No. 7500052

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Delaware Agricultural Experiment Station

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 A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS CERTIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'Emerald'

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* eighth *day of* August *in the year of our Lord one thousand nine hundred and* seventy-five

Attest:

L. Rollin

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Earl L Butz

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	2. KIND NAME	FOR OFFICIAL USE ONLY
Emerald	Soybean	PV NUMBER 7500052
3. GENUS AND SPECIES NAME	4. FAMILY NAME *(Botanical)*	FILING DATE 1-28-75 / TIME 9 A.M.
Glycine max.	Leguminosae	FEE RECEIVED $250 / BALANCE DUE $ —
	5. DATE OF DETERMINATION 11/1/66	$250 / $ —
		$250 / $ —

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
Delaware Agricultural Experiment Station	College of Agricultural Sciences University of Delaware Newark, Delaware 19711	302-738-2501

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	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:

None

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.

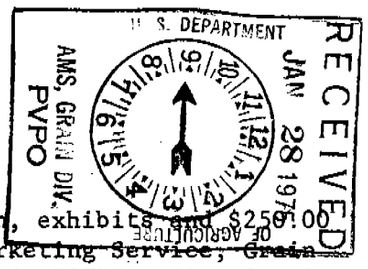
January 17, 1975
(DATE)

W. E. McDaniel
(SIGNATURE OF APPLICANT)

W. E. McDaniel
Director, Delaware Agricultural Experiment Station

(DATE)

(SIGNATURE OF APPLICANT)



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.

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Exhibit A

Origin and Breeding History of the Variety

This vegetable soybean variety is from the cross of Aoda x (Hahto x Kent) and it was made in 1960. The breeding procedure used in its development during the years of 1961 to 1965 was a modified bulk. In 1965 a single plant was selected. In 1966 the line from this single plant was saved from the Newark plots because of its outstanding traits. In 1967 and 1968 this line was rogued for off-type plants. In 1969 a yield test comparing Verde was conducted with this line. In 1970 an increase of seed was made and in 1971 some seed was sent to research scientists in five other states. This line did not enter the usual regional soybean testing program because vegetable type soybeans were not able to compete with field-type soybeans from the viewpoint of bushels of seed per acre. Seed was increased in 1972 and 1973. There have been no genetic variants in this line during the past six years. Cross-pollination of course does occur to a very small extent if the line is not isolated.

Exhibit B

Botanical Description of the Variety

The special characteristic of this vegetable soybean variety is that about 90 days after planting the seed are at their most plump stage which is the optimum time for processing by commercial packers or home owners. This variety was specifically developed for frozen food packaging as the green color is very attractive for human consumption.

This variety will be compared to the Verde soybean variety which is also a green-seeded vegetable soybean. This new variety yields about 5 bushels more seed per acre than Verde. It has a larger seed than Verde and tends toward a flat shape instead of the round seed of Verde. The new variety does hold the seed in the pods after maturity better than Verde. Some consumers have stated that the flavor after cooking has been better than Verde. It is a week to 10 days later in maturity than Verde.

FORM GR-470-2
(6-15-72)

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

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY

INSTRUCTIONS: *See Reverse.*

SOYBEAN *(GLYCINE MAX)*

NAME OF APPLICANT(S)

Delaware Agricultural Experiment Station

ADDRESS *(Street and No., or R.F.D. No.; City, State, and ZIP Code)*

College of Agricultural Sciences
University of Delaware
Newark, Delaware 19711

FOR OFFICIAL USE ONLY

PVPO NUMBER

VARIETY NAME OR TEMPORARY DESIGNATION

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Place the appropriate number that describes the varietal character of this variety in the boxes below.

1. SEED SHAPE:

[2] 1 = SPHERICAL 2 = SPHERICAL FLATTENED 3 = ELONGATE 4 = OTHER *(Specify)*

2. SEED COAT COLOR:

[2] 1 = YELLOW 2 = GREEN 3 = BROWN 4 = BLACK 5 = OTHER *(Specify)* _____

SHADE: [2] 1 = LIGHT 2 = MEDIUM 3 = DARK

3. SEED COAT LUSTER:

[1] 1 = DULL 2 = SHINY

4. SEED SIZE

[3][4] GRAMS PER 100 SEEDS

5. HILUM COLOR:

[6] 1 = BUFF 2 = YELLOW 3 = BROWN 4 = GRAY 5 = IMPERFECT BLACK 6 = BLACK 7 = OTHER *(Specify)* _____

SHADE: [3] 1 = LIGHT 2 = MEDIUM 3 = DARK

6. COTYLEDON COLOR:

[2] 1 = YELLOW 2 = GREEN

7. LEAFLET SIZE *(See Reverse)*:

[2] 1 = SMALL 2 = MEDIUM 3 = LARGE

8. LEAFLET SHAPE:

[4] 1 = OVATE 2 = OBLONG 3 = LANCEOLATE 4 = ELLIPTICAL 5 = OTHER *(Specify)* _____

9. LEAF COLOR *(See reverse)*:

[3] 1 = LIGHT GREEN 2 = MEDIUM GREEN 3 = DARK GREEN

10. FLOWER COLOR:

[2] 1 = WHITE 2 = PURPLE 3 = OTHER *(Specify)* _____

11. POD COLOR:

[2] 1 = TAN 2 = BROWN 3 = BLACK

12: POD SET:

[1] 1 = SCATTERED 2 = CONCENTRATED

13. PLANT PUBESCENCE COLOR:

[2] 1 = GRAY 2 = BROWN 3 = OTHER *(Specify)* _____

SHADE: [3] 1 = LIGHT 2 = MEDIUM 3 = DARK

14. PLANT TYPES *(See Reverse)*:

[1] 1 = SLENDER 2 = BUSHY 3 = INTERMEDIATE

15. PLANT HABIT:

[2] 1 = DETERMINATE 2 = INDETERMINATE 3 = OTHER *(Specify)* _____

16. HYPOCOTYL COLOR:

[2] 1 = GREEN 2 = PURPLE

17. SEED PROTEIN:

[ ] 1 = A 2 = B

18. NUMBER OF DAYS TO FLOWERING *(Place a zero in first box (e.g. [0][9]) when days are 9 or less.)*

[5][0]

19. MATURITY GROUP:

[6] 1 = 00 2 = 0 3 = I 4 = II 5 = III 6 = IV 7 = V 8 = VI 9 = VII 10 = VIII

20. SIZE OF 10 DAY OLD SEEDLING GROWN UNDER CONSTANT LIGHT *(Growth Chamber)* **AT 25° C.** *(Place a zero in first box (e.g. [0][2]) when size is 9 mm. or less.)*

[1][8][0] MM. LENGTH OF SEEDLING

[3][1] MM. LENGTH OF COTYLEDON

[1][6] MM. WIDTH OF COTYLEDON

21. DISEASE: *(Enter 0 =Not Tested; 1 = Susceptible; 2 = Resistant)*

[0] BACTERIAL PUSTULE	[0] SOYBEAN CYST	[2] DOWNY MILDEW	[1] PURPLE STAIN	[2] POD AND STEM BLIGHT	[0] ROOT KNOT
[0] FROGEYE	[0] STEM CANKER	[0] PHYTO-PHTHORA	[0] BROWN STEM ROT	[0] TARGET SPOT	[1] BROWN SPOT
[1] BUD BLIGHT	[0] WILDFIRE	[0] RHIZOCTONIA ROT	[0] OTHER *(Specify)*		

#7500052

EXHIBIT D

	EMERALD	VERDE
Pubescence Color	Tawny	Gray
Flower Color	Purple	Purple
Plant Height	38 inches	34 inches
Weight of 100 Seeds (Dry)	34 grams	32 grams
Shape of Seed	Slightly Flat	Round
Color of Hilum	Black	Light Green
Color of Seed	Green	Green
Yield per Acre for Processing at Plump Stage	2,500 pounds	2,000 pounds
Yield per Acre for Combining	35 bu.	30 bu.
Maturity for Processing	95 days	85 days
Maturity for Combining	126 days	118 days

LETTER FROM WILLIAM J. BENTON DATED FEB. 19, 1975 STATES "THE 'EMERALD' SOYBEAN IS COMPARED TO THE MOST SIMILAR COMMERCIAL VARIETY THE 'VERDE' SOYBEAN". RJS.

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EXHIBIT D

Amino Acid Composition (Field-Dried Soybeans)*	Emerald	Verde
Alanine	1.95	1.96
Valine	2.25	2.17
Glycine	1.92	1.91
Isoleucine	2.28	2.13
Leucine	3.78	3.62
Proline	2.35	2.24
Threonine	1.79	1.74
Serine	2.43	2.34
Methionine	0.45	0.52
Hydroxyproline	0.08	0.04
Phenylalanine	2.33	2.24
Aspartic acid	5.44	5.44
Glutamic acid	9.32	8.42
Tyrosine	1.54	1.61
Lysine	2.65	2.70
Histidine	0.90	1.48
Arginine	1.90	1.85
Cystine/2	0.19	0.30

*Percent w/w, dry weight basis.

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Exhibit E

The Delaware Agricultural Experiment Station, University of Delaware, Newark, Delaware, the employer of the breeder, believes it is the sole, original and first breeder of the 'Emerald' variety of soybean for which it solicits a certificate of protection.

FORM GR-470-2 (REVERSE)

7500052

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant shape	Kent	Petiole angle	Kent
Leaf shape	Kent	Seed size	Hahto
Leaf color	Kent	Seed shape	Hahto
Leaf surface	Kent	Seedling pigmentation	Kent

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY:

VARIETY	NO. OF DAYS TO MATURITY	LODGING SCORE	PLANT HEIGHT	LEAF SIZE		CONTENT		AVERAGE NO. OF PODS PER PLANT	IODINE NO.
				Width	Length	Protein	Oil		
Submitted	126	2.0	38			40	22 %		
Name of similar variety Verde	118	2.3	30			40	21		

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for completing this form:

1. Scott, Walter O. and Samuel R. Aldrich, 1970, Modern Soybean Production, The Farmer Quarterly.
2. Norman, A. G., 1963, The Soybean: Genetics, Breeding, Physiology, Nutrition, Management.
3. McKie, J. W., and K. L. Anderson, 1970, The Soybean Book.

LEAF COLOR: Nickerson's or any recognized color fan may be used to determine the leaf color of the described variety. The following Soybean varieties may be used as a guide to identify the colors listed on the form.

COLOR	VARIETY
Light Green	"Ada"
Medium Green	"Wilkin"
Dark Green	"Swift"

LEAF SIZE: The following varieties may be used as a guide to identify the relative size leaves.

SIZE	VARIETY
Small	"Amsoy"
Medium	"Bonus"
Large	"Anoka"

PLANT TYPE: The following varieties may be used as a guide to identify the plant type.

TYPE	VARIETY
Slender	"Vansoy"
Intermediate	"Wirth"
Bushy	"Adelphia"