPTATION

All except # 5

[ ] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST
4 = SOUTHEAST 5 = SOUTHWEST 6 = SOUTHERN PLAINS
7 = INTERMOUNTAIN

INDICATE AREA WHERE TEST WAS CONDUCTED. FURTHER EXPLANATION CAN GO IN COMMENTS AT THE END OF THE FORM.

[ ] AREA TESTED
2, 4, 6

2. WINTER HARDINESS

5 DCB PER LETTER OF 16 NOV 1981

[5] 1 = NON-HARDY (Mesa Sirsa) 3 = INTERMEDIATE NON-HARDY
5 = MODERATELY HARDY (Saranac) 7 = HARDY (Vernal)
9 = EXTREMELY HARDY (Norseman)

[1] SOURCE OF INFORMATION: 1 = ANTICIPATED 2 = MEASURED

[2] AREA TESTED

3. FALL GROWTH HABIT

[5] 1 = ERECT (Mesa Sirsa) 3 = SEMIERECT (DuPuits)
5 = INTERMEDIATE (Saranac) 7 = SEMIDECUMENT (Vernal)
9 = DECUMBENT (Norsement)

[2] AREA TESTED

4. RECOVERY AFTER FIRST SPRING CUTTING

[3] 1 = VERY FAST (Mesa Sirsa) 3 = FAST (Saranac) 5 = INTERMEDIATE
7 = SLOW (Vernal) 9 = VERY SLOW (Norseman)

[2] AREA TESTED

5. FLOWERING DATE (FIRST SPRING GROWTH)

[ ][ ] DAYS EARLIER THAN . . . . .
[ ][ ] DAYS LATER THAN . . . . .

[ ] 1 = MESA SIRSA 2 = LAHONTAN
3 = SARANAC 4 = VERNAL
5 = NORSEMAN

[ ] AREA TESTED

6. CROWN TYPE

[6] 1 = SPREADING ROOTS 3 = SPREADING RHIZOMES (Teton)
5 = BROAD (Vernal) 7 = INTERMEDIATE (Saranac)
9 = NARROW (Mesa Sirsa)

[2] AREA TESTED

7. PLANT COLOR

[5] 3 = DARK GREEN (Weevlchek) 5 = GREEN (Vernal)
7 = LIGHT GREEN (Ranger)

[2] AREA TESTED

8. HAIRINESS

[ ][ ][ ] % PLANTS WITH PUBESCENT STEMS

[0|7|7] % PLANTS WITH PUBESCENT PODS

9. POD SHAPE

[0|8|2] % PLANTS WITH TIGHT COILS

[0|1|8] % PLANTS WITH LOOSE COILS

[0|0|0] % PLANTS WITH SICKLE PODS (Less than 1 coil)

10. STEM LENGTH FREQUENCY DISTRIBUTION FOR SUBMITTED AND 1 TO 5 STANDARD VARIETIES 1/

VARIETY NAME	STEM LENGTH FREQUENCY DISTRIBUTION 2/											AVERAGE STEM LENGTH
	0 – 5 mm. %	6 – 10 mm. %	11 – 15 mm. %	16 – 20 mm. %	21 – 30 mm. %	31 – 40 mm. %	41 – 50 mm. %	51 – 60 mm. %	61 – 70 mm. %	71 – 80 mm. %	81 + mm. %	

11. FLOWER COLOR 3/ (DETERMINE COLOR ON FRESHLY OPENED FLOWERS)

0 8 0 % PURPLE 0 1 9 % VARIEGATED 0 0 0 % YELLOW 0 0 1 % CREAM 0 0 0 % WHITE

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
BACTERIAL WILT	(SUBMITTED)	31.2	2.24	.32	Univ. Minn. 1975 (Table 10)
	(RES. CK.) VERNAL	34.2	2.30		
	(SUS. CK.) NARRAGANSETT	0.9	4.01		
ANTHRACNOSE	(SUBMITTED)	48			Av. 3 tests (2 for Saranac) Table 11
	(RES. CK.) ARC	64			
	(SUS. CK.) SARANAC	7.8			
COMMON LEAF SPOT	(SUBMITTED)				
	(RES. CK.) RAMSEY				
	(SUS. CK.) RANGER				
DOWNY MILDEW	(SUBMITTED)	12.0			Kansas State 1975 (Table 12)
	(RES. CK.) SARANAC	21.5			
	(SUS. CK.) KANZA	1.1			
PHYTOPHTHORA ROOT ROT	(SUBMITTED)	0.0	5.51	.49	Univ. Minn. 1975 (Table 14)
	(RES. CK.) AGATE	20.0	3.34		
	(SUS. CK.) SARANAC	0.0	5.26		
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

1/ Preferred standards: Saranac, Vernal, Norseman, Lahontan, Mesa Sirsa. Twelve hours light at 25° C with 20,000 lux of cool white florescent; 2,000 lux of incandescent filament light and twelve hours darkness at 5°C.

2/ From cotyledonary node to tip of stem 20 days after planting.

3/ For further clarification consult USDA Agricultural Handbook No. 424.

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

INSECT	CULTIVAR	% SEEDLING SURVIVAL	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
PEA APHID	(SUBMITTED)				
	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				
SPOTTED ALFALFA APHID	(SUBMITTED)				
	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				

INSECT	CULTIVAR	% DEFOLIATION	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA WEEVIL	(SUBMITTED)				
	(RES. CK.) ARK				
	(SUS. CK.) VERNAL				

INSECT	CULTIVAR	% RESISTANT PLANTS	EMERGED ADULTS PER PLANT	EMERGED LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA SEED CHALCID	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) SONORA				

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
POTATO LEAF-HOPPER	(SUBMITTED)	38	3.95		NAPB Ames, Iowa 1975 (Table 17)
	(RES. CK.) Weevlchek	87	2.70		
	(SUS. CK.) Ranger	24	4.16		
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
NEMATODE	**CULTIVAR**	**% RESISTANT PLANTS**	**INDEX (ASI)**	**ASI LSD .05**	**TEST, YEAR & LOCATION 4/**
STEM NEMATODE	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) RANGER				
NORTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) NEV. SYN. XX				
	(SUS. CK.) LAHONTAN				
SOUTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) MOAPA 69				
	(SUS. CK.) LAHONTAN				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

13. INDICATE A VARIETY THAT MOST CLOSELY RESEMBLES THE VARIETY SUBMITTED FOR THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
AREA OF ADAPTATION	Anchor	PLANT HEIGHT	Anchor
RECOVERY AFTER CUTTING	Anchor	WINTER HARDINESS	Anchor

REFERENCES

Barnes, D.K., and C.H. Hanson, An Illustrated Summary of Genetic Traits in Tetraploid and Diploid Alfalfa, ARS Technical Bul. 1370.
Barnes, D.K., et al, Standard Tests to Characterize Pest Resistance in Alfalfa Varieties. ARS-NC-19, September 1974.
Nittler, L.W., G.W. McKee, and J.L. Newcomer, Principles and Methods of Testing Alfalfa Seed for Varietal Purity. New York Agricultural Experiment Station Bul. 807.
USDA Agricultural Handbook No. 424.

COMMENTS

TABLE 2

1974 Alfalfa Fall Dormancy Trial*

University of Minnesota

1974 Data

Entry	Minn. Seed Lot #	Number of plants in each class** 0	1	2	3	4	5	6	7	8	9	Average Score
African	2437	0	0	2	4	19	13	6	0	0	0	4.47
DuPuits		0	0	0	0	1	19	33	18	1	0	5.97
Saranac		0	0	0	0	1	11	21	25	12	0	6.46
Ranger	2449	0	0	0	0	2	5	15	27	5	1	6.49
Vernal VCC72	2695	0	0	0	0	0	0	8	16	15	1	7.21
Norseman	2405	0	0	0	0	0	0	1	6	35	22	8.14
LSD 5%												.54
1%												.72
CV												6.0

* Seeded 5-23-74 and thinned to one plant per 10-12 inches of row. Four replications. 22 ft. row per plot. Plants clipped 9-9-74. Fall dormancy reading made October 10, 1974.

** Fall dormancy scored as 0-9: 0 = 18 in. or higher, 1 = 16"-18", 2 = 14"-16", 3 = 12"-14", 4 = 10"-12", 5 = 8"-10", 6 = 6"-8", 7 = 4"-6", 8 = 2"-4", 9 = 0"-2".

Your entries — North American Plant Breeders

Citation Br.	3011	0	0	0	0	0	9	15	18	13	2	6.75
Citation Fdn.	3012	0	0	0	0	1	7	16	21	26	3	6.94
NAPB 41 Atlas	3058	0	0	0	0	0	13	23	26	17	1	6.62
NAPB 42 Victor	3048	0	0	0	0	0	3	24	21	8	2	6.69
NAPB 43 Olympic	3049	0	0	0	0	1	13	17	28	11	2	6.58
NAPB 44 Apollo	3050	0	0	0	0	0	4	25	28	17	0	6.75

Mailed to Dr. Jim Moutray
10-23-74

Laddie J. Elling

cc: Duane M. Smith

TABLE 4

1974 Spaced Plant Nursery[1], NAPB Ames, Iowa

Fall Dormancy

	1975 Data (height in inches)[2] Number of Plants in Each Category																			1975
Entry	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Average
Apollo	1	5	6	8	10	12	16	15	17	26	10	30	12	15	8	4	1	0	0	9.5
Atlas	0	2	1	5	5	16	23	33	15	29	17	25	6	9	6	3	0	0	1	10.1
Olympic	0	2	1	3	6	10	9	20	9	28	15	37	11	22	6	2	5	3	1	10.6
Victor	0	4	2	1	4	14	8	14	14	29	20	27	7	9	4	3	1	0	0	9.8
Nugget	0	1	3	5	6	8	8	16	10	30	17	13	10	6	1	1	0	0	0	9.4
Citation	0	1	4	5	6	10	17	27	18	17	20	18	7	6	3	0	0	0	0	9.4
Titan	0	0	4	6	9	20	15	25	14	18	15	10	6	7	2	2	0	0	0	8.7
Anchor	0	1	1	3	2	7	10	20	15	22	17	17	5	11	4	0	0	0	0	9.8
Vernal	1	5	5	9	13	19	25	24	20	22	16	15	4	2	2	1	0	1	0	8.2
Saranac	0	0	1	3	7	12	10	26	18	39	24	37	14	9	6	1	3	0	0	10.1

1 Seeded 5-14-74 and thinned to 12" spacing June '74.

2 1975 cut September 2, read October 14, average of 178 plants per variety.

TABLE 5

Fall dormancy of alfalfa varieties in forage trials

Entry	NAPB Ames, Iowa [1] 10-22-74	NAPB Ames, Iowa [1] 10-14-75	NAPB Ames, Iowa [1] 10-22-74	NAPB Ames, Iowa [1] 10-14-75	NAPB Ames, Iowa [1] 10-15-75	NAPB Brookston[2] Indiana 10-28-75	Univ.Neb.[2] Mead 10-6-75	Texas A & M[1] Bushland 10-15-75	Univ. Wisc.[1] Janesville 10-22-75
Apollo	6.12	11.6	6.0	14.1	5.9	5.4	---	11.4	7.62
Atlas	---	---	6.5	14.1	6.4	4.0	---	13.0	---
Olympic	7.32	13.7	6.5	14.1	7.3	2.2	4.25	13.4	9.35
Victor	7.20	13.6	6.5	14.1	6.6	3.0	5.00	14.6	8.26
Nugget	5.6	12.4	5.4	12.7	5.0	8.0	---	---	---
Citation	6.1	12.2	5.6	14.1	4.9	6.0	5.00	---	---
Anchor	5.4	13.2	5.6	13.2	5.4	6.4	---	9.1	---
Titan	4.5	11.9	4.8	12.0	5.0	7.8	---	9.5	---
Vernal[3]	4.4	9.8	4.7	11.3	---	5.4	5.75	9.1	6.12
Saranac	7.0	14.0	6.7	14.3	5.7	5.2	4.75	10.6	8.06
Agate	5.2	11.6	4.8	12.2	4.9	8.4	---	8.3	---
LSD 5%		1.9		.8		1.25			
C. V.		11.9		4.9		19.5			
Seeded	4-74		5-74		4-75	4-75	4-74	8-74	5-75

1 Height in inches

2 Higher ratings indicate less fall growth

3 Left out of data from 1975 seedings. Seed received as certified Vernal does not have Vernal fall dormancy characteristics.

TABLE 6

Crown Width of Alfalfa Varieties at Ames, Iowa

Variety	Av. Width[1] Inches	No. Plants
Anchor	4.78	139
Nugget	4.48	130
Citation	4.22	156
Apollo	4.05	195
Atlas	4.73	199
Olympic	4.34	185
Victor	4.79	158
Titan	4.94	160
Saranac	3.89	207

Seeded in 30" rows May 1974 and thinned to one plant per foot. Measured October 31, 1975.

TABLE 7

Pod Shape and Pubescence of NAPB Alfalfa Varieties, October 1975, Warden, Washington

Variety	% Plants With[1] Pubescent Pods	% Plants With Tight Pods	% Plants With Loose Pods	% Plants With Sickle Pods
Anchor	89	86	14	0
Nugget	66	87	13	0
Citation	86	90	10	0
Apollo	82	88	12	0
Atlas	77	82	18	0
Olympic	79	81	19	0
Victor	93	84	16	0

1 1-4 rating, 1 = most hair 1 + 2 = % pubescent pods

TABLE 10

1975 Bacterial Wilt Trial
University of Minnesota

Entry	Minnesota Seed Lot No.	Average severity index*	Actual percent resistant plants**
Narragansett	AS-4	4.01	0.9
Ranger	AR-132	2.79	17.9
Vernal	FC 33696	2.30	34.2
LSD 5% level		.32	
LSD 1% level		.42	
CV		8.5%	

*Calculated on basis of average severity infection of individual plants in each of 3 replications (about 75 plants observed per entry per rep.).

Your entry(ies): Jim Moutray - North American Plant Breeders

Apollo (NAPB-44)	3137	2.32	29.1
Olympic (NAPB-43)	3138	2.23	31.5
Victor (NAPB-42)	3139	2.62	22.2
Atlas (NAPB-41)	3140	2.24	31.2

** Plants scored 0 and 1 (on a 1-5 scale) considered resistant.

TABLE 11

Anthracnose resistance of Apollo, Atlas, Olympic and Victor alfalfa

	Laboratory Tests						Field Rating	
	Virginia Poly. Institute[1] Glenn Buss May - June 1975		Kansas State Univ.[2] Don Stuteville Aug. - Sept. 1975		North Carolina[3] State-Thad Busbice May-June 1975	NAPB[4] Ames, Iowa Nov-Dec.1974		1975 NAPB[5] Forage Trial Brookston, Ind. 10-28-75
	% resistant[6] plants	Total plants rated	% survivors	Plants tested	% resistant plants	% resistant[6] plants	Total plants rated	
Apollo	69	32	3.3	240	34	11.7	165	5.6[7]
Atlas	96	24	40.8	244	59	44.6	172	3.0
Olympic	87	31	42.4	239	41	54.5	182	2.2
Victor	85	41	50.8	235	59	40.1	155	1.4
Anchor	--	--	--	--	--	10.1	143	6.2
Saranac	36	28	2.5	208	21	--		--
Belts 2-An4	91	56	--	--	--	--	--	--
Arc	--	--	76.4	179	66	49.9	176	1.8
Saranac AR	--	--	--	--	--	--	--	2.2
LSD 5% level			21.2		17			1.2

1 "Inoculation did not take too well. Damping off also caused problems and severely reduced numbers before and during the inoculation. The data are not much more than rough indicators of resistance."

2 No ratings taken, survivors considered resistant.

3 "Test was not as good as hoped, higher than usual environmental factor. Value for Saranac is unrealistically high."

4 Test only fair as rhizoctonia invaded benches and made determinations difficult.

5 Ratings complicated by presence of mildew plus Leptosphaerulina and common leafspot

6 Test conducted using Barnes basic scheme. Ratings of 1 + 2 = resistance.

7 Lower numbers are most desirable.

Anthracnose (Colletotrichum trifolii)

Variety	Year tested	Conducted by	Conducted at	% Res. Plants
Atlas	1979	NAPB	Ames, Ia.	52.5*
Iroquois				6.2
Maris Phoenix				11.5
Saranac - Sus.				6.3
Arc - Res.				65.0
L.S.D. (.05)				8.1
C.V. %				18.7

*Scoring system used: Plants scored 1 and 2 (on a 1-5 scale, 5=dead) considered resistant. Growth chamber test.

ANTHRACNOSE TEST[1]

NORTH CAROLINA STATE UNIVERSITY--DR. THAD BUSBICE ARS/USDA

May 1976

Variety	% Survivors
Olympic	39.4
Victor	44.8
Apollo	9.0
Atlas	37.9
Saranac (Susceptible Check)	2.5
Saranac AR (Resistant Check)	26.2
Arc " "	48.0
Av. of two resistant checks	37.1
LSD .05% level	13.0

[1] Very severe test with all percentages low

TABLE 12

Downy mildew resistance of Apollo, Atlas, Olympic and Victor alfalfa in Kansas State test by Dr. Don Stuteville -September, 1975

	% Plants Mildew Free		
	Isolate		
Entry	I 5	I 7	I 5 and I 7[1] in combination
Apollo	18.5	11.7	4.7
Atlas	30.0	30.4	12.0
Olympic	32.8	19.7	12.6
Victor	28.4	14.5	5.7
Saranac (Res. Ck.)	52.8	27.3	21.5
Anchor	36.8	39.0	21.6
Arc	---	---	4.8
Vernal	---	---	4.2
Agate	---	---	7.1
Kanza (Sus. Ck.)	1.0	1.9	1.1
LSD..05	10.4	9.8	21.2

1 Very severe test

KANSAS STATE UNIVERSITY

Department of Plant Pathology
Dickens Hall
Manhattan, Kansas 66506
Phone: 913 532-6176

AUG 31 1976

Mildew

August 26, 1976

Dr. Jim Moutray
North American Plant Breeders
RFD #3
Ames, Iowa 50010

Dear Jim:

Your requested downy mildew evaluations are as follows:

Entry	% of mildew-free plants
Victor	5.3
Olympic	13.4
Atlas	13.5
Saranac (SCC 72)	21.7
Saranac AR	23.6
LSD .05	4.8

I am also enclosing raw data which you may wish to check.

Sincerely,

Don Stuteville

Donald L. Stuteville
Forage Pathologist

DLS/slt

Enclosures

TABLE 14

1975 Phytophthora Trial

University of Minnesota

Entry	Minn. Seed Lot No.	Average severity index*	Actual Percent resistant plants**
Saranac (SCC 72)	3043	5.26	0.0
15 x 17 (Syn. 2)	2895	5.55	0.0
Agate (Foundation)	2892	3.34	20.0
LSD 5% level		0.49	
LSD 1% level		0.65	
CV		8.5%	

*Calculated on basis of average severity infection of individual plants in each of 4 replications.

**Plants scored 1 and 2 (on a 1-6 scale) considered resistant.

Your entry(ies): Jim Moutray - North American Plant Breeders

Atlas	3140	5.51	0.0
Olympic	3138	4.75	1.5
Victor	3139	4.87	0.0
Apollo	3137	3.90	12.5

TABLE 17

1974 Spaced Plant Nursery, NAPB, Ames, Iowa

Leafhopper Yellowing Tolerance[1]

Entry	% resistance[2]	Average Severity[2] Index	Number of Plants Rated
Apollo	59	3.40	178
Atlas	38	3.95	133
Olympic	65	3.31	175
Victor	56	3.38	146
Nugget	45	3.83	120
Citation	55	3.48	154
Titan	53	3.52	144
Anchor	16	4.63	128
Vernal	55	3.56	163
Saranac	37	3.97	201
Ranger	24	4.16	186
Weevlchek	87	2.70	198
LSD .05		.37	
C.V. %		16.2	

1 Seeded 5-14-74 and thinned to 12" spacing June '74, ratings made 8-27-75.

2 Procedures used are those described in ARS-NC-19, 1 - 9 rating, 1 - 3 counted as resistant. Lower ASI ratings are most desirable.

TABLE 18

Leafhopper yellowing tolerance of alfalfa varieties in NAPB forage trials[1]

Entry	Ames, Iowa 7-17-74	Ames, Iowa 7-6-75	Ames, Iowa 7-17-74	Ames, Iowa 7-6-75	Ames, Iowa 8-28-75	Brookston, Ind. 7-1-75	Brookston, Ind. 8-13-75	Brookston, Ind. 8-13-75	Brookston, Ind. 6-26-75	Brookston, Ind. 8-25-75	Average
Apollo	4.8	3.2	3.6	3.8	3.2	3.0	6.0	5.8	4.2	2.8	4.0
Anchor	5.2	4.8	5.0	5.0	4.0	7.4	7.4	6.8	4.2	4.4	5.4
Atlas	--	--	4.0	4.6	3.4	--	--	3.8	3.0	3.4	--
Olympic	4.8	4.2	4.0	5.0	2.8	6.2	5.8	4.4	2.6	2.8	4.3
Victor	4.4	3.0	3.2	4.2	2.8	5.8	7.2	5.6	3.6	2.4	4.2
Nugget	5.2	4.0	3.8	4.4	2.6	6.2	7.2	6.4	3.6	4.8	4.8
Citation	5.0	3.8	4.0	4.2	2.6	6.4	6.6	3.6	2.8	2.6	4.2
Vernal[2]	5.0	3.8	4.0	4.6	--	5.6	4.6	3.6	--	--	--
Saranac	5.4	5.2	4.6	5.0	4.0	7.5	8.2	5.6	3.6	2.4	5.2
Titan	4.2	3.0	3.6	4.0	2.0	4.4	4.6	3.6	2.0	2.2	3.4
Agate	5.6	5.3	4.2	5.0	4.2	3.8	6.6	7.0	4.4	4.0	5.0
Seeded	4-74		5-74		4-75	4-74		5-74	4-75		

1 Lower numbers indicate less yellowing

2 Left out of data from 1975 seedings. Seed received as certified Vernal does not have Vernal fall dormancy characteristics.

TABLE 19

Bloom Note on Alfalfa Varieties at Hutchinson, Kansas

Variety	% Flowering[1]
Titan	27
Anchor	39
Vernal	23
Saranac	42
Apollo	33
Atlas	48
Victor	52
Olympic	38
Citation	61
Nugget	47
Agate	27
Kanza	25

1 First cutting made 5-20-75, bloom note taken 7-1-75 in forage plots

TABLE 20

1975 Seed Yield of alfalfa varieties at Warden, Washington[1]

Entry	% of checks[1]
Apollo	128
Atlas	132
Olympic	135
Victor	81
Nugget	135
Citation	134
Anchor	79
Vernal	85
Saranac	98
Titan	137
Agate	100
LSD 5%	45.9
C. V.	69.4

Checks average lbs/acre = 629

1 Checks are Titan, Anchor, Vernal and Saranac

Seeded May 1974 in 44" rows at 2 lbs/acre

Exhibit D (second revision 11-16-81)

'Atlas'

'Atlas' is most similar to the variety 'Olympic'. 'Atlas' differs from 'Olympic' by having greater resistance to anthracnose race 2. 'Atlas' also differs from 'Olympic' by its greater fall dormancy and less tolerance to potatoe leafhopper yellowing.

EXHIBIT E

Statement of the Basis of Applicant's Ownership

Atlas was bred by North American Plant Breeders.

BILL OF SALE AND ASSIGNMENT

KNOW ALL MEN BY THESE PRESENTS that AGRIPRO BIOSCIENCES INC., a Delaware corporation (hereinafter referred to as "Seller"), pursuant to that certain Asset Purchase Agreement of even date herewith by and between Seller and AGR ACQUISITION CORPORATION, a Delaware corporation (hereinafter referred to as "Buyer") and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, does hereby grant, bargain, sell, assign, convey and deliver unto Buyer, all of Seller's right, title and interest in and to the plant varieties owned/registered by Seller and more particularly set forth on Exhibit A attached hereto for which PVP Certificates have been issued by or may be pending before the U. S. Department of Agriculture.

TO HAVE AND TO HOLD UNTO PURCHASER, its successors and assigns forever.

IN WITNESS WHEREOF, Seller has executed this Bill of Sale and Assignment as of the 30th day of June, 1994.

AGRIPRO BIOSCIENCES INC.

BY: W. A. Zama

Title: President

STATE OF KANSAS, COUNTY OF JOHNSON

Before me, the undersigned, a Notary Public of the State and County aforesaid, personally appeared W. A. ZAMA with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence) and who, upon oath, acknowledged himself to be the PRESIDENT of Agripro Biosciences Inc., the within named bargainor, a corporation, and that he as such PRESIDENT, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as PRESIDENT.

WITNESS my hand and Notarial Seal at office the day and year above written.

Alma M. Weaver
Notary Public

My Commission Expires:
June 22, 1998

ALMA M. WEAVER
NOTARY PUBLIC
STATE OF KANSAS
My Appt. Exp. June 22, 1998

State of Delaware

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "AGR ACQUISITION CORPORATION", CHANGING ITS NAME FROM "AGR ACQUISITION CORPORATION" TO "AGRIPRO SEEDS, INC.", FILED IN THIS OFFICE ON THE THIRTIETH DAY OF JUNE, A.D. 1994, AT 4:30 O'CLOCK P.M.

A CERTIFIED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS FOR RECORDING.

SECRETARY OF STATE

2394087 8100

AUTHENTICATION: 7169071

944121584

DATE: 07-01-94

CERTIFICATE OF AMENDMENT
OF
CERTIFICATE OF INCORPORATION
OF
AGR ACQUISITION CORPORATION

AGR Acquisition Corporation, a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware,

DOES HEREBY CERTIFY:

FIRST: that the Board of Directors of said corporation, by the unanimous written consent of its members filed with the minutes of the Board, adopted a resolution proposing and declaring advisable the following amendment to the Certificate of Incorporation of said corporation:

RESOLVED, that the Certificate of Incorporation of this corporation be amended by changing the Article thereof numbered "ARTICLE I" so that, as amended, said Article shall be and read as follows:

"ARTICLE I

Name

The name of the corporation (hereinafter called the 'Corporation') is Agripro Seeds, Inc."

SECOND: That in lieu of a meeting and vote of stockholders, the sole shareholder of the corporation has given unanimous written consent to said amendment in accordance with the provisions of Section 228 of the General Corporation Law of the State of Delaware.

THIRD: That the aforesaid amendment was duly adopted in accordance with the applicable provisions of Sections 242 and 228 of the General Corporation Law of the State of Delaware.

FOURTH: That the capital of said corporation shall not be reduced under or by reason of said amendment.

IN WITNESS WHEREOF, said AGR Acquisition Corporation has caused this certificate to be signed by Gary T. Hancock, its President, and attested by Ann Steelman, its Secretary, this 30th day of June, 1994.

AGR ACQUISITION CORPORATION

BY: Gary T. Hancock
Gary T. Hancock, President

ATTEST:

BY: Ann Steelman
Ann Steelman, Secretary

LAW OFFICES

BURCH, PORTER & JOHNSON

130 NORTH COURT AVENUE

MEMPHIS, TENNESSEE 38103

TELEPHONE 901-523-2311
TELECOPIER 901-523-7140

LUCIUS E. BURCH, JR
W. J. MICHAEL CODY
JOEL PORTER
CHARLES F. NEWMAN
C. THOMAS CATES
JOE M. DUNCAN
JOHN A. STEMMLER
J. BROOKE LATHRAM
JEF FEIBELMAN
DEWITT M. SHY, JR
R. MICHAEL POTTER
JOHN W. CHANDLER, JR.
DAVID J. HARRIS
WARNER B. RODDA
DAVID H. LILLARD, JR
HOLLY K. LILLARD
SAM L. CRAIN, JR.
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REVA M. KRIEGEL
SUSAN CLARK TAYLOR
DOUGLAS F. MALIJAN
JOHN W. CAMPBELL
R. PORTER FEILD

CHAS. N. BURCH 1868-1938
H. D. MINOR 1868-1947
CLINTON H. MCKAY 1889-1943
JESSE E. JOHNSON, JR. 1913-1980
JOHN S. PORTER 1909-1990

MORGAN KEEGAN OFFICE
50 NORTH FRONT STREET
SUITE 850
MEMPHIS, TENNESSEE 38103
TELEPHONE 901-527-2311
TELECOPIER 901-527-4188

July 25, 1994

Ms. Ann Zempolich
Plant Variety Protection Office
U. S. Department of Agriculture
500 NAL Building
10301 Baltimore Boulevard
Beltsville, MD 20705

Re: Agripro Biosciences Inc. Sale of PVPs to AGR Acquisition Corporation (which has changed its name to Agripro Seeds, Inc.)

Dear Ms. Zempolich:

I am enclosing herewith the Bill of Sale and Assignment wherein Agripro Biosciences Inc. has sold and assigned all of its right, title and interest in and to the PVPs listed on the attachment to the Bill of Sale to AGR Acquisition Corporation and hereby request that your records be changed to show the new owner as Agripro Seeds, Inc., the new name of AGR Acquisition Corporation. It is our understanding that the attachment was generated by someone in your office and forwarded to Agripro Biosciences Inc. at its request, and was subsequently forwarded to our office as attorneys for the purchaser in connection with the sale transaction.

As I indicated to you in our several previous telephone conversations, AGR Acquisition Corporation changed its corporate name to Agripro Seeds, Inc. the same date as the closing of the sale. I am enclosing herewith a copy of the Certificate of Amendment filed by the Delaware Secretary of State wherein the corporate name is changed.

If I counted correctly, there are 149 PVP certificates listed on the attachment to the Bill of Sale and Assignment. I am enclosing a check in the amount of $3,725.00 payable to United States Treasury in payment of the $25.00 per certificate fee to change the owner's name on your records.

THIS DOCUMENT HAS A COLORED BACKGROUND — NOT A WHITE BACKGROUND THIS DOCUMENT HAS A COLORED BACKGROUND

HELENA

HELENA CHEMICAL COMPANY
Suite 3200 – Clark Tower
5100 Poplar Avenue
Memphis, Tennessee 38137

DATE 7-8-94

CHECK NUMBER 22406

PROTECTION AMOUNT

PAY EXACTLY 3,725 00 CTS

PAY THIS AMOUNT $3,725.00

PAY TO THE ORDER OF United States Treasury

HELENA CHEMICAL COMPANY
by

AUTHORIZED SIGNATURES