THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Syngenta Seeds, Inc.

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Syngenta Seeds, Inc.

WHEREAS, there has been presented to the

Secretary of Agriculture

an application requesting a certificate of protection for an alleged distinct variety of sexually reproduced, or tissue propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereto annexed and made a part hereto, and the

various requirements of law in such cases have been complied with, and the

title thereof is, from the records of the Plant Variety Protection Office, in the applicant

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 twenty 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,

conditioning it for propagation, or stocking it for any of the above purposes, or using it in

producing a hybrid or different variety thereof, to the extent provided by the Plant Variety

Protection Act (84 stat. 1542, as amended, 7 u.s.c. 1321 et seq.)

SOYBEAN

'S24-12'

In testimony whereof, I have hereto set my hand

and caused the seal of the Plant Variety

Protection Office to be affixed at the City of

Washington, D.C. this twentieth day of

September, in the year two thousand two.

Attest,

P. L. Smith, Commissioner

Plant Variety Protection Office

Agricultural Marketing Service

[Signature]

[Signature]
APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

1. NAME OF APPLICANT (see it to appear on the Certificate)

Syngenta
Novartis Seeds, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

X9527

3. VARIETY NAME

S24-12

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

P.O. Box 959
Minneapolis, MN 55440

5. TELEPHONE (Include area code)

612-593-7333

6. FAX (Include area code)

612-593-7801

7. GENUS AND SPECIES NAME

Glycine max

8. FAMILY NAME (Botanical)

Leguminosae

9. CROP KIND NAME (Common name)

Soybean

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

Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

Delaware

12. DATE OF INCORPORATION

1976

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVES, IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

John C. Thorne
Novartis Seeds, Inc.
P.O. Box 949
Washington, Iowa 52353

14. TELEPHONE (Include area code)

319-653-2181

15. FAX (Include area code)

319-653-4609

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

☐ Exhibit A. Origin and Breeding History of the Variety
☐ Exhibit B. Statement of Distinctness
☐ Exhibit C. Objective Description of the Variety
☐ Exhibit D. Additional Description of the Variety (Optional)
☐ Exhibit E. Statement of the Basis of the Applicant’s Ownership
☐ Voucher Sample 2,500 viable unrooted seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in an approved public repository
☐ Filing and Examination Fee ($2,450.00), made payable to "Treasurer of the United States" (Mail to PVPO)

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? (See Section 63(a) of the Plant Variety Protection Act)

☐ YES ("yes," answer Items 18 and 19 below)

☐ NO ("no," go to Item 20)

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ YES ☐ NO

19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?

☐ YES ("yes," give names of countries and dates)

☐ NO

Canada, 1995

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be repotted upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) warrant the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, 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 (Owners)

John C. Thorne

NAME (Please print or type)

SIGNATURE OF APPLICANT (Owners)

DATE

CAPACITY OR TITLE

Director, Soybean Breeding 5-20-97

(See reverse for instructions and information collection burden statement)
EXHIBIT A

Origin and Breeding History of the Variety

The soybean variety S 24-12 is derived from a single F6 plant from the cross of an experimental line designated W214981 x S 29-20. W214981 was derived from the cross B152 x experimental line 614984, selected from Cutler 71 x Essex. The cross was made in the summer of 1987 at the Novartis (formerly Northrup King) Research Center at Washington, Iowa. The F1 and F2 generations were grown at the Novaris (formerly Northrup King) Research Center at Waimea, Kauai, Hawaii, in the winter of 1987-88; the F3 at Washington in the summer of 1988; the F4 and F5 at Waimea in the winter of 1988-89, and the F6 at Washington in the summer of 1989. The F1 was bulk harvested. The F2 through F5 were advanced by harvesting 2-4 seeds per plant and planting 600 seed from the resulting bulk. In the fall of 1989, 100 plants were harvested and threshed individually. The seed from each of these plants were planted in a progeny row at Washington in 1990. One of these, numbered W004868, was selected based on yield and agronomic characteristics for further testing. This line was subsequently tested under the temporary designation X9527 and named S 24-12. It has been tested at several northern and central cornbelt locations in the U.S. and in southern Ontario from 1991 through 1996 and found to yield well compared to other mid Group 2 varieties. Descriptive characteristics including purple flowers, gray pubescence, brown pods, and yellow hilum (may contain 2% other hilum color) have been identified and confirmed. S 24-12 has been tested in the field for iron deficiency chlorosis and found to have an intermediate reaction. Field tests have also shown it to have moderate resistance to brown stem rot and Sclerotinia white mold. It has been tested for reaction to Races 1, 3, 4, 7, and 17 of Phytophthora sojae using hypocotyl inoculation of greenhouse grown plants and found to carry the Rps1-c gene for resistance.

In the summer of 1994, research personnel at the Novartis (formerly Northrup King) Research Center at Arva, Ontario, Canada, grew a small increase of S 24-12 from carefully rogued seed. This increase block was rogued carefully at flowering and maturity, and all plants not conforming to the variety description were removed. The seed harvested from this increase was planted in the winter of 1995 in Puerto Rico to produce Breeder Seed.

Foundation Seed of S 24-12 was produced in Ontario in 1995 from the Puerto Rico Breeder Seed. Canadian seed officials inspected the fields and found them to meet the standards for Foundation Seed. S 24-12 is stable and uniform. Over six years of testing and three cycles of seed increase, we have observed no variants. Any off-type plants removed from increase fields were assumed to have arisen from admixture or outcrossing. Varietal purity will be maintained using progeny rows as described previously.
Novelty Statement for the Variety

S 24-12 is most similar to S 23-12. It can be differentiated from S 23-12 on the basis of reaction to *Phytophthora megasperma*, Race 3. S 24-12 is resistant to Race 3 of Phytophthora; S23-12 is susceptible.
**OBJECTIVE DESCRIPTION OF VARIETY**

**SOYBEAN (Glycine max L.)**

<table>
<thead>
<tr>
<th>NAME OF APPLICANT(S)</th>
<th>TEMPORARY DESIGNATION</th>
<th>VARIETY NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novartis Seeds, Inc.</td>
<td></td>
<td>S24-12</td>
</tr>
</tbody>
</table>

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

P.O. Box 959  
Minneapolis, MN  55440

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., 09).

1. **SEED SHAPE:**

   | 2 |
   | L |
   | U |
   | T |

   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 |
   | 2 |
   | 3 |
   | 4 |
   | 5 |

   1 = Yellow  2 = Green  3 = Brown  4 = Black  5 = Other (Specify)

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

   | 1 |
   | 2 |

   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)

   May contain up to 2% other hilum color.

   | 2 |
   | 2 |
   | 3 |
   | 4 |
   | 5 |
   | 6 |
   | 7 |

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

6. **COTYLEDON COLOR:** (Mature Seed)

   | 1 |
   | 2 |

   1 = Yellow  2 = Green

7. **SEED PROTEIN PEROXIDASE ACTIVITY:**

   | 1 |
   | 2 |

   1 = Low  2 = High

8. **SEED PROTEIN ELECTROPHORETIC BAND:**

   | 1 | 2 |

   1 = Type A (SP1a)  2 = Type B (SP1b)

9. **HYPOCHOTYL COLOR:**

   | 1 |
   | 2 |
   | 3 |
   | 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 unifoliolate leaves ('Hodgson'; 'Coker Hampton 266A')

10. **LEAFLET SHAPE:**

    | 3 |

    1 = Lanceolate  2 = Oval  3 = Ovalate  4 = Other (Specify)
11. LEAFLET SIZE:

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

12. LEAF COLOR:

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

13. FLOWER COLOR:

2 = White
2 = Purple
3 = White with purple throat

14. POD COLOR:

2 = Ten
2 = Brown
3 = Black

15. PLANT PUBESCEENCE COLOR:

1 = Gray
2 = Brown (Tawny)

16. PLANT TYPES:

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

17. PLANT HABIT:

3 = Determinate ('Gnome'; 'Braxton')
3 = Indeterminate ('Nebsoy'; 'Improved Pelican')
2 = Semi-Determinate ('Wilt')

18. MATURITY GROUP:

5 = 1
6 = 2
7 = 3
8 = 4
9 = 5
10 = 6
11 = 7
12 = 8
13 = 9

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:

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)
Powdery Mildew (Microsphaera diffusa)
Brown Stem Rot (Cephalosporium gregatum) Moderately Resistant
Stem Canker (Diaporthe phaseolorum var. caulivora)
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*)
  - Race 1
  - Race 2
  - Race 3
  - Race 4
  - Race 5
  - Race 6
  - Race 7
  - Race 8
  - 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*)
  - Race 1
  - Race 2
  - Race 3
  - Race 4
  - Other (Specify)
- Lance Nematode (*Hoplolaimus Columbus*)
- 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)
- Iron Chlorosis on Calcareous Soil: Intermediate
- 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.**

<table>
<thead>
<tr>
<th>Character</th>
<th>Name of Variety</th>
<th>Character</th>
<th>Name of Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Shape</td>
<td>S20-91</td>
<td>Seed Coat Luster</td>
<td>S20-91</td>
</tr>
<tr>
<td>Leaf Shape</td>
<td>Pioneer 9273</td>
<td>Seed Size</td>
<td>S20-91</td>
</tr>
<tr>
<td>Leaf Color</td>
<td>S23-12</td>
<td>Seed Shape</td>
<td>S23-12</td>
</tr>
<tr>
<td>Leaf Size</td>
<td>Pioneer 9273</td>
<td>Seedling Pigmentation</td>
<td>S23-12</td>
</tr>
</tbody>
</table>
### 23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>NO. OF DAYS MATURITY</th>
<th>PLANT LODGING SCORE</th>
<th>CM PLANT HEIGHT</th>
<th>LEAFLET SIZE</th>
<th>SEED CONTENT</th>
<th>SEED SIZE G/100 SEEDS</th>
<th>NO. SEEDS/POD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted</td>
<td>129</td>
<td>2.9</td>
<td>77</td>
<td>5</td>
<td>10</td>
<td>42.1</td>
<td>21.4</td>
</tr>
<tr>
<td>S20-91</td>
<td>127</td>
<td>2.3</td>
<td>76</td>
<td>6</td>
<td>10</td>
<td>43.1</td>
<td>21.2</td>
</tr>
</tbody>
</table>

**PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:**

SYNGENTA SEEDS, INC.

1. NAME OF APPLICANT(S)

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

3. VARIETY NAME

S24-12

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

5. TELEPHONE (Include area code)

6. FAX (Include area code)

P.O. Box 959

612-593-7333

Minneapolis, MN 55440

612-593-7801

7. PVPO NUMBER

9700318

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain.

X YES  ☐ NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?

If no, give name of country

X YES  ☐ NO

10. Is the applicant the original breeder? If no, please answer the following:

a. If original rights to variety were owned by individual(s):

Is (are) the original breeder(s) a U.S. national(s)? If no, give name of country

X YES  ☐ NO

b. If original rights to variety were owned by a company:

Is the original breeder(s) U.S. based company? If no, give name of country

X YES  ☐ NO

11. Additional explanation on ownership (If needed, use reverse for extra space):

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UFOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UFOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original breeder, both the original breeder and the applicant must meet one of the above criteria.

The original breeder may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, 5715 R Street, Washington, D.C. 20250. When mailing, refer to OMB No. 0581-0055 and form number in your letter.

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