No. 9100040

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Iowa State University Research Foundation, Inc.

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, 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. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'Archer'

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* 29th *day of* May *in the year of our Lord one thousand nine hundred and* ninety-two.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Edward Madigan

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): Iowa State University Research Foundation
2. TEMPORARY DESIGNATION: ABSR101BC
3. VARIETY NAME: Archer
4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*: 214 O & L, Iowa State University, Ames, IA 50011
5. PHONE *(Include area code)*: 515-294-4740

FOR OFFICIAL USE ONLY

PVPO NUMBER: 9100040

6. GENUS AND SPECIES NAME: Glycine max
7. FAMILY NAME *(Botanical)*: Leguminosae

FILING — DATE: Dec. 4, 1990 — TIME: ☐ A.M. ☐ P.M.

8. KIND NAME: Soybean
9. DATE OF DETERMINATION: 31 August 1990

FEES RECEIVED — AMOUNT FOR FILING: $2150.- DATE: Dec. 4, 1990 — AMOUNT FOR CERTIFICATE: $250.- DATE: ~~Apr~~ May 4, 1992

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*: Iowa State University Research Foundation, Inc. (Corp.)
11. IF INCORPORATED, GIVE STATE OF INCORPORATION: Iowa
12. DATE OF INCORPORATION:
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

PHONE *(Include area code)*:

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED
   a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
   b. ☒ Exhibit B, Novelty Statement.
   c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
   d. ☐ Exhibit D, Additional Description of Variety.
   e. ☒ 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)* ☐ No
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ Yes ☐ 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)* ☒ 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)* ☐ No

   The variety was formally released on 31 August 1990. Sale of seed to commercial seed growers will not occur until 1991 in the United States. The variety was not released in any other countries.
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: Silvia B. Cianzio / Interim Executive Director, ISU Research Foundation, Inc. — DATE: 11-5-90

SIGNATURE OF APPLICANT: Walter A. Fehr — DATE: 11-5-90

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

Exhibit A

Development of the Cultivar 'Archer' by the Multiple-seed Procedure of Single-seed Descent

Year	Activity
1	The crosses of Williams 82 X BSR 101 and PRX 54-59 X BSR 101 was made at Iowa State University - Ames, IA. The populations were designated as AX3069 and AX3073.
1	F_1 seeds of AX3069 and AX3073 were planted in the field at Iowa State University-University of Puerto Rico nursery at Isabela Puerto Rico during October to obtain BC_1F_1 seeds.
2	BC_1F_1 seeds of AX3069 and AX3073 were planted during February in Puerto Rico to obtain BC_2F_1 seeds.
2	BC_2F_1 seeds of AX3069 nand AX3073 were planted in the field at Ames to obtain BC_3F_1 seeds.
2	BC_3F_1 seeds of AX3069 and AX3073 were tested for resistance with the cotyledon test in the greenhouse at Ames. BC_4F_1 seeds were obtained on resistance plants for each cross.
3	BC_4F_1 seed of Ax3069 and AX3073 were tested for resistance in the greenhouse at Ames. F_1 seed was obtained for the intercross of AX3069 and AX3073.
3	F_1 seed of intercrossing was planted in the greenhouse at Ames to obtain F_2 seed.
3	F_1-derived lines were grown in Puerto Rico and remnant seed was tested for the prescence of both genes in Ames. 1000 F_3 seeds were harvested from selected F_1-derived lines.
4	The $F_{1:3}$ lines were grown in Puerto Rico. F_3 plants were harvested individually from rows selected for the prescence of both genes.
4	The $F_{3:4}$ lines were planted in the field at Ames in five foot rows. Remnant seed was tested for presence of both genes. Of the lines having both genes for resistance, two plants were individually harvested and the remainder of each row was harvested in bulk.
5	The bulked seed of each line was tested for the prescence of both genes using the hypocotyl test in the greenhouse at Ames. Of those lines selected, single plants from the same row were also tested.

5 a. Single plants: Each single plant selected was grown in purification rows 10 ft. long at 4 sds./ft. Each pair of rows will be identified so it can be traced back to the 1987 BSR 101 plot from which it came.
b. Bulked Rows: Selected bulked rows were evaluated in the BSR 101 BC 2YT ($F_{3:5}$) at Ames. The test consisted of 2-row plots, 15 ft. long, planted at 9 sds./ft., with 3 replications.

6 a. BSR 101 BC was evaluated in the Uniform Soybean Tests.
b. The line was approved for release by the Iowa Agriculture and Home Economics Expermint Station, and was named 'Archer'.
c. Progeny rows harvested in year 5 were used to plant about 3 ha for breeder seed production. The progeny increases were examined for homogenity during the growing season and the increases were harvested together.

7 The breeder seed of Archer was planted in Iowa to obtain foundation seed.

9100040

Iowa Crop Improvement Association

2023 Agronomy Hall Ames, Iowa 50011
Area Code 515-294-6921

Iowa
a place to grow

February 18, 1992

Dr. Jeffrey L. Strachan
Plant Variety Examiner
National Agricultural Library
Rm. 500, 10301 Baltimore Blvd.
Beltsville, Maryland 20705

RE: Soybean Application No. 9100040, ARCHER

Dear Dr. Strachan:

This letter is to provide evidence indicating the stability of ARCHER in support of the application for Plant Variety Protection.

Breeder seed of ARCHER was produced in 1989. The field inspection report completed by the Iowa Crop Improvement Association inspector and seed inspection report indicates the following:

YEAR	INSPECTION Field No.	Field % off-type	Field Description	Seed Lot No.	Seed Lot % off-type	Seed Lot Description
1989	6	0.00		91Br	0.00	

This variety was not increased as foundation seed in Iowa. It was distributed to Foundation seed organizations in Illinois, Indiana, Michigan, Minnesota and Ohio for planting in 1990. Therefore, this is the only data we have supporting the stability and uniformity of this variety.

Sincerely,

Robert E. Lawson

Robert E. Lawson
Secretary-Treasurer

Member
Association of Official Seed Certifying Agencies

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Exhibit B, Novelty Statement

Archer is most similar to 'BSR 101'. The two varieties are similar in the following traits:

Seed protein and oil content
Moderately resistant to Fe-deficiency chlorosis on calcareous soil
Shattering resistance
Flower color
Pod color at maturity
Pubescence color
Hila color
Seed coat luster
Seed size (g/100 seeds)

Archer differs from 'BSR 101' in the following traits:

Resistance to races 1-22, 24, and 25 of Phytophthora rot

0A00019

FORM APPROVED: OMB NO. 0581-0055

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

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Iowa State University Research Foundation	ABSR101BC	Archer

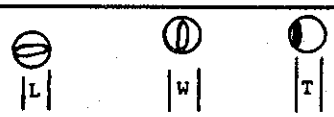
ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
214 O & L
Iowa State University
Ames, IA 50011

FOR OFFICIAL USE ONLY
PVPO NUMBER 9100040

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]). Starred characters ★ are considered fundamental to an adequate soybean variety description. Other characters should be described when information is available.

1. SEED SHAPE:

[1]



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][6] Grams per 100 seeds

★ **5. HILUM COLOR: (Mature Seed)**

[5] 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 = Low 2 = High

★ **8. SEED PROTEIN ELECTROPHORETIC BAND:**

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

★ **9. HYPOCOTYL COLOR:**

[3] 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:**

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

★ **15. PLANT PUBESCENCE COLOR:**

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

16. PLANT TYPES:

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

★ **17. PLANT HABIT:**

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

★ **18. MATURITY GROUP:**

[0][4] 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:

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

★ [0] Bacterial Blight *(Pseudomonas glycinea)*

★ [0] Wildfire *(Pseudomonas tabaci)*

FUNGAL DISEASES:

★ [0] Brown Spot *(Septoria glycines)*

Frogeye Leaf Spot *(Cercospora sojina)*

★ [0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [0] Other *(Specify)* _____

[0] Target Spot *(Corynespora cassiicola)*

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

[0] Powdery Mildew *(Microsphaera diffusa)*

★ [2] Brown Stem Rot *(Cephalosporium gregatum)*

[0] 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)

★ [2] Pod and Stem Blight *(Diaporthe phaseolorum* var; *sojae)* (moderately resistant)

[1] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma* var. *sojae)*

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

[2] Race 8 [2] Race 9 [2] Other *(Specify)* Races 10-22, 24, and 25

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

★ [0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

★ [0] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

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

[0] Lance Nematode *(Hoplolaimus Colombus)*

★ [0] Southern Root Knot Nematode *(Meloidogyne incognita)*

★ [0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[0] Reniform Nematode *(Rotylenchulus reniformis)*

[0] OTHER DISEASE NOT ON FORM *(Specify):* _____

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

★ [2] Iron Chlorosis on Calcareous Soil (moderately resistant)

[ ] Other *(Specify)* _____

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

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[0] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	BSR 101	Seed Coat Luster	BSR 101
Leaf Shape	BSR 101	Seed Size	BSR 101
Leaf Color	BSR 101	Seed Shape	BSR 101
Leaf Size	BSR 101	Seedling Pigmentation	BSR 101

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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		
Archer Submitted	133	1.4	84	8.5	12	38.8	20.8	16.5	3
BSR 101 Name of Similar Variety	132	1.3	84	8.3	12	38.6	20.9	16.3	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 E, Statement of the Basis of Applicant's Ownership

Archer was developed at Iowa State University's Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa, and owned by the Iowa State University Research Foundation, Inc.