No. 7700003

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Western 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 ...ED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Gus'

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* ninth *day of* May *in the year of our Lord one thousand nine hundred and* seventy-seven

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 Gus	2. KIND NAME Barley	FOR OFFICIAL USE ONLY PV NUMBER 7700003
3. GENUS AND SPECIES NAME Hordium vulgare	4. FAMILY NAME (Botanical) Gramineae	FILING DATE 10-22-76 TIME 12:45 A.M. P.M. FEE RECEIVED $ 250.00 $ 250.00 $ 250.00 BALANCE DUE $ — $ — $ —
	5. DATE OF DETERMINATION May 20, 1975 1/24/77 EST	
6. NAME OF APPLICANT(S) EST ~~WPB ACQUISITION INC.~~ 11/5/85 ~~Western Plant Breeders~~ 12/10/85 WESTERN PLANT BREEDERS, INC. (a Maryland corporation)	7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) 1918 VAN BUREN EST 12/10/85 ~~Rt. 3, Box 45B~~ P.O. BOX 1110 ~~Conrad, Montana 59425~~ PHOENIX, AZ 85001 ATT.: MR. ROBERT HUNTINGTON	8. TELEPHONE AREA CODE AND NUMBER 406 278-5547
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Partnership	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION

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

Dr. A. E. Carleton, Rt. 3, Box 45 B
Pres. WPB Conrad, Montana 59425

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

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 [X] 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.

(DATE) Albert E Carleton (SIGNATURE OF APPLICANT)

(DATE) (SIGNATURE OF APPLICANT)

00001

13A. The original basic germplasm was obtained from Dr. T. R. Ramage's (ARS, USDA) barley breeding program at Tucson, Arizona. Gus was selected from a broad based male-sterile facilitated recurrent selection population which contained crosses of Southwestern United States adapted germplasm and short strawed genotypes to the world collection of barley. The original crossing was done in 1971 among the material obtained from Dr. Ramage. The F_1 thru the F_5 generations were grown in the winter in Arizona and in the summer in Montana. Gus was selected in the F_5 generations from a group of 30 F_5 lines being grown in Arizona. Five plants were pulled from the F_5 line and grown in Montana in 1975. These five plant rows were uniform for plant height, plant color, head color, head type, and maturity. Seed from these five plant rows was bulked as the basic seed stock of Gus. This basic seed was seeded in Arizona in 1975-76 to produce Breeders seed.

The major variants observed during the selection and multiplication stages have been tall out-crossed hybrid plants. Most of these out-crosses have been two-rowed plants. These variants have been removed thru roguing however outcrossing may occur in later generations. These outcrossed variants will be hybrids and range from 5" to 12" taller than Gus.

Since Gus was selected in the F_5 generation and basic seed was from F_6 plant rows, genetic stability based on self-pollination and homozygocity level in the F_6 generation will provide varietal stability. Basic seed, Breeders seed, and Foundation seed have been produced and no abnormal change in morphological or physiological traits have been observed.

13B. The seed of Gus is thin hulled and bright yellow in color. Gus has a light blue aleurone color.

Gus has ~~erect~~ prostrate early plant growth with plants having a dark green color. SES 3/1/77

The mature plants of Gus are semi-dwarfs with up-right dense heads (not a club). Gus will be shorter than Arivate or Kombar grown under similar conditions (See Data sheet on plant Height). Gus has much stronger straw than Arivate or CM 67. Gus has plant height and straw strength similar to WPB's variety Reliance. Gus and Reliance can be distinguished be plant color (Gus-dark green, Reliance-yellowish green), head type (Gus-normal, Reliance-club), and seed (Gus-yellow hull, light blue aleurone; Reliance-brownish hull, dark blue aleurone--see seed samples of Gus and Reliance).

13C. See Insert

~~13D.~~ Gus can be seperated from other barley varieties by plant height (See ~~Table 1~~). Gus is some 23 cm shorter than Arivate and 9 cm shorter than Kombar. Gus is thus, considerable shorter than other normal head type varieties ~~adapted~~ to the Southwest.

Gus can be seperated from other ~~barley~~ varieties by its upright head type at maturity. Kombar and Arivate heads ~~droop~~ upon maturity.

Gus can be seperated from other Southwest varieties by ~~straw~~-strength (See Table 2). Gus had an average lodging percentage of 2.2% while ~~Arivate~~

Superceded. 3/1/77 SES

Date of Determination. Both varieties were determined at a meeting on May 20, 1975. The 1976 date for 'Gus' was a typing error.

(ADDENDUM) 1/24/77 RCJ

Exhibit A. The frequency of variants in 'Gus' barley was less than 1 in 8 to 10,000 plants. The frequency of variants in 'Reliance' barley was less than 1 in 15 to 20,000 plants.

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)
Western Plant Breeders

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)
Valley Seed Co., Box 1110, Phoenix, Arizona 85026
Montana Seeds, Inc., Rt. 3, Conrad, Montana 59425

FOR OFFICIAL USE ONLY
PVPO NUMBER
7700003
VARIETY NAME OR TEMPORARY DESIGNATION
Gus or 6-3 or V6-3

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

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

2. MATURITY (50% Flowering):

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

[6] No. of days *Earlier* than ..... [1]
[10] No. of days *Later* than ..... [2]
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):

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

[0][6] Cm. *Shorter* than ..... [2]
[ ][ ] Cm. *Taller* than ..... [x]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN
x = taller than none listed

4. STEM:

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

[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[0][4] NO. OF NODES (Originating from node above ground)

1&2 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

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

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

[2][5] MM. WIDTH (First leaf below flag leaf)

[2][3] CM. LENGTH (First leaf below flag leaf)

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

6. HEAD:

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

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

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

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

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

[2] 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

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

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

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

'Gus'

Exhibit D. "Gus' is most similar to 'Reliance' but differs in that 'Gus' has a prostrate seedling growth habit and dark bluish-green broad leaves while 'Reliance' has semi-prostrate seedling growth with narrower light green leaves. 'Gus' has strap heads while 'Reliance' has a club head type. Seeds of 'Gus' have yellow thin hulls and light blue aleurone color while 'Reliance' seeds have brownish thin hulls and dark blue aleurone color.

Exhibit E. Western Plant Breeders, a partnership, is the developer and sole owner of 'Gus' barley.

TABLE 1. Plant Height (in cm) Comparisons at Several Locations

Variety	Mesa Trial 1	Mesa Trial 2	Stockton	El Central	$\bar{x}$
Reliance	76.2	71.1	68.3	63.5	69.8
Arivate	126.7	94.0	91.4	101.6	98.4
Kombar	88.9	83.8	82.1	81.3	84.0
CM 67	-	-	80.7	88.9	84.8
Gus	81.3	76.2	71.3	71.1	75.0
$LSD_{.05}$			3.0 cm	8.2 cm	

TABLE 2. Straw Strength as Lodging Percentage at Several Locations

Variety	Mesa Trail 1	Mesa Trail 2	Stockton	El Central	$\bar{x}$
Reliance	10	1	5	10	6.5
Arivate	68	37	49	60	53.5
Kombar	1	0	1	10	3.0
CM 67	--	--	75	95	85.0
Gus	2	1	1	5	2.2
Signal	--	--	82	98	87.0
$LSD_{.05}$			10%	6%	

STATE OF ARIZONA)
) ss.
County of Maricopa)

ASSIGNMENT

WHEREAS, WESTERN PLANT BREEDERS, INC., an Arizona corporation (a/k/a) WESTERN PLANT BREEDERS), having its principal place of business at Phoenix, Arizona, has adopted, used and is using the following Certificate of Protection which is registered in the Plant Variety Protection Office of the Secretary of Agriculture:

Certificate No. 7700003 Gus Barley

WHEREAS, WPB ACQUISITION INC., a Maryland corporation, having its principal place of business in Hayward, California, is desirous of acquiring said Plant Variety Protection Certificate; and

WHEREAS, WESTERN PLANT BREEDERS, INC., states that it has title to the above Certificate and that this transfer does not violate any applicable ruling or order of any court or agency of competent jurisdiction.

NOW, THEREFORE, for valuable consideration, receipt of which is hereby acknowledged, WESTERN PLANT BREEDERS, INC. does hereby assign and set over to WPB ACQUISITION INC., all of the right, title and interest of WESTERN PLANT BREEDERS, INC., in and to the variety of barley named:

"Gus"

together with all goodwill associated with that variety and that name, and together with all rights under and to that Certificate of Plant Variety Protection, No. 7700003, issued by the Secretary of Agriculture of the United States of America on May 9, 1977.

WESTERN PLANT BREEDERS, INC.

By Albert E. Carleton
Albert E. Carleton, President

On this 30th day of September, 1985, before me, appeared Albert E. Carleton, to me personally known, who, being by me duly sworn, did say that he is the president of WESTERN PLANT BREEDERS, INC., an Arizona corporation, and that the foregoing Assignment is on behalf of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal at my office in Phoenix, Arizona the day and year last above written.

Yvonne M. Bolton aka Yvonne M. Smith
Notary Public

My Commission Expires:

November 3, 1986

FORM GR-470-5 (Reverse) 1977 'Gus' 77-3

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

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

[1] Hair: 1 = ABSENT 2 = PRESENT

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

[ ] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[2] Hairs: 1 = FEW 2 = MANY

10. SEED:

[2] Type: 1 = NAKED 2 = COVERED

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

[~~2~~ 4] 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.)

EGS 4/11/77

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

[2] Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

less [1%] PERCENT ABORTIVE

[5 0] GMS. PER 1000 SEEDS

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

[0] SEPTORIA	[1] NET BLOTCH	[1] SPOT BLOTCH	[2] POWDERY MILDEW
[1] LOOSE SMUT	[1] BACTERIAL BLIGHT	[1] COVERED SMUT	[0] FALSE LOOSE SMUT
[0] STEM RUST	[0] LEAF RUST	[0] SCAB	[0] SCALD
[0] AY	[0] BSMV	[1] BYDV	[0] OTHER (Specify)

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

[0] GREEN BUG	[0] ENGLISH GRAIN APHID	[0] CHINCH BUG	[0] ARMYWORM
[0] GRASS HOPPERS	[0] CERIAL LEAF BETTLE	[0] OTHER (Specify)	

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

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

[0] DDT [0] OTHER (Specify)

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Reliance	Seed size	Arivate
Leaf size	Kombar	Coleoptile elongation	Kombar
Leaf color	Reliance	Seedling pigmentation	Kombar
Leaf carriage	Reliance		

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, Utilizati 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.