THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Idaho Agricultural Experiment Station

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 tuber propagated 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 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 purpose, or using it in producing a hybrid or different variety therefrom, to the extent provided by the Plant Variety Protection Act. In the United States seed of this variety (1) shall be sold by variety name only as a certified seed and (2) shall conform to the number of generations specified by the owner of the variety, 784 Stat. 1342, as amended, 7 U.S.C. 2321 et seq.

RAPE

'Sterling'

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 twelfth day of September, in the year two thousand one.

[Signature]
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

[Signature]
Secretary of Agriculture
# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

## Instructions and information collection burden statement on reverse

1. **NAME OF APPLICANT(S) (as it is to appear on the Certificate)**
   
   Idaho Agricultural Experiment Station

2. **TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER**
   
   UI.35.5.15 (PI 597354)

3. **VARIETY NAME**
   
   'STERLING'

4. **ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)**
   
   IAES, College of Agriculture, University of Idaho, Department of Plant, Soil, and Entomological Sciences, Moscow, Idaho 83844-2339

5. **TELEPHONE (include area code)**
   
   (208) 885-7173

6. **FAX (include area code)**
   
   (208) 885-6654

7. **GENUS AND SPECIES NAME**
   
   Brassica napus L. oleifera

8. **FAMILY NAME (Botanical)**
   
   Cruciferae

9. **CROP KIND NAME (Common name)**
   
   Spring Rapeseed

10. **IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) (Common name)**
    
    University Experiment Station

11. **IF INCORPORATED, GIVE STATE OF INCORPORATION**

12. **DATE OF INCORPORATION**

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

   **Jack Brown**
   
   Dept PSES
   
   University of Idaho
   
   Moscow, ID 83844-2339

14. **TELEPHONE (include area code)**

   (208) 885-7078

15. **FAX (include area code)**

   (208) 885-7760

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
   - [ ] Exhibit E. Statement of the Basis of the Applicant's Ownership
   - [ ] Voucher Sample (2,600 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in a public repository)
   - [ ] Filing and Examination Fee ($2,400), made payable to "Treasurer of the United States" (Mail to PVPC)

17. **DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED?** (See Section 833(a) of the Plant Variety Protection Act)

   - [ ] YES if "yes," answer items 18 and 19 below
   - [ ] NO if "no," go to item 20

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

   - [ ] YES
   - [ ] NO

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 if "yes," give names of countries and dates
   - [ ] NO

21. **The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished 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) is/are 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 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 representations herein can jeopardize protection and result in penalties.

**SIGNATURE OF APPLICANT (Owner(s))**

[Signature]

**NAME (Please print or type)**

RICHARD C. HEIMsch, DIRECTOR

**CAPACITY**

IDaho AGRICULTURAL EXPERIMENT STATION

**DATE**

07/04/97

**SIGNATURE OF APPLICANT (Owner(s))**

[Signature]

**NAME (Please print or type)**

Jack Brown

**CAPACITY OR TITLE**

Breeder

**DATE**

07/24/97
Attachment

'STERLING'
Spring Industrial Rapeseed
(Brassica napus L.)

Exhibit A: Origin and History of the Variety

Sterling is a pure-line (near homozygous) spring industrial rapeseed cultivar with high erucic acid content in seed oil and canola-quality seed meal, selected for high adaptability to environments throughout the Pacific Northwest region (Idaho, Oregon, Washington and Montana). This cultivar was developed from a single plant selection in 1994 from a segregating F₄ population derived from the cross 'Jaguar' x 'Hero'. Jaguar is a canola quality cultivar (i.e. low erucic acid content (less than 20 g kg⁻¹) and less than 30 μmol g⁻¹ of glucosinolate in the defatted seed meal) that was developed by Maribo Seeds Co., Denmark, and Hero is a spring industrial rapeseed cultivar (i.e. high erucic acid content in the seed oil) developed at the University of Manitoba, Canada.

F₄ seed from the original hybridization was produced in the spring of 1992. Progeny from the cross were evaluated in a multivariate cross prediction trial (3) in the greenhouse in 1992 (F₁ to F₂) and field in 1993 (F₂ to F₃). Based on the cross prediction studies, progeny from this cross were identified as having high potential of producing desirable recombinant inbred lines. Seeds from the F₃ population were selected for high erucic acid content in the oil using a half-seed technique and a procedure similar to Downey and Harvey (1) and McGregor (2). Lines from the half-seed analyses with highest erucic acid content were increased from F₃ to F₄ seed over the winter months 1993/94 in the glasshouse and seed used to plant single-plant plots for increase and field assessment trials in 1994. Over the winter of 1994/95, a further greenhouse seed increase was carried out from F₅ to F₆ seed.

Breeders' seed of Sterling was derived from a single plant selected from the F₆ population grown in the greenhouse in 1994/95. Seed from the initial selection was grown as F₆ single-plant plots in 1995. Prior to harvest, 30 single plant selections were identified with desired uniformity, oil and seed meal quality. In 1996, F₇ seed from these 30 plants were grown in single-plant plots. During the growing season, plots were visually inspected and any off-type plants were removed. Before harvest 20 single plant selections were taken from each single-plant plot and evaluated for quality characters. Four hundred single F₈ plants were retained and combined to plant foundation seed in 1997.

Exhibit B: Statement of Distinctness

Sterling is a medium maturity spring rapeseed cultivar with high erucic acid content in the seed oil. Sterling is similar in plant height, plant morphology, and maturity to the spring rapeseed (canola) cultivar ‘Legend’. Oil quality of Sterling is significantly different from Legend, with Sterling having high erucic acid content (>45%) and Legend having less than 1% erucic acid content in seed oil. Fatty acid profile of Sterling is similar to that of the cultivar 'Hero'. However, Sterling is significantly shorter than Hero. Sterling also has a more prostrate seedling
habit, less leaf lobing, less leaf margin serration, and less leaf glaucosity compared to Hero.

**Additional information: Fatty Acid Profile**

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Year</th>
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<th>18:0</th>
<th>18:1</th>
<th>18:2</th>
<th>18:3</th>
<th>20:1</th>
<th>22:1</th>
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<td>3.4</td>
<td>0.9</td>
<td>19.9</td>
<td>14.5</td>
<td>7.2</td>
<td>11.2</td>
<td>43.6</td>
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<td>1996</td>
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<td>1.2</td>
<td>16.0</td>
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<td>7.0</td>
<td>9.7</td>
<td>44.9</td>
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<td>1.1</td>
<td>15.4</td>
<td>12.4</td>
<td>6.9</td>
<td>7.5</td>
<td>47.7</td>
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<td>1998</td>
<td>2.8</td>
<td>1.1</td>
<td>15.2</td>
<td>12.2</td>
<td>6.7</td>
<td>8.8</td>
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**References and notes**

## OBJECTIVE DESCRIPTION OF VARIETY

### RAPESEED

*Brassica napus and B. campestris*

<table>
<thead>
<tr>
<th>Name of Applicants(s)</th>
<th>Temporary Designation</th>
<th>Variety Name 'STERLING'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho Agricultural Experiment Station</td>
<td>UI.35.5.15</td>
<td>[PI 597354]</td>
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</tbody>
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<th>Official Use Only</th>
<th>PVPO Number</th>
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<tbody>
<tr>
<td>IAES, College of Agriculture University of Idaho; Dept. of PSES</td>
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<tr>
<td>Moscow ID 83844-2331</td>
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<td>2339 (87:10/5/2000)</td>
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<td></td>
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<tr>
<td>9700372</td>
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<td></td>
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</table>

1. **SPECIES:**
   - **X** Brassica napus
   - ___ Brassica campestris

2. **TYPE:**
   - **X** Spring
   - ___ Winter

3. **PLANT HEIGHT (at pod maturity):**
   - ___ 0.0 cm Tall (compare to standard variety below)
   - ___ 6.0 cm shorter than Check variety: HERO
   - ___ Height same as Check variety: __________
   - ___ ___ cm taller than Check variety: __________

   **Height Class:**
   - 1 = Short (Candle)
   - 2 = Medium short ( )
   - 3 = Medium (Jet Neuf)
   - 4 = Medium tall ( )
   - 5 = Tall (Dwarf Essex)
   - 2 = Short (Erglu)
   - 3 = Medium (Cresus)
   - 4 = Medium tall ( )
   - 5 = Tall (Petranova)

4. **STEM ANTHOCYANIN:**
   - ___ 1 = Absent
   - ___ 2 = Weak
   - ___ 3 = Medium
   - ___ 4 = Strong

5. **SEED COTYLEDONS (Maximum width fully developed; mean of 50 graded seeds):**
   - ___ 1 = Narrow (Erglu)
   - ___ 2 = Medium (Primor)
   - ___ 3 = Broad (Expander)

6. **SEEDLING GROWTH HABIT (leaf rosette):**
   - ___ 1 = Upright
   - ___ 2 = Prostrate (short photoperiod)
7. LEAVES:

- **Margins (serration):**
  - 1 = Absent or very weak (Akela)
  - 2 = Weak (Arvor, Jet Neuf)
  - 3 = Medium (Primor)
  - 4 = Strong (Candle, Kentan)

- **Lobing (fully developed leaf on plant or rosette):**
  - 1 = Absent or very weak (Akela)
  - 2 = Weak (Arvor)
  - 3 = Medium (Primor)
  - 4 = Medium strong (Argus)
  - 5 = Strong (Kentan)

- **Leaf Attachment to stem:**
  - 1 = Fully clasping (Candle)
  - 2 = Partial clasping (Jet Neuf)
  - 3 = No clasping

- **Color:**
  - 1 = Light green (Arvor)
  - 2 = Medium green (Primor)
  - 3 = Medium dark green (Oro)
  - 4 = Dark green (Brunowski, Rapora)

- **Glaucosity:**
  - 1 = Absent
  - 2 = Weak (Span)
  - 3 = Weak to medium (Gulliver)
  - 4 = Medium (Magnus)
  - 5 = Medium to strong (Oro)
  - 6 = Strong

8. FLOWERS:

- **Flower Buds Location:**
  - 1 = Buds at tip of apical meristem (Jet Neuf)
  - 2 = Buds immediately below apical meristem (Candle)

- **Petal color:**
  - 1 = Pale yellow
  - 2 = Yellow (Jet Neuf, Primor)
  - 3 = Orange
  - 4 = White

- **Anther dotting (at opening of flower; give percentage: 0 %)**
  - 1 = Absent
  - 2 = Few
  - 3 = Medium (Primor)
  - 4 = Many

- **Flowering class (Autumn sown):**
  - 1 = Very early (Arvor)
  - 2 = Early (Primor)
  - 3 = Medium early
  - 4 = Medium late
  - 5 = Late (Marcus)
  - 6 = Very late

- **Flowering class (Spring sown):**
  - 1 = Very early (Tower)
  - 2 = Early (Kosa)
  - 3 = Medium early
  - 4 = Medium late
  - 5 = Late (Petranova)
  - 6 = Very late

9. PODS (Slique):

- **Pod type:**
  - 1 = Bilateral single pod (Jet Neuf)
  - 2 = Other

- **Silique beak length:**
  - 1 = Short (Foro)
  - 2 = Medium (Liragold)
  - 3 = Long (Rapol)

- **Pod length; (give length: 72.23 mm):**
  - 1 = Short
  - 2 = Medium
  - 3 = Long

- **Pod width; (give width: 4.16 mm):**
  - 1 = Narrow
  - 2 = Medium
  - 3 = Wide

- **Pod habit:**
  - 1 = Erect (Gulliver)
  - 2 = Semi-erect to erect (Oro)
  - 3 = Semi-erect
  - 4 = Horizontal to semi-erect (Brink)
  - 5 = Horizontal

- **Pedicel length:**
  - 1 = Very short
  - 2 = Short
  - 3 = Long

- **Ripening Class (Autumn sown):**
  - 1 = Very early
  - 2 = Early
  - 3 = Medium
  - 4 = Late
  - 5 = Very late
9. PODS (Continued):

- _______ 98 _______ days to maturity:
- _______ days earlier than _______ Check variety: __________
- maturity same as __________ Check variety: HERO
- _______ days later than _______ Check variety: __________

9700372

10. SEEDS:

- _______ 3 - 5 _______ g/1000 unsized seed:
- _______ 0 - 3 _______ g less than Check variety: Westar
- weight same as Check variety: __________
- _______ _______ g more than Check variety: __________
- _______ 2 _______ Weight Class (grams) 1 = less than 3.0 (Candle) 2 = 3.0 - 3.9 ( )
3 = 4.0 - 5.0 (Jet Neuf) 4 = more than 5.0 ( )
- _______ 3 _______ Seeds Per Pod: (give number: _______ . 37 _______ per pod) 1 = Low ( ) 2 = Medium ( ) 3 = High ( )
- _______ 5 _______ Testa Color: 1 = Black (Jet Neuf) 2 = Red ( )
3 = Yellow (Yellow Sarson) 4 = Dark brown to back ( )
5 = Reddish-brown to black ( ) 6 = Other __________

11. CHEMICAL COMPOSITION OF SEED:

- _______ 3 _______ Erucic Acid __________
1 = Low (less than 2%) 2 = Intermediate
3 = High (more than 50%) 4 = Intermediate
5 = High (more than 50%)

Glucosinate Content; (give: _______ 10.66 _______ micro moles/g, _______ mg/g)
1 = Low - Less than 30 mHIm/g (Candle)
2 = High - More than 30 mHIm/g (Mikado)

- _______ 40.16 _______ % Oil 35.4 _______ % Protein (oil free meal)

Fatty Acid Composition (%):

<table>
<thead>
<tr>
<th>Palmitic</th>
<th>Stearic</th>
<th>Oleic</th>
<th>Linoleic</th>
<th>Linolenic</th>
<th>Eicosenoic</th>
<th>Erucic</th>
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</thead>
<tbody>
<tr>
<td>16:0</td>
<td>18:0</td>
<td>18:1</td>
<td>18:2</td>
<td>18:3</td>
<td>20:1</td>
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<tr>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
</tbody>
</table>

12. FROST TOLERANCE (Late spring frosts):

- _______ 3 _______ Tolerance: 1 = Not hardy - susceptible (Indore) 2 = Moderately susceptible ( )
3 = Moderately resistant ( ) 4 = Hardy (Bridger)

13. LODGING RESISTANCE:

- _______ 4 _______ Resistance: 1 = Weak (Span) 2 = Moderately weak (Olga)
3 = Moderately strong ( ) 4 = Strong (Torne)

14. HERBICIDE RESISTANCE:

- _______ 1 _______ Atrazine:
1 = Susceptible (Jet Neuf) 2 = Resistant ( )

Other: _______ SU _______ 1 = Susceptible 2 = Resistant
15. DISEASE RESISTANCE:  
0 = Not tested  
1 = Susceptible  
2 = Low resistance  
3 = Moderate resistance  
4 = High resistance

- 0 Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)
- 0 Black Leg, Stem Canker (*Leptosphaeria maculans, Plenodomus lingum*)  
  (*Phoma lingam*)
- 0 White Rust (*Albugo candida, A. cruciferrarium*)
- 0 Light Leaf Spot (*Pyrenopeziza brassicae*)
- 0 Downy Mildew (*Peronospora parasitica*)
- 0 Rhizoctonia Root Rot (*Rhizoctonia solani*)
- 0 Alternaria Black Spot (*Alternaria brassicicola*)
- 0 Other

16. COMMENTS: Please give any additional comments which characterizes the variety.

<table>
<thead>
<tr>
<th>Glucosinolate Profile and Total (μmol/gram)</th>
<th>Total</th>
<th>But</th>
<th>OH.But</th>
<th>Pent</th>
<th>OH.Pent</th>
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</thead>
<tbody>
<tr>
<td>10.7±0.47</td>
<td>2.2±0.04</td>
<td>0.3±0.03</td>
<td>7.2±0.11</td>
<td>0.2±0.09</td>
<td></td>
</tr>
</tbody>
</table>

17. DIRECTIONS: Select the number which characterizes the variety in the features above. Those characteristics marked with an asterisk * should be recorded. Any others should be recorded if possible to help establish novelty or uniqueness. Characteristics described, including numerical measurements, should represent those that are typical for the variety. Give test area conditions.
‘STERLING’
Spring Industrial Rapeseed
(Brassica napus L.)

Submitted to
Foundation Seed Stocks Committee

University of Idaho

Jack Brown
Department of Plant, Soil
and Entomological Sciences
University of Idaho
Moscow, ID 83844-2339

Telephone: (208) 885-7078
FAX: (208) 885-7760
E-mail: JBROWN@UIDAHO.EDU

Boise, Idaho
December 6, 1996
REGISTRATION OF STERLING SPRING INDUSTRIAL RAPESEED

'Sterling' spring industrial rapeseed (Brassica napus L. spp. oleifera (Metzg) Sinsk. f. annua) [Reg. no. 97712] [PI. 597354] was developed for use as an industrial oil-quality cultivar by the Idaho Agricultural Experiment Station, Moscow, ID 83844. This cultivar is protected by U.S. Plant Variety Protection (PVP __________).

Sterling is a pure-line (near homozygous) spring industrial rapeseed cultivar with high erucic acid content in seed oil and canola-quality seed meal, selected for high adaptability to environments throughout the Pacific Northwest region (Idaho, Oregon, Washington and Montana). This cultivar was developed from a single plant selection in 1994 from a segregating F₄ population derived from the cross 'Jaguar' x 'Hero'. Jaguar is a canola quality cultivar (i.e. low erucic acid content (less than 20 g kg⁻¹) and less than 30 μmol g⁻¹ of glucosinolate in the defatted seed meal) that was developed by Maribo Seeds Co., Denmark, and Hero is a spring industrial rapeseed cultivar (i.e. high erucic acid content in the seed oil) developed at the University of Manitoba, Canada.

F₁ seed from the original hybridization was produced in the spring of 1992. Progeny from the cross were evaluated in a multivariate cross prediction trial (4) in the greenhouse in 1992 (F₁ to F₂) and field in 1993 (F₂ to F₃). Based on the cross prediction studies, progeny from this cross were identified as having high potential of producing desirable recombinant inbred lines. Seeds from the F₃ population were selected for high erucic acid content in the oil using a half-seed technique and a procedure similar to Downey and Harvey (2) and McGregor (3). Lines from the half-seed analyses with highest erucic acid content were increased from F₃ to F₄ seed over the winter months 1993/94 in the glasshouse and seed used to plant single-plant plots for increase and field assessment trials in 1994. Over the winter of 1994/95, a further greenhouse seed increase was carried out from F₅ to F₆ seed.

Agronomic performance of Sterling was compared to the performance of the three control cultivars, Hero, 'Reston' and 'R.500', over three years (1994, 1995 and 1996) in trials grown in Idaho, Montana, Washington and Oregon. The 1996 trials were the Pacific Northwest Canola Variety Trials (PNWCVT) (1). Hero and Reston are high erucic acid cultivars developed at the University of Manitoba, Canada. R.500 is a B. rapa (yellow sarson) high erucic acid cultivar with high seed glucosinolate content that shows very poor adaptation to conditions in the Pacific Northwest. R.500 was included as a control in the 1994 and 1995 trials since it is the only spring-type high erucic acid cultivar available commercially to U.S. farmers.

Averaged over 12 year/sites, seed yield of Sterling was 1658 kg ha⁻¹. Seed yield over years was relatively consistent (1274, 1901 and 1753 kg ha⁻¹ from 1994, 1995 and 1996, respectively). Sterling produced seed yields 24%, 77% and 492% higher than the control cultivars Hero, Reston and R.500, respectively. Sterling produced greater seed yield than the highest yielding control cultivar (Hero) at all 12 sites evaluated.
Sterling has high oil content with high erucic acid content and very low glucosinolate content. Over 12 year/sites, oil content of Sterling was 404 g kg\(^{-1}\), and not significantly different from Hero (403 g kg\(^{-1}\)), the highest oil content control. Averaged over all field plot trials, erucic acid content of Sterling (463 g kg\(^{-1}\)) was significantly higher than Hero (423 g kg\(^{-1}\)) or Reston (398 g kg\(^{-1}\)). Total seed glucosinolate content of Sterling is consistently low, averaging 10.7 \(\mu\)mol g\(^{-1}\) of defatted meal.

Sterling plants are short in stature (99 cm, 6 cm shorter than Hero). Plants begin flowering medium-early (approximately 54 days after planting) and reach maturity 98 days after planting. Seed size is medium with average 1000 seed weight at 3.5 g, 0.3 g lighter than the spring canola cultivar ‘Westar’. Sterling is moderately resistant to spring frost, is resistant to lodging and is susceptible to triazine class and other broad-leaf herbicides.

Breeders’ seed of Sterling was derived from a single plant selected from the \(F_6\) population grown in the greenhouse in 1994/95. Seed from the initial selection was grown as \(F_6\) single-plant plots in 1995. Prior to harvest, 30 single plant selections were identified with desired uniformity, oil and seed meal quality. In 1996, \(F_7\) seed from these 30 plants were grown in single-plant plots. During the growing season, plots were visually inspected and any off-type plants were removed. Before harvest 20 single plant selections were taken from each single-plant plot and evaluated for quality characters. Four hundred single \(F_8\) plants were retained and combined to plant foundation seed in 1997.

Seed increases of Sterling are limited by Plant Variety Protection [PVP _____ _____] to foundation and certified seed classes. Requests for seed of Sterling for either experimental or commercial production can be made to the Idaho Agricultural Experiment Station, University of Idaho, Moscow, ID 83844-2331.


References and notes


derived by single seed descent for two or more characters simultaneously. 
*Heredity* 54:397-411.

5. Assistant Professor, Plant Breeding and Genetics and Research Associates, 
respectively. Plant, Soil and Entomological Sciences, University of Idaho, 
Moscow, ID 83844-2339.
Table 1. Seed yield (lb/acre) of Sterling and three high erucic acid control cultivars in 1994, 1995 and 1996.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Mean</th>
<th>Rank</th>
<th>1994 3 sites</th>
<th>1995 2 sites</th>
<th>1996 8 sites</th>
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<tbody>
<tr>
<td>Hero</td>
<td>1193</td>
<td>(2)</td>
<td>927</td>
<td>1012</td>
<td>1359</td>
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<tr>
<td>Reston</td>
<td>835</td>
<td>(3)</td>
<td>570</td>
<td>1028</td>
<td>1039</td>
</tr>
<tr>
<td>R.500</td>
<td>250</td>
<td>(4)</td>
<td>*</td>
<td>250</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
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<td>(1)</td>
<td>1137</td>
<td>1696</td>
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<tr>
<td>s.e. mean</td>
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<td>229</td>
<td>148</td>
</tr>
<tr>
<td>LSD 5%</td>
<td>322</td>
<td></td>
<td>324</td>
<td>453</td>
<td>415</td>
</tr>
</tbody>
</table>

Table 2. Oil content (%) of Sterling and three high erucic acid control cultivars in 1994, 1995 and 1996.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Mean</th>
<th>Rank</th>
<th>1994 3 sites</th>
<th>1995 2 sites</th>
<th>1996 8 sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>40.3</td>
<td>(2)</td>
<td>36.4</td>
<td>42.6</td>
<td>41.3</td>
</tr>
<tr>
<td>Reston</td>
<td>36.9</td>
<td>(4)</td>
<td>34.5</td>
<td>42.6</td>
<td>36.3</td>
</tr>
<tr>
<td>R.500</td>
<td>38.6</td>
<td>(3)</td>
<td>*</td>
<td>38.6</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
<td>40.4</td>
<td>(1)</td>
<td>36.6</td>
<td>42.9</td>
<td>41.3</td>
</tr>
<tr>
<td>s.e. mean</td>
<td>0.76</td>
<td></td>
<td>1.06</td>
<td>0.91</td>
<td>0.59</td>
</tr>
<tr>
<td>LSD 5%</td>
<td>1.47</td>
<td></td>
<td>2.10</td>
<td>1.81</td>
<td>1.64</td>
</tr>
</tbody>
</table>
Table 3. Erucic acid content (%) of Sterling and three high erucic acid control cultivars in 1994 in 1995 and in 1996.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Mean</th>
<th>Rank</th>
<th>1994 2 sites</th>
<th>1995 2 sites</th>
<th>1996 2 sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>42.3</td>
<td>(3)</td>
<td>49.1</td>
<td>44.2</td>
<td>42.5</td>
</tr>
<tr>
<td>Reston</td>
<td>39.8</td>
<td>(4)</td>
<td>42.2</td>
<td>37.5</td>
<td>*</td>
</tr>
<tr>
<td>R.500</td>
<td>56.7</td>
<td>(1)</td>
<td>58.2</td>
<td>55.2</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
<td>46.3</td>
<td>(2)</td>
<td>43.6</td>
<td>50.4</td>
<td>44.9</td>
</tr>
<tr>
<td>s.e. mean</td>
<td>0.83</td>
<td></td>
<td>1.22</td>
<td>1.02</td>
<td>0.25</td>
</tr>
<tr>
<td>LSD 5%</td>
<td>1.63</td>
<td></td>
<td>2.41</td>
<td>2.03</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Table 4. Glucosinolate profile and total glucosinolates (µmol/gram of defatted meal) of ‘Sterling’ Breeders’ seed lot. Also shown is the profile and total of the winter rapeseed cultivar ‘Bridger’ (PvP 8500171).

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Total</th>
<th>3-but&lt;sup&gt;1&lt;/sup&gt;</th>
<th>OH-But</th>
<th>4-pent</th>
<th>OH-pent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridger</td>
<td>25.57±0.86</td>
<td>8.08±0.16</td>
<td>1.96±0.09</td>
<td>14.76±0.13</td>
<td>0.77±0.17</td>
</tr>
<tr>
<td>Sterling</td>
<td>10.7±0.47</td>
<td>2.25±0.04</td>
<td>0.35±0.03</td>
<td>7.24±0.11</td>
<td>0.21±0.09</td>
</tr>
</tbody>
</table>

<sup>1</sup> 3-butenyl glucosinolate; 2-hydroxy-3-butenyl glucosinolate; 4-pentenyl glucosinolate; 2-hydroxy-4-pentenyl glucosinolate.
Table 5. Seedling establishment (1 to 9 scale with 9 = good establishment), days from planting to flower start, plant height (cm), days from planting to maturity, lodging resistance (1 to 9 scale with 9 = no lodge), and test weight (kg/ha) of ‘Sterling’ and three control cultivars. Data presented are weighted averages from two locations in 1994, the 1995 Pacific Northwest Canola Variety Trial (9 locations), and the 1996 Pacific Northwest Canola Variety Trial (8 locations).

<table>
<thead>
<tr>
<th></th>
<th>Establishment (1-9)</th>
<th>Flower start (days)</th>
<th>Plant height (cm)</th>
<th>Maturity(^1) (days)</th>
<th>Lodge(^1) (1-9)</th>
<th>Test(^2) Weight (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>5.8</td>
<td>54</td>
<td>104</td>
<td>98</td>
<td>9.0</td>
<td>64.6</td>
</tr>
<tr>
<td>Reston</td>
<td>3.9</td>
<td>59</td>
<td>114</td>
<td>105</td>
<td>8.5</td>
<td>64.1</td>
</tr>
<tr>
<td>R.500</td>
<td>3.5</td>
<td>56</td>
<td>80</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
<td>5.5</td>
<td>54</td>
<td>99</td>
<td>98</td>
<td>9.0</td>
<td>64.4</td>
</tr>
</tbody>
</table>

|        | s.e. mean | 0.93     | 1.12    | 4.47     | 0.86     | 0.62       | 0.20       |
|        | LSD 5%     | 1.83     | 2.19    | 8.77     | 1.70     | 1.21       | 0.39       |

\(^1\) Only averaged over eight 1996 sites.  \(^2\) Data from only a single location
Table 6. Seed yield (lb/acre) of Sterling and three high erucic acid control cultivars grown at the Parker Farm, Moscow (Mosc), ID and two trials at the Kambitsch Farm, Genesee (Gen.1 and Gen.2), in 1994 and 1995.

<table>
<thead>
<tr>
<th></th>
<th>Weighted mean</th>
<th>1994</th>
<th></th>
<th></th>
<th>1995</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mosc</td>
<td>Gen.1</td>
<td>Gen.2</td>
<td>Mosc</td>
<td>Gene</td>
</tr>
<tr>
<td>Hero</td>
<td>961</td>
<td>880</td>
<td>819</td>
<td>1082</td>
<td>778</td>
<td>1246</td>
</tr>
<tr>
<td>Reston</td>
<td>753</td>
<td>685</td>
<td>499</td>
<td>527</td>
<td>1032</td>
<td>1024</td>
</tr>
<tr>
<td>R.500</td>
<td>250</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>114</td>
<td>386</td>
</tr>
<tr>
<td>Sterling</td>
<td>1263</td>
<td>932</td>
<td>912</td>
<td>1568</td>
<td>1522</td>
<td>1381</td>
</tr>
</tbody>
</table>

s.e. mean | 190 | 222 | 160 | 111 | 193 | 266 |
LSD 5%     | 382 | 440 | 317 | 220 | 388 | 535 |

Table 7. Oil content (%) of Sterling and three high erucic acid control cultivars grown at the Parker Farm, Moscow (Mosc), ID and two trials at the Kambitsch Farm, Genesee (Gen.1 and Gen.2), in 1994 and 1995.

<table>
<thead>
<tr>
<th></th>
<th>Weighted mean</th>
<th>1994</th>
<th></th>
<th></th>
<th>1995</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mosc</td>
<td>Gen.1</td>
<td>Gen.2</td>
<td>Mosc</td>
<td>Gene</td>
</tr>
<tr>
<td>Hero</td>
<td>38.9</td>
<td>33.9</td>
<td>37.9</td>
<td>37.3</td>
<td>42.7</td>
<td>42.6</td>
</tr>
<tr>
<td>Reston</td>
<td>37.8</td>
<td>32.7</td>
<td>35.7</td>
<td>35.2</td>
<td>42.4</td>
<td>42.9</td>
</tr>
<tr>
<td>R.500</td>
<td>38.5</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>37.1</td>
<td>40.0</td>
</tr>
<tr>
<td>Sterling</td>
<td>39.1</td>
<td>34.1</td>
<td>37.9</td>
<td>37.9</td>
<td>42.6</td>
<td>43.1</td>
</tr>
</tbody>
</table>

s.e. mean | 1.00 | 1.27 | 1.21 | 0.71 | 0.99 | 0.84 |
LSD 5%     | 1.93 | 2.51 | 2.39 | 1.41 | 1.99 | 1.69 |
Table 8. Plant establishment (1 to 9 scale with 9 = good establishment), days from planting to flower start and plant height (cm) averaged over three trials in 1994 and two locations in 1995.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>6.1</td>
<td>55.5</td>
<td>91.0</td>
<td>5.5</td>
<td>57.6</td>
<td>140.0</td>
</tr>
<tr>
<td>Reston</td>
<td>4.7</td>
<td>60.7</td>
<td>111.0</td>
<td>4.5</td>
<td>62.5</td>
<td>155.0</td>
</tr>
<tr>
<td>R.500</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>3.5</td>
<td>56.5</td>
<td>80.0</td>
</tr>
<tr>
<td>Sterling</td>
<td>7.0</td>
<td>56.5</td>
<td>98.0</td>
<td>5.0</td>
<td>58.0</td>
<td>120.0</td>
</tr>
</tbody>
</table>

s.e. mean 0.62 0.86 1.17 0.68 0.81 1.71
LSD 5% 1.23 1.70 2.31 1.37 1.63 3.44

Table 9. Plant establishment (1 to 9 scale with 9 = good establishment), days from planting to flower start, plant height (cm), days from planting to final maturity, lodging (1 to 9 scale 9 = no lodge), and seed test weight (kg/ha) averaged over six trials in 1996.

<table>
<thead>
<tr>
<th></th>
<th>Establishment</th>
<th>Flower Start</th>
<th>Height</th>
<th>Maturity</th>
<th>Lodge</th>
<th>Test Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>5.7</td>
<td>52.7</td>
<td>99.2</td>
<td>137</td>
<td>9.0</td>
<td>64.6</td>
</tr>
<tr>
<td>Reston</td>
<td>3.5</td>
<td>57.3</td>
<td>105.5</td>
<td>141</td>
<td>8.5</td>
<td>64.1</td>
</tr>
<tr>
<td>Sterling</td>
<td>5.0</td>
<td>52.2</td>
<td>94.0</td>
<td>137</td>
<td>9.0</td>
<td>65.2</td>
</tr>
</tbody>
</table>

s.e. mean 0.61 0.72 0.28 0.01 0.00 0.20
LSD 5% 1.70 2.01 0.78 0.03 0.00 0.56
Table 10. Seed yield (lb/acre) of Sterling and two high erucic acid control cultivars grown at the Parker Farm, Moscow (Mosc), ID; Kambitsch Farm, Genesee (Gene), ID; Potlatch (Potl), ID; Colfax (Colf), WA; Dayton (Dayt), WA; Prosser (Pros), WA; Pendleton (Pend), OR; Moccasin (Mocc), MT; and Bozeman (Boze), MT, in 1996.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Rank</th>
<th>Mosc ID</th>
<th>Gene ID</th>
<th>Potl ID</th>
<th>Colf WA</th>
<th>Dayt WA</th>
<th>Pros WA</th>
<th>Pend OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>1359</td>
<td>(2)</td>
<td>1183</td>
<td>1469</td>
<td>611</td>
<td>1655</td>
<td>1716</td>
<td>2169</td>
<td>710</td>
</tr>
<tr>
<td>Reston</td>
<td>1039</td>
<td>(3)</td>
<td>995</td>
<td>1084</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
<td>1564</td>
<td>(1)</td>
<td>1246</td>
<td>2045</td>
<td>614</td>
<td>1910</td>
<td>2119</td>
<td>2053</td>
<td>961</td>
</tr>
<tr>
<td>s.e. mean</td>
<td>148</td>
<td></td>
<td>151</td>
<td>127</td>
<td>98</td>
<td>258</td>
<td>114</td>
<td>123</td>
<td>164</td>
</tr>
<tr>
<td>LSD 5%</td>
<td>415</td>
<td></td>
<td>422</td>
<td>354</td>
<td>274</td>
<td>736</td>
<td>320</td>
<td>345</td>
<td>458</td>
</tr>
</tbody>
</table>
Table 11. Oil content of Sterling and two high erucic acid control cultivars grown at the Parker Farm, Moscow (Mosc), ID; Kambitsch Farm, Genesee (Gene), ID; Potlatch (Potl), ID; Colfax (Colf), WA; Dayton (Dayt), WA; Prosser (Pross), WA; Pendelton (Pend), OR; Moccasin (Mocc), MT; and Bozeman (Boze), MT, in 1996. Also shown is the oil content obtained from the Breeders' seed lot.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Mosc ID</th>
<th>Gene ID</th>
<th>Potl ID</th>
<th>Colf WA</th>
<th>Dayt WA</th>
<th>Pross WA</th>
<th>Breeders Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>41.3</td>
<td>41.8</td>
<td>43.3</td>
<td>41.3</td>
<td>40.2</td>
<td>43.4</td>
<td>38.0</td>
<td>*</td>
</tr>
<tr>
<td>Reston</td>
<td>36.3</td>
<td>31.6</td>
<td>41.0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Sterling</td>
<td>41.3</td>
<td>41.4</td>
<td>43.6</td>
<td>41.9</td>
<td>39.9</td>
<td>42.4</td>
<td>38.4</td>
<td>40.16±0.116</td>
</tr>
</tbody>
</table>

s.e. mean  | 0.59 | 0.64 | 0.46 | 0.77 | 0.52 | 0.55 | 0.58 | -
LSD 5%     | 1.64 | 1.80 | 1.29 | 2.15 | 1.45 | 1.55 | 1.63 | -
Table 12. Fatty acid profile of Sterling and three high erucic acid control cultivars grown in 1994 (average of two locations), 1995 (average of two locations) and in 1996 based on 2 x 10 samples from the Breeders seed lot.

<table>
<thead>
<tr>
<th></th>
<th>16:0</th>
<th>18:0</th>
<th>18:1</th>
<th>18:2</th>
<th>18:3</th>
<th>20:1</th>
<th>22:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>2.8</td>
<td>1.0</td>
<td>17.0</td>
<td>12.3</td>
<td>7.5</td>
<td>10.4</td>
<td>49.1</td>
</tr>
<tr>
<td>Reston</td>
<td>3.4</td>
<td>1.4</td>
<td>19.0</td>
<td>15.1</td>
<td>5.6</td>
<td>13.2</td>
<td>42.2</td>
</tr>
<tr>
<td>R.500</td>
<td>1.7</td>
<td>1.1</td>
<td>12.7</td>
<td>12.6</td>
<td>8.4</td>
<td>5.3</td>
<td>58.2</td>
</tr>
<tr>
<td>Sterling</td>
<td>3.4</td>
<td>0.9</td>
<td>19.9</td>
<td>14.5</td>
<td>7.2</td>
<td>11.2</td>
<td>43.6</td>
</tr>
<tr>
<td></td>
<td><strong>s.e. mean</strong></td>
<td>0.61</td>
<td>0.26</td>
<td>0.69</td>
<td>0.97</td>
<td>0.98</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td><strong>LSD 5%</strong></td>
<td>1.21</td>
<td>0.52</td>
<td>1.38</td>
<td>1.92</td>
<td>1.94</td>
<td>2.16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>16:0</th>
<th>18:0</th>
<th>18:1</th>
<th>18:2</th>
<th>18:3</th>
<th>20:1</th>
<th>22:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>3.1</td>
<td>1.3</td>
<td>18.0</td>
<td>13.1</td>
<td>9.4</td>
<td>10.7</td>
<td>44.2</td>
</tr>
<tr>
<td>Reston</td>
<td>3.2</td>
<td>1.5</td>
<td>26.7</td>
<td>14.4</td>
<td>9.2</td>
<td>12.2</td>
<td>37.5</td>
</tr>
<tr>
<td>R.500</td>
<td>1.9</td>
<td>1.1</td>
<td>14.4</td>
<td>12.8</td>
<td>8.9</td>
<td>5.6</td>
<td>55.2</td>
</tr>
<tr>
<td>Sterling</td>
<td>3.1</td>
<td>1.1</td>
<td>15.4</td>
<td>13.4</td>
<td>9.0</td>
<td>8.5</td>
<td>50.4</td>
</tr>
<tr>
<td></td>
<td><strong>s.e. mean</strong></td>
<td>0.70</td>
<td>0.34</td>
<td>1.07</td>
<td>1.47</td>
<td>0.27</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td><strong>LSD 5%</strong></td>
<td>1.39</td>
<td>0.67</td>
<td>2.12</td>
<td>2.92</td>
<td>0.54</td>
<td>1.55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>16:0</th>
<th>18:0</th>
<th>18:1</th>
<th>18:2</th>
<th>18:3</th>
<th>20:1</th>
<th>22:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hero</td>
<td>3.4</td>
<td>1.2</td>
<td>17.4</td>
<td>12.7</td>
<td>8.4</td>
<td>10.0</td>
<td>42.5</td>
</tr>
<tr>
<td>Sterling</td>
<td>3.3</td>
<td>1.2</td>
<td>16.0</td>
<td>12.9</td>
<td>7.0</td>
<td>9.7</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td><strong>s.e. mean</strong></td>
<td>0.03</td>
<td>0.04</td>
<td>0.13</td>
<td>0.06</td>
<td>0.06</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td><strong>LSD 5%</strong></td>
<td>0.06</td>
<td>0.08</td>
<td>0.26</td>
<td>0.12</td>
<td>0.12</td>
<td>0.16</td>
</tr>
</tbody>
</table>

1 16:0 = palmitic acid; 18:0 = stearic acid; 18:1 = oleic acid; 18:2 = linoleic acid; 18:3 = linolenic acid; 20:1 = eicosenoic acid; 22:1 = erucic acid.
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S)/
   Idaho Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
   UI.35.5.15
   (PI 597354)

3. VARIETY NAME
   "STERLING"

4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)
   IAES, College of Agriculture
   University of Idaho
   Moscow ID 83844-2337

5. TELEPHONE (Include area code)
   (208) 885-7173

6. FAX (Include area code)
   (208) 885-6654

7. PVPO NUMBER
   9700372

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 U.S. 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 U.S. 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.

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