No. 8600145

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Northrup King Co.

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, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'S23-12'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 19th *day of* February *in the year of our Lord one thousand nine hundred and* eighty-eight.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng

Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S): Northrup King Co.

2. TEMPORARY DESIGNATION: W001446

3. VARIETY NAME: S23-12

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*: P.O. Box 959, Minneapolis, MN 55440

5. PHONE *(Include area code)*: 612-593-7333

FOR OFFICIAL USE ONLY

PVPO NUMBER: 8600145

6. GENUS AND SPECIES NAME: Glycine max

7. FAMILY NAME *(Botanical)*: Leguminosae

FILING — DATE: August 4, 1986 — TIME: 11 a.m. [✓] A.M. [ ] P.M.

8. KIND NAME: Soybean

9. DATE OF DETERMINATION: March, 1985

FEES RECEIVED — AMOUNT FOR FILING: $ 1800.00 — DATE: August 4, 1986 — AMOUNT FOR CERTIFICATE: $ 200.00 — DATE: December 21, 1987

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

11. IF INCORPORATED, GIVE STATE OF INCORPORATION: Delaware

12. DATE OF INCORPORATION: 1986

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Robert W. Romig
Northrup King Co.
P.O. Box 959
Minneapolis, MN 55440

PHONE *(Include area code)*: 612-593-7305

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. [X] Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. [X] Exhibit B, Novelty Statement.
c. [X] Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. [X] Exhibit D, Additional Description of Variety.
e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.

15. 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) of the Plant Variety Protection Act.)* [ ] Yes *(If "Yes," answer items 16 and 17 below)* [X] No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? [ ] Yes [X] No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? [ ] Foundation [ ] Registered [ ] Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? [ ] Yes *(If "Yes," give date)* [X] No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? [ ] Yes *(If "Yes," give names of countries and dates)* [X] No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) 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(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT: Robert W. Romig — DATE: July 31, 1986

SIGNATURE OF APPLICANT — DATE

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

EXHIBIT A

Origin and Breeding History of the Variety

1977-79. The Northrup King soybean research group at Washington, Iowa made the cross 'S1346' x 'A2575' and advanced the population to F_6. In September, 1979, we harvested 100 random plants and threshed them individually.

1980. We grew each of the 100 plant selections in an F_7 progeny row. One of these, numbered W001446, was selected on the basis of agronomic appearance to be tested in a preliminary yield trial. This line was subsequently named S23-12.

1981-83. We tested S23-12 in replicated yield trials at several midwestern locations and found it to yield well in comparison to other Group II varieties. We identified and confirmed the descriptive characteristics purple flower color, grey pubescence, brown pods, yellow hila, and dull seed coat luster. We tested S23-12 for resistance to Races 1, 4, and 7 of Phytophthora megasperma by inoculation of detached cotyledons and found it to be susceptible. We tested it for tolerance to iron deficiency chlorosis on calcareous soil in northwest Iowa and found it to be moderately tolerant.

In 1983 we initiated seed increase from 500 grams of carefully hand rogued seed. We removed all plants not conforming to the variety description by roguing the increase block several times. Growth and maturity were uniform.

1984-85. We continued to test S23-12 in advanced yield trials to confirm descriptive characteristics and performance.

We grew Breeder Seed of S23-12 in 1984 from the initial increase made in 1983. The field was rogued several times. We produced Foundation Seed of S23-12 in 1985. The Iowa Crop Improvement Association inspected the production field and found it to meet the requirements for Foundation Seed. S23-12 was approved for eligibility for certification by the National Soybean Variety Review Board on December 12, 1985.

S23-12 is a stable and uniform soybean variety. We have observed no variants in five years of testing and three years of seed increase other than minor, environmentally induced variation normally encountered in a soybean variety.

We will maintain varietal purity by use of progeny rows as needed.

VARIANTS – LIGHT BUFF TO GRAY HILUM AT A FREQUENCY UP TO 2%. RJS 6/17/87

EXHIBIT B

Novelty Statement for the Variety

Soybean variety S23-12 is most similar to Wells. It can be differentiated from Wells by hilum color. S23-12 has yellow hilum color while Wells has imperfect black hilum color.

FORM APPROVED: OMB NO. 0581-0055

EXHIBIT C
(Soybean)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.*)*

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Northrup King Co.	W001446	S23-12

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
P. O. Box 959
Minneapolis, MN 55440
Attention: Robert Romig

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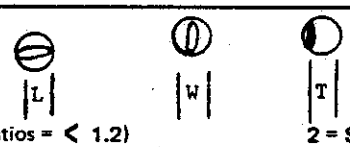
PVPO NUMBER
8600145

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]).

1. SEED SHAPE:

[2]



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

[1] 1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

[1][8] Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

[2] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

6. COTYLEDON COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

[1] 1 = Low 2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

[2] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

9. HYPOCOTYL COLOR:

[4] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

[3] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

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11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17') 3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[2] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton') 3 = Dark Green ('Gnome'; 'Tracy')

13. FLOWER COLOR:

[2] 1 = White 2 = Purple 3 = White with purple throat

14. POD COLOR:

[2] 1 = Tan 2 = Brown 3 = Black

15. PLANT PUBESCENCE COLOR:

[1] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[1] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton') 3 = Bushy ('Gnome'; 'Govan')

17. PLANT HABIT:

[3] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will') 3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

[5] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V 9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

[ ] Bacterial Pustule *(Xanthomonas phaseoli* var. *sojensis)*

[ ] Bacterial Blight *(Pseudomonas glycinea)*

[ ] Wildfire *(Pseudomonas tabaci)*

FUNGAL DISEASES:

[1] Brown Spot *(Septoria glycines)*

Frogeye Leaf Spot *(Cercospora sojina)*

[ ] Race 1 [ ] Race 2 [ ] Race 3 [ ] Race 4 [ ] Race 5 [ ] Other *(Specify)* _____

[ ] Target Spot *(Corynespora cassiicola)*

[ ] Downy Mildew *(Peronospora trifoliorum* var. *manshurica)*

[1] Powdery Mildew *(Microsphaera diffusa)*

[ ] Brown Stem Rot *(Cephalosporium gregatum)*

[ ] Stem Canker *(Diaporthe phaseolorum* var. *caulivora)*

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19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

- [ ] Pod and Stem Blight *(Diaporthe phaseolorum var; sojae)*
- [ ] Purple Seed Stain *(Cercospora kikuchii)*
- [ ] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma var. sojae)*

[1] Race 1 [1] Race 2 [1] Race 3 [1] Race 4 [1] Race 5 [1] Race 6 [1] Race 7

[1] Race 8 [1] Race 9 [ ] Other *(Specify)* _____

VIRAL DISEASES:

- [ ] Bud Blight (Tobacco Ringspot Virus)
- [ ] Yellow Mosaic (Bean Yellow Mosaic Virus)
- [ ] Cowpea Mosaic (Cowpea Chlorotic Virus)
- [ ] Pod Mottle (Bean Pod Mottle Virus)
- [ ] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

[1] Race 1 [1] Race 2 [1] Race 3 [1] Race 4 [ ] Other *(Specify)* _____

- [ ] Lance Nematode *(Hoplolaimus Colombus)*
- [ ] Southern Root Knot Nematode *(Meloidogyne incognita)*
- [ ] Northern Root Knot Nematode *(Meloidogyne Hapla)*
- [ ] Peanut Root Knot Nematode *(Meloidogyne arenaria)*
- [ ] Reniform Nematode *(Rotylenchulus reniformis)*
- [ ] OTHER DISEASE NOT ON FORM *(Specify)*: _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- [2] Iron Chlorosis on Calcareous Soil
- [ ] Other *(Specify)* _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- [ ] Mexican Bean Beetle *(Epilachna varivestis)*
- [ ] Potato Leaf Hopper *(Empoasca fabae)*
- [ ] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	S1346	Seed Coat Luster	S1346
Leaf Shape	B242	Seed Size	S1346
Leaf Color	S1346	Seed Shape	S1346
Leaf Size	B242	Seedling Pigmentation	S1346

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23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
Submitted	125	1.6	86	56	104	38.6	22.6	17.9	2-3
Corsoy 79 Name of Similar Variety	124	3.0	87	63	106	39.9	22.4	13.8	2-3

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A_2 in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

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EXHIBIT D

Additional Description of the Variety

Soybean variety S23-12 is an early to mid Group II cultivar maturing about the same as S23-03. It exhibits long hypocotyl reaction when grown in 4.5 inches of sand at 77° F for 14 days. It is moderately tolerant to iron-deficiency chlorosis on calcareous soil.

EXHIBIT E

Statement of the Basis of Applicant's Ownership.

Soybean variety S23-12 was developed by the Northrup King Co. soybean breeding staff from germplasm sources cited in Exhibit A of this application. Northrup King Co. believes that the variety is novel as defined in the Plant Variety Protection Act and, therefore, that Northrup King is the sole owner of the variety.