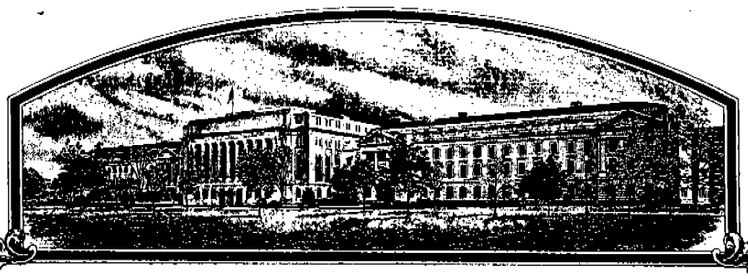

No. 7500002

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 seventeen 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 USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Georgie'

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* 20th *day of* December *in the year of our Lord one thousand nine hundred and* seventy-six

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(12-15-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION: GEORGIE	2. KIND NAME: Cereal Spring Barley	FOR OFFICIAL USE ONLY — PV NUMBER: 7500002
3. GENUS AND SPECIES NAME: Hordeum Sativum	4. FAMILY NAME *(Botanical)*: Gramineae	FILING DATE: 7.1.74 — TIME: 10:30 A.M. ~~P.M.~~
	5. DATE OF DETERMINATION: 1969	FEE RECEIVED: $ 250.00 / $ 250.00 / $ 250.00 — BALANCE DUE: $ — / $ — / $ —
6. NAME OF APPLICANT(S): North American Plant Breeders	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*: P.O. Box 2955 ~~P. O. Box 991~~ 5201 Johnson Dr. ~~1120 Marshall St.~~ Mission, KS 66205 ~~Little Rock, Arkansas 72203~~ EET 9/20/76	8. TELEPHONE AREA CODE AND NUMBER: (913) 384-1940 ~~(501) 374-1652~~ EET 9/20/76
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*: Partnership	10. STATE OF INCORPORATION: Connecticut	11. DATE OF INCORPORATION: 3/9/73

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

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.)* [X] YES [ ] NO EET 9/16/76*

14B. Does the applicant(s) specify that this variety be limited as to number of generations? EET 9/16/76* [X] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? EET 9/16/76* [X] FOUNDATION [X] REGISTERED [X] CERTIFIED

* as per letter dated 9/10/76.

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.

June 26, 1974
(DATE)

(SIGNATURE OF APPLICANT)
North American ~~Plant Breeders~~
B.W.A. Greengrass, General Manager

(DATE)

(SIGNATURE OF APPLICANT)

EXHIBIT A

North American Plant Breeders
5201 Johnson Drive
P.O. Box 2955
Mission, Kansas, 66205
(Formerly Of Little Rock, Arkansas)

ORIGIN AND BREEDING HISTORY OF VARIETY "GEORGIE"

Georgie was bred by Rothwell Plant Breeders in the United Kingdom, and was introduced for the USA by N.A.P.B. who have exclusive rights for the material for that territory.

Georgie was developed from the cross (Vada x Zephyr) ~~x 59114~~, made at Rothwell in 1966. ~~The line 59114 was of Dutch origin.~~ Pedigree selection was employed throughout for the development of the variety, the definitive plant selection fixing the type being that chosen at F_4.

Plant rows were grown at F_6 for elimination of any deviant or off-type material, and those retained were rechecked at F7 as plant row progenies before bulking as nucleus stock for multiplication here.

Stability is being ensured by fresh plant row selection each year for the initial stage of the variety multiplication programme.

Georgie has been accepted by the authorities in the United Kingdom as "Distinct, Uniform, and Stable" under the test procedure for grant of Plant Variety Rights. Attached as an appendix to this exhibit are photocopies of the Final Report of November, 1975 confirming this, which also includes statements of the variants counted in the test procedure.

Strict checks of ear row progenies by N.A.P.B. during multiplication in 1976 have found maturity variants (3%) and neck variants (under 1%). Such off-type progenies (and some doubtful for collar variation) were not included for the multiplication stock.

Mission, Kansas
GED:cm
9/10/76

Attachment - Appendix

FORM GR-470 (REVERSE)

U. S. DEPARTMENT OF AGRICULTURE
RECEIVED
JUL 1 1974
AMS, GRAIN DIV.
PVPO

INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $250.00 fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, 6525 Belcrest Road, Hyattsville, Maryland 20782. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety based on the definition in Section 41 (a) of the Act and decision is made to increase the seed.

13a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

13b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

13c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

13d Provide complete data indicative of novelty. Seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty may be submitted. Seeds submitted may be sterile.

13e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

91 721

N.A.P.B. Application for Georgie: Appendix to Exhibit A

Ministry of Agriculture, Fisheries and Food and Plant Variety Rights Office
Department of Agriculture and Fisheries for Scotland
Department of Agriculture for Northern Ireland

AFP 2/136

SPECIAL FINAL REPORT

for PLANT BREEDERS RIGHTS PURPOSES

REPORT ON TESTS FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Crop: SPRING BARLEY

Species: Hordeum distichum L.

APPLICATION DATA

Application for: (a) addition to National List [X] (b) grant of PBR [X]

File Reference AFP 2/136

Approved name: GEORGIE

Breeder's designation: RPB 38-69

Parentage ~~or breeding history~~ of variety as stated by applicant

VADA X ZEPHYR

Name and address of breeder: Rothwell Plant Breeders Limited, Rothwell, Lincs.

Name and address of applicant: (a) For Plant Breeders Rights: as Breeder

(b) For National Listing (if different)

Name and address of U.K. agent or address for service: -

TEST AUTHORITIES AND TEST DATA

A. England and Wales
National Institute of Agricultural Botany, Huntingdon Road, Cambridge.

B. Scotland
Dept. of Agric. and Fisheries for Scotland
Agric. Scientific Services, East Craigs, Edinburgh.

C. Northern Ireland
Department of Agriculture for Northern Ireland
Field Botany Division, Crossnacreevy, Belfast.

	1	2	3	4	5
Years of tests	1973	1974	1975		
Tests conducted by (reference above)	ABC	ABC	ABC		

CY

T OF VARIANTS

SPECIAL

AFP 2/136

FINAL REPORT

EAR ROWS

Centre	No. of Variant rows	Description of Variants	Variant confirmed or not
1973 Harvest Year - Ear-rows from ears ex applicant			
BELFAST (100 Ear Rows)	1	Ears more glaucous, earlier to droop, mixed for rachilla hair type	
	1	Taller	
CAMBRIDGE (100 Ear Rows)	1	Grain type pilosum	Pre-examination confd
	1	Later at awn emergence by 3 days, taller by 10 cm	
	1	Earlier at awn-emergence by 2 days	
	1	Taller by 10 cm	
EDINBURGH (100 Ear Rows)	1	Later at awn-emergence by 2 days, foliage lighter green	
1974 Harvest Year - Ear-rows from ears ex applicant			
BELFAST (100 Ear Rows)	1	Pigmentation stronger, slightly taller	
	1	" " "	
	1	Shorter by 10 cm	
CAMBRIDGE (100 Ear Rows)	1	Ears later to droop	
EDINBURGH (100 Ear Rows)	Nil		
1975 Harvest Year - Ear-rows from ears ex applicant			
BELFAST (100 Ear Rows)	Nil		
CAMBRIDGE (100 Ear Rows)	Bed failed		
EDINBURGH (100 Ear Rows)	Nil		

Remarks

SPECIAL | FINAL | REPORT

JTS

/3	CAMBRIDGE	100-ear sample	Grain type C	1	
	EDINBURGH	400-plant sample,	Sl.taller, ears earlier to droop		3
1974	BELFAST	400-seed sample	Grain type C	3	
		100-ear sample	" " "	3	
	CAMBRIDGE	50-ear sample	" " "	1	
		315-plant sample	" " "	3	
	EDINBURGH	100-ear sample	" " "	2	
		400-seed sample	" " "	2	
			" " pilosum	1	
			Grain type A	1	

C. NATIONAL LIST PERFORMANCE TRIAL SEED STOCK

1973 (Year 1) and 1974 (Year 2)

Satisfactory

1975 No variants recorded in routine sample examinations.

STABILITY

Satisfactory See Remark (d) below

DISTINCTNESS

Distinct

Remarks

(a) In its initial test year 1973, AFP 2/136 exhibited evidence of serious lack of uniformity in the submitted ears and the applicant was invited to submit further material for testing in 1974(see Interim Report dated 19.12.74).

(b) In harvest year 1974, AFP 2/136 exhibited a lack of uniformity in both submitted ears and submitted seed and the applicant submitted further material for testing in 1975 (see 2nd Interim Report dated 13 February 1975).

(c) In harvest year 1975, no lack of uniformity in the submitted ears was exhibited, routine sample examinations of the submitted seed showed it to be free from the variant(type C grains) encountered in the 1974 submission and distinctness was established.

(d) In its initial test year 1973, AFP 2/136 exhibited slight evidence of a possible lack of stability in one major character. In subsequent submissions and material grown from them in harvest years 1974 and 1975, no further within-row variation was observed and in the 1975 seed and ear submission there was no evidence of variation in the major character. Although no submission has been tested through a cycle of reproduction, it is considered that there is little reason to suppose that the variety lacks stability.

Signed for N.I.A.B. A J EADE [signature] Date 21 NOV 1975

for D.A.F.S. J L KEPPIE [signature] Date 25/11/75

for D.A.N.I. J TINMAN [signature] Date 1/12/75

EXHIBIT B

North American Plant Breeders
5201 Johnson Drive
P.O. Box 2955
Mission, Kansas, 66205
(Formerly of Little Rock, Arkansas)

BOTANICAL DESCRIPTION OF THE VARIETY "GEORGIE"

Georgie has type A grain (U.P.O.V. convention) with weak to moderate pigmentation in the lemma nerves at maturity. The base of the lemma is bevelled, the rachilla is of medium length and the grain has a ~~hairy~~ glabrous ventral furrow. SES 5/27/76

Growth at tillering is semi-erect and the lower leaf sheaths are glabrous and pigmented. Flag-leaf auricles are pigmented, and so too are the tips of the awns. Georgie is moderately strongly glaucous at earing.

Georgie has ears between medium-lax and lax, and of 2-row conformation. Awns are rough, equal to or slightly longer than the ear. The first rachis segment is of medium length and width and is fairly strongly curved. Middle rachis segments are straight to medium humped in profile.

The variety has short, stiff straw and the maturity is two days later than Betzes.

Mission, Kansas
GED:cm
9/10/76

FORM GR-470-5
(11-1-72)

FORM APPROVED. OMB NO. 40-R3712

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY
BARLEY *(HORDEUM VULGARE)*

INSTRUCTIONS: *See Reverse.*

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, 1120 Marshall St.
Little Rock, Arkansas 72203

FOR OFFICIAL USE ONLY
PVPO NUMBER 7500001
VARIETY NAME OR TEMPORARY DESIGNATION LUD

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

1. GROWTH HABIT:

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

[2] Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

[2] 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

[ ] No. of days *Earlier* than . . . . . [ ]
[2] No. of days *Later* than . . . . . [1]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON
5 = PIROLINE 6 = PRIMUS 7 = UNITAN

3. PLANT HEIGHT (From soil level to top of head):

[3] 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

7 10/5/96

[0 0] Cm. *Shorter* than . . . . . [1]
[ ] Cm. *Taller* than . . . . . [ ]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON
5 = PIROLINE 6 = PRIMUS 7 = UNITAN

4. STEM:

[ ] Exertion *(Flag to spike at maturity)*: 1 = 0 - 3 cm. 2 = 3 - 10 cm. 3 = 10 - 15 cm.

[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[ ] NO. OF NODES (Originating from node above ground)

[4] Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN 4 = MODIFIED CLOSED OR OPEN

[1] Shape of Neck: 1 = STRAIGHT 2 = SNAKY 3 = OTHER (Specify)

5. LEAF:

[1] Basal leaf sheath *(seedling)*: 1 = GLABROUS 2 = PUBESCENT

[1] Position of flag leaf *(at boot stage)*: 1 = DROOPING 2 = UPRIGHT

[3] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[ ] MM. WIDTH (First leaf below flag leaf)

[ ] CM. LENGTH (First leaf below flag leaf)

[2] Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

[1] Type: 1 = TWO-ROWED 2 = SIX-ROWED

[1] Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify)

[3] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[1] Lateral Kernels Overlap: 1 = NONE 2 = AT TIP 3 = 1/4 - 1/2 OF HEAD

[3] Rachis *(Hair on edge)*: 1 = LACKING 2 = FEW 3 = COVERED

7. GLUME:

[1] Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA

[2] Hairs: 1 = NONE 2 = SHORT 3 = LONG

[2] Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

[2] Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = MORE THAN EQUAL TO LENGTH OF GLUMES

[1] Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

EXHIBIT D

North American Plant Breeders
5201 Johnson Drive
P.O. Box 2955
Mission, Kansas, 66205
(Formerly of Little Rock, Arkansas)

DATA INDICATIVE OF NOVELTY "GEORGIE"

Georgie is in general most similar to Vada. It differs in having considerably stronger straw, more resistance to lodging, and is two inches shorter. Resistance to loose smut is higher than that of Vada.

The grain of Georgie is distinct from Vada in having no ventral crease hairs beneath the rachilla.

Characteristics recognized by the National Institute of Agricultural Botany, Cambridge, for the United Kingdom are incorporated in the Recommended List; a copy of the 1976 list for spring barleys is attached as an appendix as additional confirmation that Georgie is a novel variety.

Mission, Kansas
GED:cm
9/10/76

Attachment

8. LEMMA:

[5] Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike) 5 = LONG (longer than spike) 6 = HOODED

[3] Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

[1] Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

[1] Hair: 1 = ABSENT 2 = PRESENT

[1] Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE

[1] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[ ] Hairs: 1 = FEW 2 = MANY

10. SEED:

[2] Type: 1 = NAKED 2 = COVERED

[1] Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

[3] Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.) 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

[2] Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

[~~2~~] 1 ECT 10/3/78 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

[ ][ ] PERCENT ABORTIVE

[4][0] GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[ ] SEPTORIA	[ ] NET BLOTCH	[ ] SPOT BLOTCH	[2] POWDERY MILDEW
[ ] LOOSE SMUT	[ ] BACTERIAL BLIGHT	[ ] COVERED SMUT	[ ] FALSE LOOSE SMUT
[ ] STEM RUST	[ ] LEAF RUST	[ ] SCAB	[1] SCALD ECT 9/8/76
[ ] AY	[ ] BSMV	[ ] BYDV	[ ] OTHER (Specify)

12. INSECT: (0 = Not tested, 1 = Susceptible 2 = Resistant)

[ ] GREEN BUG	[ ] ENGLISH GRAIN APHID	[ ] CHINCH BUG	[ ] ARMYWORM
[ ] GRASS HOPPERS	[ ] CERIAL LEAF BETTLE	[ ] OTHER (Specify)	

HESSIAN FLY RACES: [ ] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[1] DDT [ ] OTHER (Specify)

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Not known at date of application	Seed size	Not known at date of application
Leaf size		Coleoptile elongation	
Leaf color		Seedling pigmentation	
Leaf carriage			

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions an terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Can in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilizat Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

00010

RECOMMENDED LIST OF SPRING BARLEYS 1976

The control for yield comparisons is the mean of Proctor and Zephyr. Comparisons other than with the control are not strictly valid, and **differences of 3% or less should be treated with reserve.**

Varieties classified for General use G, Special use S, Provisional recommendation P, Becoming Outclassed O	Recommended									Provisionally recommended						Becoming Outclassed					
	Mazurka G	Lofa Abed G	Abacus G	Wing G	Hassan G	Julia G	Maris Mink S	Armelle S	Proctor S	Ark Royal PG	Aramir PG	Georgie PG	Sun-dance PG	Varunda PG	Tyra PS	Universe O	Borac O	Vada O	Midas O	Zephyr O	Imber O
Agricultural Characters:																					
Yield as % of control	113	112	112	108	108	106	113	107	98	114	112	112	112	110	109	114	108	104	104	102	101
Standing power	7	6	5½	6½	6½	7	9	7	5½	7	8	8	7½	6½	6	9	7½	5½	8½	7	6½
Shortness of straw	5	6½	5½	5½	7	6½	9	4	6	5½	6	7½	6½	6	6½	9	7	6½	8	6½	6
Earliness of ripening	8	6	7	7	7½	7	5½	6	5½	4½	7½	7	6½	7½	7½	5½	7½	7	6	7½	7
Resistance to brown rust	3	5	5	3	5	5	4	5	3	3	5	5	5	5	5	5	4	5	1	3	3
Resistance to mildew	7	6	7	6	5	3	8	5	3	7	7	6	7	6	6	7	3	6	5	2	4
Resistance to Rhynchosporium	2	2	3	2	3	2	1	8	5	4	2	3	2	3	4	1	2	3	2	2	3
Resistance to yellow rust	4	5	5	2	6	3	4	4	5	6	5	3	4	5	3	2	1	2	4	5	3
Resistance to loose smut	2	5	3	3	4	4	2	3	8	8	2	2	4	3	3	4	2	3	4	3	5
Resistance to cereal cyst eelworm (R)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	R	–	–	–	–	–	–
Resistance to ear loss	3	8	6	7	7	5	7	7	7	–	6	–	–	5	–	8	6	8	7	5	5
Malting grade (greatly influenced by conditions of growth)	5	2	1	7*	6*	4	5	5	6*	8	4	1	4	1	1	2	6	2	3	5	9
1,000 corn weight	7	6½	7	6½	7	6½	6	7	6	6	6½	7	7	6½	7½	6	6½	6½	5½	6½	6½
Specific weight	7	7½	7	7	7	7½	7½	7	7	7	8	6½	7	6	7	7	7	7	6½	7	7
Year first listed	1972	1971	1974	1972	1971	1968	1973	1974	1953	1976	1975	1976	1976	1975	1976	1973	1971	1969	1970	1966	1970

A high figure indicates that the variety shows the character to a high degree.

* Recommended by the Institute of Brewing as malting varieties, although new varieties may not have been proved on a commercial scale.

See the note on varieties for the north and south-west (page 14)

VARIETIES RECOMMENDED FOR GENERAL USE

Mazurka — Very high yield with early maturity and long but fairly stiff straw; very liable to ear loss when ripe. Good resistance to mildew.

Europa x H.4808. M.G.H., Holland.

Lofa Abed — Yield very high, and relative yield especially high in lower yielding situations. Good resistance to most diseases except Rhynchosporium. Rather late maturing. Straw rather weak.

Proctor x Minerva. Abed, Denmark.

Abacus — Very high yield with good resistance to mildew and moderately good resistance to brown rust. Straw rather weak.

Vada x Zephyr. Rothwell Plant Breeders, Lincs.

Wing — Good malting quality. Susceptible to yellow rust.

Lyallpur x Ingrid. Weibull, Sweden.

Hassan — Good malting quality with moderately good brown rust and good yellow rust resistance.

Delta x [Agio x (Kenia x Arabian variety)]. Cebeco, Holland.

Julia — Fairly stiff straw. Moderately good resistance to brown rust. Liable to ear loss when ripe.

Delta x Wisa. Cebeco, Holland.

VARIETIES RECOMMENDED FOR SPECIAL USE

Maris Mink	Recommended only for areas where Rhynchosporium is not normally prevalent; liable to severe infections in the west and south. Yield potential very high. Very short and very stiff straw. Good resistance to mildew. Late maturing.	Deba Abed x (Emir x Swallow). Plant Breeding Institute, Cambridge.
Armelle	Recommended for its very good resistance to Rhynchosporium and moderately good resistance to brown rust. Long but fairly stiff straw. Rather late maturing.	Ceres x Clermont. I.N.R.A., France.
Proctor	Recommended where a traditional malting barley is required, and for the south-west where Rhynchosporium is prevalent. Late maturing. Straw rather weak. Yield rather low.	Kenia x Plumage-Archer. Plant Breeding Institute, Cambridge.

NEW VARIETIES PROVISIONALLY RECOMMENDED

Ark Royal	Very high yield with very good malting quality and fairly stiff straw. Late maturing. Good resistance to most diseases.	Proctor x HP.5466. Rothwell Plant Breeders, Lincs.
Aramir	Very high yield and stiff straw. Good resistance to mildew and moderately good resistance to brown rust.	Volla x Emir. Cebeco, Holland.
Georgie	Very high yield and stiff straw. Moderately good brown rust resistance.	Vada x Zephyr. Rothwell Plant Breeders, Lincs.
Sundance	Very high yield and stiff straw. Good mildew resistance and moderately good brown rust resistance.	Vada x Zephyr. Rothwell Plant Breeders, Lincs.
Varunda	High yield and good resistance to disease except Rhynchosporium. Liable to ear loss when ripe.	Vada x Hijlkema 1148. Wageningen, Holland.

Tyra	Recommended for its resistance to cereal cyst eelworm and high yield. Susceptible to yellow rust. Straw rather weak.	(Monte Cristo x Herta) x (Rika x Droat). Pajbjerg, Denmark.

VARIETIES BECOMING OUTCLASSED

Universe	Very susceptible to Rhynchosporium. Liable to severe infections in the west and south. Yield potential very high. Very short and very stiff straw. Good resistance to mildew and moderately good resistance to brown rust but susceptible to yellow rust. Late maturing.	Abed 3371 x Vada. Miln Marsters, Chester and King's Lynn.
Berac	Stiff straw and good malting quality. Very susceptible to yellow rust.	Balder x Erica. C.I.V., Holland.
Vada	Moderately good brown rust resistance but susceptible to yellow rust. Straw rather weak.	*Hordeum laevigatum* x Gull. Wageningen, Holland.
Midas	Yields best in the north, where brown rust is not normally prevalent. Requires good growing conditions. Responds to above average seed-rate. Short and very stiff straw. Rather late maturing. Grain small.	[(Proctor x Wong) x M.R.A.] x gamma ray mutant from Maythorpe. Miln Marsters, Chester and King's Lynn.
Zephyr	Fairly stiff straw. Liable to ear loss when ripe.	H.2149 x Carlsberg. M.G.H., Holland.
Imber	Very good malting quality. Yield rather low. Liable to ear loss when ripe.	Elsa x Proctor. Guinness, Warminster.

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EXHIBIT E

North American Plant Breeders
5201 Johnson Drive
P.O. Box 5299
Mission, Kansas, 66205
(Formerly of Little Rock, Arkansas)

STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP: "GEORGIE"

Georgie was bred by full-time employees of Rothwell Plant Breeders Limited. Pursuant to terms of employment of such employees, ownership of the variety vested in Rothwell Plant Breeders Limited.

Pursuant to an agreement dated March 9, 1973, between Rothwell Plant Breeders and North American Plant Breeders, ownership of the variety in the U.S.A. and the right to apply for plant variety protection in the U.S.A. passed to the applicant.

Further information on this matter has been provided in the letter of February 3, 1976 from Mr. B. W. Greengrass, together with a notorized copy establishing N.A.P.B. as assignee of title to all Rothwell Plant Breeders' bred varieties in U.S.A.

Mission, Kansas
GED:cm
9/10/76

Excerpts from:

NAPB-RPB
TECHNICAL COLLABORATION AGREEMENT

"AGREEMENT dated this 9th day of March 1973, between NORTH AMERICAN PLANT BREEDERS, a partnership of R-P and OPB (both as hereinafter defined) existing under the laws of the State of Connecticut, USA ("NAPB") on the one hand and ROTHWELL PLANT BREEDERS LIMITED, a company incorporated in England with its registered office at Field House, Grimsby, Lincolnshire, England ("RPB") on the other relating to technical collaboration between them as hereinafter recited.....

"WITNESSETH THAT the parties hereto agree as follows:

"ARTICLE I - DEFINITIONS

Following terms used herein shall have the following meanings:

(4) 'Seed' means any reproductive material of Agricultural Crops.

(5) 'Seed Know-How' means any knowledge, expertise and other information, and any rights of whatever nature (including but not limited to plant breeders' and similar rights) relating in any way to Agricultural Crops or Seed, or relating in any way to all processes, methods and apparatus for the breeding, planting, harvesting, production and treating of Agricultural Crops and Seed. Proprietary or secret knowledge, expertise and other information and rights relating to chemicals used for treating Agricultural Crops or Seed are excluded from the definition of 'Seed Know-How' but such proprietary or secret knowledge, expertise and other information and rights relating to chemicals used for treating Agricultural Crops or Seed for the purpose of creating inheritable characteristics in Agricultural Crops or Seed are included in such definition.

"ARTICLE IV - TECHNICAL COLLABORATION AND LICENSING

(1) RPB, to the extent of its rights and during the term of this Agreement, shall (a) make available to NAPB on a continuing basis, all Seed available to RPB for the NAPB territory from all sources in quantities for initial plant breeding purposes, (b) disclose and transfer to NAPB on a continuing basis for use in the NAPB territory in connection with the breeding, development, production and sale of Seed all present and future Seed Know-How available to RPB for the NAPB territory from all sources, and (c) assign and continue to assign to NAPB all its right, title and interest in and to said Seed Know-How and said Seed for exploitation throughout the NAPB territory.....

(4) Any assignments made or licenses granted under the provisions of Clauses (1), (2) or (3) hereof shall be in perpetuity or for the life of the rights being assigned or licensed. However, the respective obligations of the parties to make such assignments and grant such licenses to each other hereunder with respect to new Seed or new Seed Know-How, shall terminate forthwith upon termination of this Agreement for any reason.

(7) Insofar as NAPB has the right by way of assignment of all right, title and interest in Seed Know-How: (i) NAPB shall have the exclusive right to take whatever action it deems necessary to protect Seed Know-How in the NAPB territory by filing application for plant breeders certificate and similar rights; (ii) RPB shall assist NAPB in securing and transmitting all information for the completion and prosecution of such applications; (iii) within thirty (30) days after the execution of this Agreement RPB shall assign to NAPB all applications for U.S. Certificates

for Plant Variety Protection and hereby grants to NAPB the exclusive right to file applications for Plant Variety Protection Certificates and to be the owner of all rights with respect thereto, including the right to enforce such Certificates and rights represented thereby against unauthorized third parties. Reciprocally, RPB shall have similar exclusive rights for the RPB territory and NAPB shall render similar assistance and make similar assignments to RPB.

"IN WITNESS WHEREOF, the parties have executed this Agreement the day and year first above written.

NORTH AMERICAN PLANT BREEDERS

By /s/ B.W.A. Greengrass

Title: General Manager

ROTHWELL PLANT BREEDERS LIMITED

By /s/ F. M. Collins

Title: Managing Director"

I certify this document to be true excerpts from the original agreement.

Rosalyn Snyderman

A Notary Public for the County of Pulaski, State of Arkansas

My Commission Expires Nov. 1, 1979

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

944121584

AUTHENTICATION: 7169071

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

E. BURCH, JR
MICHAEL CODY
PORTER
HLES F. NEWMAN
HOMAS CATES
OE M. DUNCAN
JOHN A. STEMMLER
J. BROOKE LATHRAM
JEF FEIBELMAN
DEWITT H. SHY, JR
R. MICHAEL POTTER
JOHN W. CHANDLER, JR
DAVID J. HARRIS
WARNER B. RODDA
DAVID M. LILLARD, JR
HOLLY K. LILLARD
SAM L. CRAIN, JR
NATHAN A. BICKS
STEPHEN D. CRAWLEY
LAUREL C. WILLIAMS
LISA A. KRUPICKA
LECANNE MARSHALL COX
RICHARD R. SPORE, III
BETH WEEMS BRADLEY
KATHRYN E. STORY
LES JONES
MELISSA A. MARAVICH
RICKY E. WILKINS
TODD A. ROSE
REVA M. KRIEGEL
SUSAN CLARK TAYLOR
DOUGLAS F. HALIJAN
JOHN W. CAMPBELL
R. PORTER FEILD
CHAS. N. BURCH 1868-1936
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 650
MEMPHIS, TENNESSEE 38103
TELEPHONE 901-527-2311
TELECOPIER 901-527-4180

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 EXACTLY PAY 3725 00 CTS

PAY THIS AMOUNT $3,725.00

PAY TO THE ORDER OF United States Treasury

HELENA CHEMICAL COMPANY
by

AUTHORIZED SIGNATURES