



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Agriculture & Agril-Food Canada, Lacombe

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, or conditioning it for propagation, or stocking it for any of the above purposes, or using it in producing a hybrid or different variety there from, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)



Attest:

Acting Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

FIELD PEA

'AAC Carver'

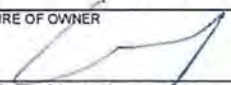
In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-eighth day of December, in the year two thousand and seventeen.

Secretary of Agriculture



REPRODUCE LOCALLY. include form number and date on all reproductions

Form Approved - OMB No. 0581-0055

<p><b>U.S. DEPARTMENT OF AGRICULTURE</b>  <b>AGRICULTURAL MARKETING SERVICE</b>  <b>SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE</b></p> <p><b>APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE</b>  <i>(Instructions and information collection burden statement on reverse)</i></p>		<p>The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995</p> <p>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).</p>	
1. NAME OF OWNER <b>Agriculture &amp; Agri-Food Canada, Lacombe</b>		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME <b>MP1920, P0405 12</b>	3. VARIETY NAME <b>AAC Carver</b>
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) <small>Lacombe Research and Development Centre c/o AAFC PBR/VR Manager 6000 C and E trail Lacombe, Alberta T4L 1W1 Canada</small>		5. TELEPHONE (include area code) <b>403 782 8126</b>	FOR OFFICIAL USE ONLY PVPO NUMBER <b>201600249</b>
6. FAX (include area code) <b>403 782 6120</b>		7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) <b>Department of the Canadian Federal Government</b>	8. IF INCORPORATED, GIVE STATE OF INCORPORATION <b>N/A</b>
9. DATE OF INCORPORATION <b>N/A</b>		10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) <b>Shaan Tsai MERIDIAN SEEDS PO BOX 224. 2 - 6TH AVE N CASSELTON, ND 58012</b>	11. TELEPHONE (Include area code) <b>204 988 4681</b>
12. FAX (Include area code)		13. E-MAIL <b>s.tsai@canterra.com</b>	FILING AND EXAMINATION FEES: \$ <b>4,382</b> DATE <b>05/11/2016</b> CERTIFICATION FEE: \$ DATE
14. CROP KIND (Common Name) <b>field pea</b>	15. GENUS AND SPECIES NAME OF CROP <b>Pisum sativum</b>	16. FAMILY NAME (Botanical) <b>Fabaceae</b>	
17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO  IF YES, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.	20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input checked="" type="checkbox"/> NO (If "no", go to item 23) <input type="checkbox"/> UNDECIDED	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Filing and Examination Fee (\$4,382), make checks payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office) other methods of payment explained in the instructions		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO  IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO  IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED  (If additional explanation is necessary, please use the space indicated on the reverse.)	
25. The owners declare that a viable sample of basic seed will be furnished directly to an acceptable depository in support of the variety within three months of filing. Seed will be replenished upon request in accordance with such regulations as may be applicable. For a tuber propagated variety or vegetative propagated parent of the variety, a tissue culture or vegetative sample will be deposited in a public repository within three months of the date of the certificate fee request letter. These will be maintained for the duration of the certificate. The undersigned owner(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 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO  IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
SIGNATURE OF OWNER 		SIGNATURE OF OWNER	
NAME (Please print or type) <b>Ann de St Remy</b>		NAME (Please print or type)	
CAPACITY OR TITLE <b>Team Lead SPSE-West Office of Intellectual Property &amp; Commercialization</b>	DATE <b>April 29, 2016</b>	CAPACITY OR TITLE	DATE

2016 MAY 11 AM 11:14

22. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

23. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

24. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

CANADA - Date of Application: 2014-12-10, PBR application # 14-8491



U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE		FOR OFFICIAL USE ONLY
<b>EXHIBIT A – ORIGIN AND BREEDING HISTORY</b> ** Use additional pages as needed		PVPO NUMBER
1. Name of Owner	2. Temporary Designation or Experimental Name	3. Variety Name
Agriculture & Agri-Food Canada, Lacombe	MP1920, P0405 12	AAC Carver
<p>4. Describe the genealogy (back to and including public and commercial varieties, lines, or clones used) and the breeding method(s). **</p> <p>AAC Carver was developed from the cross CDC715S-4/P98089063. CDC715S-4, derived from the cross 92-46Y-PMR-1Y/MP1566, was a yellow pea breeding line developed at the Crop Development Centre, University of Saskatchewan. P98089063, developed at Agriculture and Agri-Food Canada (AAFC) Morden Research Station, MB, Canada from the cross CDC Mozart/Miami, was a high yielding and semi-leafless yellow pea breeding line.</p> <p>The breeding method for AAC Carver was pedigree selection in combination with single seed descent (SSD). The cross CDC715S-4/P98089063 was made in the greenhouse at AAFC Morden Research Station, MB in the winter of 2003. The F1 was grown in the field in Lacombe, AB in the summer of 2004 and bulk harvested. The F2 was planted at two sites in the field in 2005 in Lacombe, AB. A total of 342 powdery mildew resistant plants were selected from the F2 population using SSD, and advanced to the F3 generation in the greenhouse at AAFC Lacombe Research Centre in the winter of 2005 using SSD. The F4 generation was grown in the field in Lacombe, AB in 2006, and a total of 212 single plants were harvested. Each of the harvested plants was grown in 1 m<sup>2</sup> plot in the field in 2007 in Lacombe, AB, from which 16 lines were visually selected on the basis of maturity and good lodging resistance. These 16 lines were grown replicated preliminary yield test in Lacombe, AB in 2008, and six lines were selected on the basis of their yield, maturity, lodging resistance and seed quality for advanced yield test, which was grown in replicated trials at six sites (Barrhead, AB; Lacombe, AB; Morden, MB; Namao, AB; Rosthern, SK; Saskatoon, SK) in 2009. One of the six lines, designated as P0405 12, had high seed yield, good lodging resistance and good seed quality, was selected for further evaluation. Line P0405-12 was grown in two 1 x 15 m strips in the field in 2010 in Lacombe, AB for seed multiplication and purification by roguing off-type plants. It was entered into the 2011-2012 Western Canada Field Pea Cooperative Registration Test-B (CO-OP Test) as entry MP1920, and evaluated at a total of 19 qualified location-years. The test locations were Barrhead, AB; Brandon, MB; Brooks, AB; Fort St. John, BC; Indian Head, SK; Lacombe, AB; Melfort, SK; Moose Jaw, SK; Scott, SK; St. Albert, AB; Swift Current, SK; Vegreville, AB and Yorkton, SK. The pre-breeder seed of AAC Carver was derived from a single F8 line, and the first breeder seed was produced in the F9.</p>		
5. Give the details of subsequent stages of selection and multiplication. **		
Year	Detail of Stage	Selection Criteria
2003: The cross was made in the greenhouse at AAFC Morden Research Station in the winter.		
2004: F1 was grown in the field in Lacombe, AB in summer and bulk harvested.		
2005: F2 was planted at two sites in the field in Lacombe, AB and 342 powdery mildew resistant plants were selected using Single Seed Descent.		
2005: F3 consisted advanced F2 lines in the greenhouse at Lacombe, AB during winter using Single Seed Descent.		
2006: F4 grown in field in Lacombe and 212 plants were harvested.		
2007: F5 Each plant was grown in 1m <sup>2</sup> plot in the field in Lacombe, AB from which 16 lines were visually selected on the basis of maturity, and lodging resistance.		
2008: These 16 lines were grown in replicated preliminary yield tests in Lacombe, AB and were selected on the basis of their yield, maturity, lodging resistance, and seed quality.		
2009: 6 lines advanced in into 6 replicated yield tests (Barrhead, AB, Lacombe, AB, Morden, MB, Namao, AB, Rosthern, SK, and Saskatoon, SK		
2010: 1 line exhibiting high yield, good lodging resistance and seed quality was advanced into two 1X15m strips in the field in Lacombe, AB for seed multiplication and purification by roguing off-type plants.		
2011-2012: Entered into Western Canada Field Pea Cooperative Registration Test B		
6. Is the variety uniform? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
How did you test for uniformity?		
The variety was developed using pedigree selection that ensures uniformity. Uniformity was tested in F5, F6, F7, F8, and Breeder seed production plots (F9). A number of characters, including plant type, height, maturity, color, seed cotyledon color, powdery mildew resistant, are observed or assessed. Off-type plants were removed in pre-breeding seed production (F8), and breeder seed production plots (F9). The variety demonstrated highly uniformity.		
7. Is the variety stable? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
How did you test for stability? Over how many generations?		
Similar to the test for uniformity, the variations in various generations in F5, F6, F7, F8, and Breeder seed production plots (F9) were observed or assessed. No segregation on plant type, height, maturity, color, seed cotyledon color, powdery mildew resistant, were observed.		
8. Are genetic variants observed or expected during reproduction and multiplication? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
If yes, state how these variants may be identified, their type and frequency		
Under excessive moisture and prolonged growing season or thin plant stands, tall and late maturing may occur in the variety. Such plants have a continued vegetative growth, and taller than other plants by up to 18cm. These are variants. The frequency of such plants is to up to 1%		

<p>U.S. DEPARTMENT OF AGRICULTURE                  AGRICULTURAL MARKETING SERVICE                  SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE                  APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE</p> <p><b>EXHIBIT B – STATEMENT OF DISTINCTNESS</b>                  ** Use additional tables to present clear differences for additional comparison varieties.                  Use additional pages to present supporting evidence.</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center; font-weight: bold; font-size: small;">FOR OFFICIAL USE ONLY</td> </tr> <tr> <td style="text-align: center; font-weight: bold; font-size: small;">PVPO NUMBER</td> </tr> </table>	FOR OFFICIAL USE ONLY	PVPO NUMBER
FOR OFFICIAL USE ONLY			
PVPO NUMBER			

1. Name of Owner Agriculture & Agri-Food Canada, Lacombe	2. Temporary Designation or Experimental Name MP1920, P0405 12	3. Variety Name AAC Carver
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Based on overall morphology, AAC Carver is most similar to AC Agassiz AAC Carver most clearly  
*Applicant's new variety* *Most similar comparison variety(ies)* *Applicant's new variety*

differs from AC Agassiz in the following traits Name the specific trait. Then list the value of that trait for each variety in the comparison. Submit appropriate supporting evidence (see the Guidelines for Presenting Evidence in Support of Variety Distinctness in the instructions):

	Eg. Leaf Pubescence Eg. Leaf Color Eg. Plant Height	heavy pubescence Dark Green (5GY 3/4) 200 cm +/- 10 cm (N=25)	glabrous Light Green (2.5GY 8/10) 250 cm +/- 15 cm (N=25)	photograph attached Munsell Color Chart statistics attached
	1. Qualitative traits:	2. Color traits:	3. Quantitative traits:	4. Other traits:
Application Variety	AAC Carver  see attached		see attached	
Comparison Variety 1	Agassiz  see attached		see attached	
Comparison Variety 2	Mozart  see attached		see attached	
Comparison Variety 3				

\*\* Use additional tables to present clear differences for additional comparison varieties. Use additional pages to present supporting evidence.



## Exhibit B – Statement of Distinctness

	Qualitative traits	Quantative traits
AAC Carver	<p><b>Flower Shape of Base of Standard:</b> More level than Agassiz, more similar to Mozart (see Exhibit D section 6.7 of AAC Carver PBR and photos)</p> <p><b>Pod Degree of Curvature:</b> 1.5 Not as curved as Agassiz, similar to Mozart (see Exhibit D section 7.5 in AAC Carver PBR)</p>	<p><b>Plant Height:</b> 90 cm (see Exhibit D section 2.2 in AAC Carver PBR)  <b>Stem Vine Length:</b> 6cm (see Exhibit D section 3.1 in AAC Carver PBR)  <b>Stipule Length:</b> 62mm (see Exhibit D section 5.3 in AAC Carver PBR)  <b>Stipule Width:</b> 30mm (see Exhibit D section 5.4 in AAC Carver PBR)  <b>Stipule Density of Flecking:</b> 1.8 (see Exhibit D section 5.7 in AAC Carver PBR)  <b>Seed Size:</b> 226g (see Exhibit D section 8.11 in AAC Carver PBR and Table 1)  <b>Protein Content:</b> 23% (see Exhibit D section 9.1 in AAC Carver PBR)  <b>Flower Length of Peduncle:</b> 46mm (see Exhibit D section 6.9 in AAC Carver PBR)  <b>Pod Length:</b> 69mm (see Exhibit D section 7.1 in AAC Carver PBR)</p>
Agassiz	<p><b>Flower Shape of Base of Standard:</b> More arched than AAC Carver &amp; Mozart (see Exhibit D section 6.7 of AAC Carver PBR and photos)</p> <p><b>Pod Degree of Curvature:</b> 2.5 More curved than AAC Carver, and Mozart (see Exhibit D section 7.5 in AAC Carver PBR)</p>	<p><b>Plant Height:</b> 85 cm (see Exhibit D section 2.2 in AAC Carver PBR)  <b>Stem Vine Length:</b> 5cm (see Exhibit D section 3.1 in AAC Carver PBR)  <b>Stipule Length:</b> 70mm (see Exhibit D section 5.3 in AAC Carver PBR)  <b>Stipule Width:</b> 34mm (see Exhibit D section 5.4 in AAC Carver PBR)  <b>Stipule Density of Flecking:</b> 2.8 (see Exhibit D section 5.7 in AAC Carver PBR)  <b>Seed Size:</b> 216g (see Exhibit D section 8.11 in AAC Carver PBR) and Table 1  <b>Protein Content:</b> 26% (see Exhibit D section 9.1 in AAC Carver PBR)  <b>Flower Length of Peduncle:</b> 81mm (see Exhibit D section 6.9 in AAC Carver PBR)  <b>Pod Length:</b> 74mm (see Exhibit D section 7.1 in AAC Carver PBR)</p>
Mozart	<p><b>Flower Shape of Base of Standard:</b> More level than Agassiz, similar to AAC Carver (see Exhibit D section 6.7 of AAC Carver PBR and photos)</p> <p><b>Pod Degree of Curvature:</b> Not as curved as Agassiz, similar to AAC Carver (see Exhibit D section 7.5 in AAC Carver PBR)</p>	<p><b>Plant Height:</b> 69 cm (see Exhibit D section 2.2 in AAC Carver PBR)  <b>Stem Vine Length:</b> 4cm (see Exhibit D section 3.1 in AAC Carver PBR)  <b>Stipule Length:</b> 68mm (see Exhibit D section 5.3 in AAC Carver PBR)  <b>Stipule Width:</b> 38mm (see Exhibit D section 5.4 in AAC Carver PBR)  <b>Stipule Density of Flecking:</b> 3.0 (see Exhibit D section 5.7 in AAC Carver PBR)  <b>Seed Size:</b> 210g (see Exhibit D section 8.11 in AAC Carver PBR) and Table 1  <b>Protein Content:</b> 25% (see Exhibit D section 9.1 in AAC Carver PBR)  <b>Flower Length of Peduncle:</b> 66mm (see Exhibit D section 6.9 in AAC Carver PBR)  <b>Pod Length:</b> 69mm (see Exhibit D section 7.1 in AAC Carver PBR)</p>

**Table 1. Agronomic performance, seed quality and disease resistance of AAC Carver and the check cultivars in the 2011-2012 Field Pea Co-operative Registration Test**

	Yield (kg ha <sup>-1</sup> )	DTM <sup>z</sup> (d)	Height <sup>y</sup> (cm)	PHL <sup>x</sup> (1-9)	TSW <sup>w</sup> (g)	Shape <sup>v</sup> (1-5)	SCB <sup>u</sup> (%)	Protein <sup>t</sup>	MB <sup>s</sup> (1-9)	PM <sup>r</sup> (1-9)	FW <sup>q</sup> (%)
AAC Carver	4941	96	89	3.7	226	2.7	1.3	21	5.6	0.0	10
Agassiz (CK)	4528	99	85	4.4	212	2.6	4.2	24	4.8	0.0	15
CDC Golden (CK)	4021	97	80	4.6	199	2.4	1.3	24	5.2	0.0	19
LSD ( $p=0.05$ )	239	1	3	0.5	5	0.1	1.3	1	1.1	-	8
Location-year	19	17	18	18	18	18	7	11	4	2	2

<sup>z</sup> Days to maturity.

<sup>y</sup> Plant height (cm).

<sup>x</sup> Pre-harvest lodging score, 1 = upright, 9 = prostrate.

<sup>w</sup> Thousand seed weight (g).

<sup>v</sup> Seed shape, 1 = round, 5 = cubed.

<sup>u</sup> Seed coat breakage (%).

<sup>t</sup> Protein content of seeds (%).

<sup>s</sup> *Mycosphaerella* blight, 1 = no disease, 9 = whole plant severely blighted.

<sup>r</sup> Powdery mildew, 1 = no disease, 9 = whole plant severely mildewed.

<sup>q</sup> Fusarium wilt, percentage of the wilted plants.

REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved OMB NO 0581-0055

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U.S. DEPARTMENT OF AGRICULTURE  
 AGRICULTURAL MARKETING SERVICE  
 SCIENCE AND TECHNOLOGY  
 PLANT VARIETY PROTECTION OFFICE  
 BELTSVILLE, MD 20705

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY  
 Pea (*Pisum sativum* L.)

NAME OF APPLICANT (S) <b>Meridian Seeds</b>	TEMPORARY OR EXPERIMENTAL DESIGNATION <b>MP1920, P0405-12</b>	VARIETY NAME <b>AAC Carver</b>
ADDRESS (Street and No. or RD No., City, State, Zip Code and Country) PO Box 224, 2-6th Ave. N. Casselton, North Dakota 58012  Email: <b>s.tsai@canterra.com</b>		FOR OFFICIAL USE ONLY  PVPO NUMBER

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g.,    or  ) when the number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: \_\_\_\_\_ Please answer all questions for your variety; lack of response may delay progress of your application.

1. TYPE:  
 1 = Garden      2 = Field      3 = Edible-pod      4 = Other (Specify) \_\_\_\_\_

2. MATURITY:

<input type="text" value="0"/> <input type="text" value="3"/>	Node Number of First Bloom:	<input type="text" value="7"/>	No. of Days Processing	<input type="text" value="7"/>	Heat Units
<input type="text" value="0"/> <input type="text" value="3"/>	No. of Days Earlier Than	}	1 = Alaska	2 = Thomas Laxton WR	3 = Little Marvel
<input type="text" value="0"/> <input type="text" value="3"/>	Days Same As		4 = Wando	5 = Alderman WR	6 = Australian Winter
<input type="text" value="0"/> <input type="text" value="3"/>	No. of Days Later Than		7 = Other (Specify) <u>Agassiz</u>		

3. PLANT HEIGHT:

<input type="text" value="8"/> <input type="text" value="9"/>	cm High	<input type="text" value="7"/>	Name of Check Cultivar _____
<input type="text" value="0"/> <input type="text" value="4"/>	cm Shorter Than	<input type="text" value="7"/>	Same as Check Cultivar _____
<input type="text" value="0"/> <input type="text" value="4"/>	cm Taller Than	<input type="text" value="7"/>	Name of Check Cultivar <u>Agassiz</u>

4. VINE:

<input type="text" value="1"/>	Habit:	1 = Determinate	2 = Indeterminate
<input type="text" value="3"/>	Branching:	1 = None (Alaska)	2 = 1-2 Branches (Little Marvel)      3 = More than 2 Branches (Dwarf Gray Sugar)
<input type="text" value="1"/>	Internodes:	1 = Straight	2 = Zig Zag
<input type="text" value="0"/> <input type="text" value="4"/>	Stockiness:	1 = Slim (Alaska)	2 = Medium (Thomas Laxton WR)      3 = Heavy (Alderman)
<input type="text" value="0"/> <input type="text" value="4"/>	Total Number of Nodes		



5. LEAFLETS:

Color: 1 = Light Green (Alaska WR) 2 = Medium Green (Thomas Laxton WR) 3 = Dark Green (Alderman)  
 4 = Other (Specify) \_\_\_\_\_ 5 = Blue Green 6 = Yellow Green 0 = Not Applicable

Wax: 1 = None 2 = Light 3 = Medium 4 = Heavy 0 = Not Applicable

Molding: 1 = Not Marbled 2 = Marbled (Alaska) 0 = Not Applicable

Number of Leaflet Pairs: 1 = Not Paired 2 = One 3 = Two 4 = Three or More 0 = Not Applicable

Leaflet Type: 1 = Leafless 2 = Semi 3 = Normal

6. STIPULES:

1 = Lacking 2 = Present  1 = Not Clasping 2 = Clasping  1 = Not Marbled 2 = Marbled

Size (Compared with Leaflets): 1 = Smaller 2 = Same 3 = Larger 0 = Not Applicable

Color (Compared with Leaflets): 1 = Lighter 2 = Same 3 = Darker 0 = Not Applicable

Color: 1 = Light Green 2 = Medium Green 3 = Dark Green 4 = Blue Green 5 = Yellow Green 0 = Not Applicable

Color Chart Value: \_\_\_\_\_ Select the Color Chart Used to Determine the Values:

Royal Horticulture Society Colour Chart  
 Munsell Color Chart  
 Other \_\_\_\_\_

Stipule Size: 1 = Small 2 = Medium 3 = Large

Please Provide Comparative Varieties (Check Varieties) and Stipule Color

	Variety (1)	Variety (2)	Variety (3)
Variety Name:	AAC Carver	Agassiz	
Stipule Size:	62mm	70mm	
Color:			
Color Chart Value:			

7. FLOWER COLOR:

Venation  Standard  Wing  Keel

1 = White 2 = Greenish 3 = Lavender 4 = Purple 5 = Red 6 = Other (Specify) \_\_\_\_\_

8. PODS:

Shape: 1 = Straight 2 = Slightly Curved 3 = Curved

End: 1 = Pointed (Alderman) 2 = Blunt (Alaska)

Color: 1 = Light Green (Alaska WR) 2 = Medium Green 3 = Dark Green (Alderman)  
 4 = Other (Specify) \_\_\_\_\_ 5 = Blue 6 = Purple 7 = Yellow

Surface: 1 = Smooth 2 = Rough  Surface: 1 = Shiny 2 = Dull

Borne: 1 = Single 2 = Double 3 = Single and Double 4 = Single, Double & Triple 5 = Double & Triple  
 6 = Triple 7 = Other (Specify) \_\_\_\_\_ 8 = Quad, Single, Double, Triple 9 = Quad

cm Length   mm Width (Between Sutures)   No. Seeds Per Pod

9. SEEDS: (95-100 Tenderometer)

Color: 1 = Light Green 2 = Green 3 = Dark Green 4 = Other (Specify) \_\_\_\_\_  
 5 = Yellow 6 = Brown 7 = Yellow Green

Seive: %         Average

9. SEEDS: (cont.) (Dry-Mature)

- 3 Shape: 1 = Flattened 2 = Angular 3 = Oval 4 = Rounded
- 2 Surface: 1 = Smooth 2 = Dimpled 3 = Wrinkled  1 Luster: 1 = Shiny 2 = Dull
- Color Pattern: 1 = Monocolor 2 = Mottled 3 = Striped 4 = Dotted
- 7 Primary Color: } 1 = Creamy White 2 = Cream & Green 3 = Light Green 4 = Medium Green  
 5 = Dark Green 6 = Blue Green 7 = Yellow 8 = Brown  
 Secondary Color: } 9 = Red 10 = Gray 11 = Black 12 = Salmon  
 13 = Purple 14 = Tan 15 = White 16 = Pink  
 17 = Yellow Green
- 1 Hilum Color: 1 = White 2 = Tan 3 = Black
- 2 Cotyledon Color: 1 = Green 2 = Yellow 3 = Orange 4 = Cream
- 2  3 Grams per 100 Seeds

10. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Moderately Resistant, 4 = Moderately Susceptible, 5 = Tolerant)

- |   |   |
|---|---|
| <input type="checkbox"/> 0 Fusarium Wilt – Race 1 | <input type="checkbox"/> 4 Fusarium Wilt (Near Wilt) – Race 2           |
| <input type="checkbox"/> 0 Ascochyta Blight       | <input type="checkbox"/> 0 Common Mosaic                                |
| <input type="checkbox"/> 0 Bacterial Blight       | <input type="checkbox"/> 0 Pea Enation Mosaic Virus                     |
| <input type="checkbox"/> 0 Downy Mildew           | <input type="checkbox"/> 0 Seedborne Mosaic Virus                       |
| <input type="checkbox"/> 2 Powdery Mildew         | <input type="checkbox"/> 0 Yellow Bean Mosaic Virus                     |
| <input type="checkbox"/> Other (Specify) _____    | <input type="checkbox"/> 0 Leaf Roll Virus                              |
| <input type="checkbox"/> Other (Specify) _____    | <input type="checkbox"/> 4 Other (Specify) <u>mycosphaerella blight</u> |

11. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Moderately Resistant, 4 = Moderately Susceptible, 5 = Tolerant)

- 0 Aphids  Other (Specify) \_\_\_\_\_

12. Additional information on any item above, or general comments that may aid in identification:

Seed Size: Significantly larger than Agassiz and Mozart - see 'Exhibit B Table 1' and Exhibit D section 8.11 in AAC Carver PBR.



**PVP EXHIBIT D:**

PBR Appl. #: 14-8491  
cv. name: AAC Carver  
Exp. name: MP1920  
PBR final Report

**PBRO**

**Plant Breeders' Rights Office**

<p><b>PEA</b> <b>OBJECTIVE</b> <b>DESCRIPTION</b></p> <p><i>Pisum sativum L. sensu lato</i></p>
---

To be completed in connection with an application for Plant Breeders' Rights. Completed forms are to be returned to:

The Commissioner of Plant Breeders' Rights  
Plant Products Division  
59 Camelot Drive  
Nepean, Ontario, Canada  
K1A 0Y9

**A. THE OBJECTIVE DESCRIPTION FORM**

1. The objective description form lists characteristics to be used as the basis for developing the description of pea varieties. It is recommended that the form be completed in as much detail as possible to ensure that an accurate description of the variety is on record.
2. The form must be completed as part of the examination requirements for Plant Breeders' Rights. The description of the variety will be published in the *Plant Varieties Journal*.
3. Information on this document may be accessible or protected as required under the provisions of the Access to Information Act. Information that could cause you or your organization injury if released is protected from disclosure as defined in Section 20 of the Access to Information Act.

**B. TEST GUIDELINES**

1. The objective description form must be completed based on tests and trials conducted in Canada by the applicant in order to show that the candidate variety is distinct, uniform and stable.
2. The PBRO recommends the use of the UPOV (International Union for the Protection of New Varieties of Plants) test guidelines for pea (see Appendix I).
3. Protocols used for the trials (e.g. plot size, no. of replications, no. of plants, plant spacing) and any statistical data that may be necessary to support the description should be attached to the present form. The location of the trial site from which data is collected must be clearly indicated.
4. Observations for both the candidate and reference varieties must be taken from plants grown at the same site under the same conditions. A minimum of two growing seasons of tests and trials is required.
5. It is recommended that the breeder retain the raw data (e.g. leaf measurements) in the event that the data are required by the PBRO to verify test results. If raw data are not available, the breeder may be required to do further trials.

**C. REFERENCE VARIETIES**

1. Candidate varieties must be compared to the most similar variety(ies) presently grown in Canada. If there is also another similar candidate variety(ies), and/or another similar foreign variety(ies), these varieties must also be used for comparison. The applicant selects the reference varieties and must describe them concurrently by the same characteristics used for the candidate variety. In the case of crops requiring registration under the Seeds Act, at least one of the reference varieties must be a registered variety.

**D. CHARACTERISTICS**

1. To assess distinctness the characteristics described in the objective description should be used. Additional characteristics will be accepted (please attach to the back of the form).



## PEA OBJECTIVE DESCRIPTION

---

2. All characteristics used to describe the candidate variety must be described for all reference varieties. Both the candidate variety and the reference variety(ies) must be described for all characteristics designated on the form with an asterisk (\*). Optional characteristics should also be described to ensure that a complete description of the variety is on record.
3. A rating system of 1-9 provides a scale for describing most characteristics in this form. To rate characteristics select a value that best corresponds to the state indicated. Characteristics may be rated with intermediate values where the characteristic grades gradually from one extreme to another. For example, where the states for a characteristic are described as: small(3), medium(5), large(7); other values of 1, 2, 4, 6, 8 or 9 may be selected.
4. Each characteristic on this form has been arranged in a table format allowing the candidate variety (CV) and up to four reference varieties (R1 to R4) to be described (if additional reference varieties are used, another form may be attached).
5. Each characteristic must be described for two years of observation. A rating (1-9) must be given for each year, or a measurement including the standard deviation should be described for both years. An overall summary should be presented as an average of both years.

### E. PHOTOGRAPHS

1. Applicants must submit comparative photographs of characteristics which clearly demonstrate that the candidate variety is distinct from the reference variety(ies). For example, the photographs may compare leaf shapes, flower colour, or fruit shape. Macro photography may be required to illustrate small details such as pubescence, petal spotting, or stamen and anther characteristics.
2. The photographs must be based on plant material from the tests and trials used to complete this form.
3. The photographs should be submitted in print format. Both the candidate and reference varieties should be in the same frame of the photograph.
4. The candidate and reference varieties should be clearly labelled in the photographs. Where suitable, photographs taken indoors should be against a grey-neutral background. Photographs taken outdoors should be taken on an overcast day, not in full sun.

### F. LEGEND

(\*) Characteristics which must always be included when completing the objective description form, except when the state of expression of a preceding characteristic renders this impossible.

(+) See explanations and methods in Appendix II.

CV Candidate variety

R1-R4 Reference varieties

RHS Royal Horticultural Society colour chart

**G. PEA OBJECTIVE DESCRIPTION**

(i) Name and address of person completing this form:

DENGJIN BING  
 AAFC Lacombe Research Centre  
 6000 C and E Trail, Lacombe, AB  
 T4L 1W1

(ii) Reference varieties: In the table below fill out the denomination of the reference variety(ies) which will be used when describing the candidate variety.

**REFERENCE VARIETIES**

R1	R2	R3	R4
Agassiz	CDC Mozart		

(iii) Testing location: Indicate the location(s) and year(s) of variety testing. If more than one location was used, indicate the characteristics (objective description numbers) and corresponding location.

Lacombe, AB 2014-2015

(iv) Describe the protocols used for the tests and trials (plot size, number of plants, number of replications, plant spacing, etc.)

RCBD with 4 replications. The plot size was 5x1 m with 20 cm row space. The seeding rate was 85 viable seeds per square meter.

**1.0 CLASSIFICATION (\*)**

1.1 Botanical name: *Pisum sativum* L. sensu lato

1.2 Denomination: proposed variety name: AAE Carver

1.3 Type:  1. Garden



2. Field  
 3. Edible pod  
 4. Sugar snap

**2.0 PLANT CHARACTERISTICS**

Carver Agassiz CDCMozart

**2.1 Plant: stem fasciation**

(+)		CV	R1	R2	R3	R4
absent	1	1	1	1		
present	9					

**2.2 Plant: height (observe when 30% of plants have one flower open)**

mean (cm)	90	85	69		
range	60-125	58-125	50-90		
standard deviation	16	18	13		
number measured	40	40	40		

**2.3 Plant: colour (observe at flowering)**

(*)						
yellow green	1	2	2	2		
green	2					
blue or dark green	3					

**2.4 Plant : anthocyanin colouration**

absent	1	1	1	1		
present	9					

**3.0 STEM CHARACTERISTICS****3.1 Stem: vine length (observe after flowering when pods are fully swollen)**

(*) (+)						
short (cm)	3	6	5	4		

(66-140) (92-115) (48-102)

medium	5
long	7

3.2 Stem: number of nodes up to and including first flowering node (observe at harvest, include the two scale nodes)

(\*) (+)

	CV	R1	R2	R3	R4
mean number of nodes	22	22	21		
range	18-28	16-31	15-27		
standard deviation	3	4	4		
number measured	40	40	40		

3.3 Stem: anthocyanin colouration of axil (varieties with anthocyanin only)

(+)

absent	1					
present	9					

3.4 Stem: type of anthocyanin colouration of axil (varieties with anthocyanin only)

(+)

single ring	1					
double ring	2					

#### 4.0 LEAF CHARACTERISTICS

4.1 Leaf: presence of leaflets

(\*)

absent	1					
present	9					

4.2 Leaf: average maximum number of leaflets (observe any time after stipules at seventh node are fully opened)

(+)

four	1					
------	---	--	--	--	--	--



six	2
eight	3

## 4.3 Leaflet: length (observe at second fertile node)

		CV	R1	R2	R3	R4
short	3					
medium	5					
long	7					

## 4.4 Leaflet: width (observe at second fertile node)

narrow	3					
medium	5					
wide	7					

## 4.5 Leaflet: shape (observe at second fertile node)

elliptic	1					
ovate	2					

## 4.6 Leaf: waxiness of upper surface of leaves and stipules

absent	1					
present	9					

## 4.7 Leaflet/stipules: dentation (observe over whole plant)

(+)

absent	1					
present	9					

## 4.8 Leaflet/stipules: degree of dentation

(+)

very weak	1					
-----------	---	--	--	--	--	--

weak	3
medium	5
strong	7
very strong	9

4.9 Leaf or tendril: petiole length (varieties without leaflets only, observe at second fertile node, measuring from axil to first tendril branch)

(+)	CV	R1	R2	R3	R4
mean					
range					
standard deviation					
number measured					

## 5.0 STIPULE CHARACTERISTICS

5.1 Stipule: development (observe any time after stipules at seventh node are fully opened)

(\*) (+)

rudimentary	1	2	2	2		
normal	2					

5.2 Stipule: 'rabbit-eared' stipules (observe any time after stipules at 7th node are fully opened)

(+)

absent	1	1	1	1		
present	9					

5.3 Stipule: length (observe at second fertile node)

(\*) (+)

mean (mm)	62	70	68		
range	41-77	43-88	49-78		
standard deviation	9	12	8		
number measured	40	40	40		



5.4 Stipule: maximum width (observe at second fertile node)

(\*) (+)

mean (mm)		30	34	38		
range		21-45	22-41	28-46		
standard deviation		6	5	5		
number measured		40	40	40		

## 5.5 Stipule: colouration (varieties with anthocyanin only)

		CV	R1	R2	R3	R4
absent	1					
present	9					

## 5.6 Stipule: flecking (observe over whole plant)

(\*) (+)

absent	1	9	9	9		
present	9					

## 5.7 Stipule: maximum density of flecking (observe over whole plant)

(+)

very sparse	1	1.8	2.8	3.0		
sparse	3					
medium	5					
dense	7					
very dense	9					

## 6.0 FLOWERING CHARACTERISTICS

## 6.1 Time of flowering (observe when approximately 30% of plants have one flower open, avoid recording early flowering variants)

(\*)

early	3	4	4	4		
medium	5	56d	56d	55d		
late	7					

6.2 Number of flower bearing nodes per stem (observe when nodes show signs of producing flowers which do not develop beyond the bud stage)

few	3					
medium	5					
many	7					

6.3 Maximum number of flowers per node (non-fasciated varieties only, observe when highest nodes show signs of producing flowers which do not develop beyond the bud stage)

(*) (+)		CV	R1	R2	R3	R4
one	1	3	3	3		
one to two	2					
two	3					
two to three	4					
three	5					
three to four	6					
more than four	7					

6.4 Flower: anthocyanin colouration of wing (varieties with anthocyanin only, observe when slight opening of the wings show the keel to when standards are fully open)

(*) (+)						
pink blush	1					
pink	2					
reddish purple	3					
or RHS colour chart no. (if available)	4					

6.5 Flower: colour of standard (varieties without anthocyanin only, observe on fresh, fully opened flowers)

cream	1	2	2	2		
white	2					
other:	3					

6.6 Flower: maximum width of standard



(+)

mean (mm)	24	26	24		
range	20-30	20-30	19-27		
standard deviation	3	3	2		
number measured	40	40	40		

## 6.7 Flower: shape of base of standard

(+)

		CV	R1	R2	R3	R4
strongly raised	1	6.4	7.1	6.4		
raised	3					
level	5					
arched	7					
strongly arched	9					

## 6.8 Flower: shape of apex of upper calyx lobe (observe at second flowering node)

acuminate	1	2	2	2		
pointed	2					
rounded	3					

## 6.9 Flower: length of peduncle from stem to first flower (observe at first flowering node, measure from axil to first node or bend in the peduncle)

(+)

short	3	3	7	5		
medium	5	46mm 81mm 66mm				
long	7					

## 7.0 POD CHARACTERISTICS

## 7.1 Pod: length (observe at second flowering node)

(\*) (+)

mean (mm)	69	74	69		
range	50-77	62-81	55-76		

standard deviation	6	5	5		
no. measured	40	40	40		

## 7.2 Pod: maximum width (observe at second flowering node)

(*) (+)	CV	R1	R2	R3	R4
mean (mm)	12	11	11		
range	10-13	9-12	10-13		
standard deviation	1	1	1		
no. measured	40	40	40		

## 7.3 Pod: thickened wall (varieties with no or partial parchment only, observe on fully developed or swollen pods, not showing any signs of senescence)

absent	1					
present	9					

## 7.4 Pod: parchment (observe when pods are dry and papery; seed should be drying but not hard)

(+)					
absent or partially present	1				
entirely present	9				

## 7.5 Pod: degree of curvature (observe entire plant when pods are fully swollen)

(*) (+)					
absent or very weak	1	1.5	2.5	1.5	
weak	3				
medium	5				
strong	7				
very strong	9				

## 7.6 Pod: direction of seed bearing suture (curvature) (observe when pods fully swollen)



(\*) (+)

concave	1	1	1	1		
convex	2					

7.7 Pod: shape of distal part (varieties without thickened pod wall only, observe when pods fully swollen)

(\*) (+)

		CV	R1	R2	R3	R4
pointed	1	2	2	2		
blunt	2					

7.8 Pod: colour (observe when pods fully swollen)

(\*) (+)

yellow	1	2	2	2		
green	2					
blue green	3					
purple	4					

7.9 Pod: strings of suture (observe varieties with no or partial parchment only when pods are fully swollen)

(+)

absent or rudimentary	1					
present	9					

7.10 Pod: anthocyanin colouration of suture (varieties with anthocyanin only, observe when pods are well developed, beginning to dry out)

(+)

absent	1					
present	9					

7.11 Pod: spots of anthocyanin colouration on outer wall (varieties with anthocyanin only, observe when pods are well developed and beginning to dry out)

(+)

PEA OBJECTIVE DESCRIPTION

APPLICATION NO.

absent	1					
present	9					

7.12 Pod: number of ovules (observe at second fertile node when ovules are partially developed but before senescence)

(\*)

	CV	R1	R2	R3	R4
mean	7	7	7		
range	4-9	6-8	6-8		
standard duration	1	1	1		
no. measured	40	40	40		

7.13 Pod: intensity of green colour of immature seeds (observe when seed is firm, before starchy to taste)

(\*) (+)

light	3	3	3	3		
medium	5					
dark	7					

8.0 SEED CHARACTERISTICS: (+) (observe dry seed)

8.1 Seed: shape of starch grain

(\*) (+)

simple	1	1	1	1		
compound	2					

8.2 Seed: colour of cotyledon

(\*) (+)

green	1	2	2	2		
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yellow	2
red	3

## 8.3 Seed: marbling of testa (varieties with anthocyanin only)

(\*) (+)

absent	1					
present	9					

## 8.4 Seed: violet or pink spots on testa (varieties with anthocyanin only)

(\*) (+)

		CV	R1	R2	R3	R4
absent	1					
faint	2					
intense	3					

## 8.5 Seed: black colour of hilum

(\*) (+)

absent	1					
present	9					

## 8.6 Seed: colour of testa (varieties with anthocyanin only)

reddish brown	1					
brown	2					
brownish green	3					

## 8.7 Seed: shape

spherical	1	2	2	2		
ovoid	2					
irregular	3					

## 8.8 Seed: wrinkling of cotyledon

absent or very weak	1					
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PEA OBJECTIVE DESCRIPTION

APPLICATION NO.

weak	3
medium	5
strong	7
very strong	9

## 8.9 Seed: dimpled cotyledons (varieties with unwrinkled seed and simple starch grains only)

(+)		CV	R1	R2	R3	R4
absent	1	9	9	9		
present	9					

## 8.10 Seed: size

(\*) (+)

small	3	5	5	5		
medium	5					
large	7					

## 8.11 Seed: weight (grams per 1000 seed)

weight in grams	226	216	210		
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## 8.12 Time of maturity (observe hard, dry seed)

early	3	4	4	4		
medium	5	91d	92d	92d		
late	7					

## 9.0 QUALITY CHARACTERISTICS

## 9.1 Protein content

percentage	23	26	25		
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## 9.2 Cooking quality (describe)

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## 10.0 REACTION TO DISEASES

- 0 - not tested
- 1 - resistant
- 3 - moderately resistant
- 5 - moderately susceptible
- 7 - susceptible
- 9 - highly susceptible

		CV	R1	R2	R3	R4
10.1	seedling blight, root rot and wilt <i>Aphanomyces euteiches</i> <i>Fusarium oxysporum</i> f.sp. <i>pisi</i> <i>Fusarium</i> spp. <i>Pythium</i> spp.					
10.2	mycosphaerella blight and ascochyta foot rot <i>Mycosphaerella pinodes</i> <i>Phoma medicaginis</i> var. <i>pinodella</i>					
10.3	ascochyta leaf and pod spot <i>Ascochyta pisi</i>					
10.4	downy mildew <i>Peronospora viciae</i>					
10.5	powdery mildew <i>Erysiphe polygoni</i>	1	1	1		
10.6	bacterial blight <i>Pseudomonas syringae</i> pv. <i>pisi</i>					

10.7	bean yellow mosaic virus					
10.8	other (specify) _____ _____ _____					

- 11.0 Describe chemical traits of the candidate variety that aid in its identification, eg. electrophoresis. Please attach data and the corresponding protocol.

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- 12.0 Describe in detail the kind and approximate percentage of plant types which deviate from the normal type of the candidate variety.

(\*) Under the excessive moisture and prolonged growing season or thin plant stands tall and late maturing may occur in the variety. Such plants have a continued vegetative growth, and taller than other plants by upto 10 cm. These are variants. The frequency of such plants is upto 1%.

- 13.0 Indicate what characteristics are most useful in distinguishing the candidate variety from others.  
(\*) Use objective description key numbers.

2.2, 3.1, 5.3, 5.4, 5.7, 6.7, 6.9, 7.1, 7.5, 8.11, 9.1.



PEA OBJECTIVE DESCRIPTION

APPLICATION NO.

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14.0 Additional comments and characteristics.

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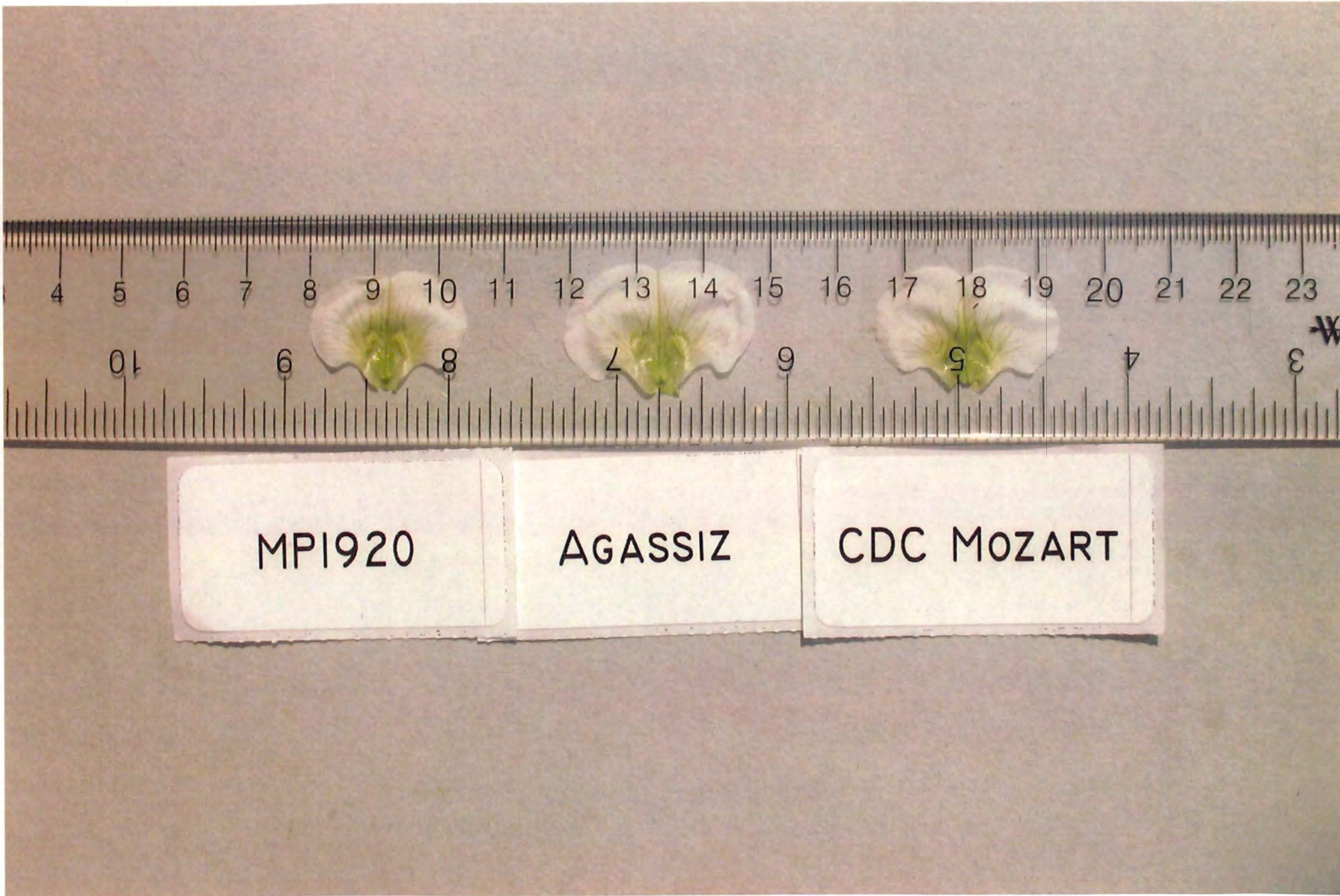
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14-03-96



MPI920

AGASSIZ

CDC MOZART



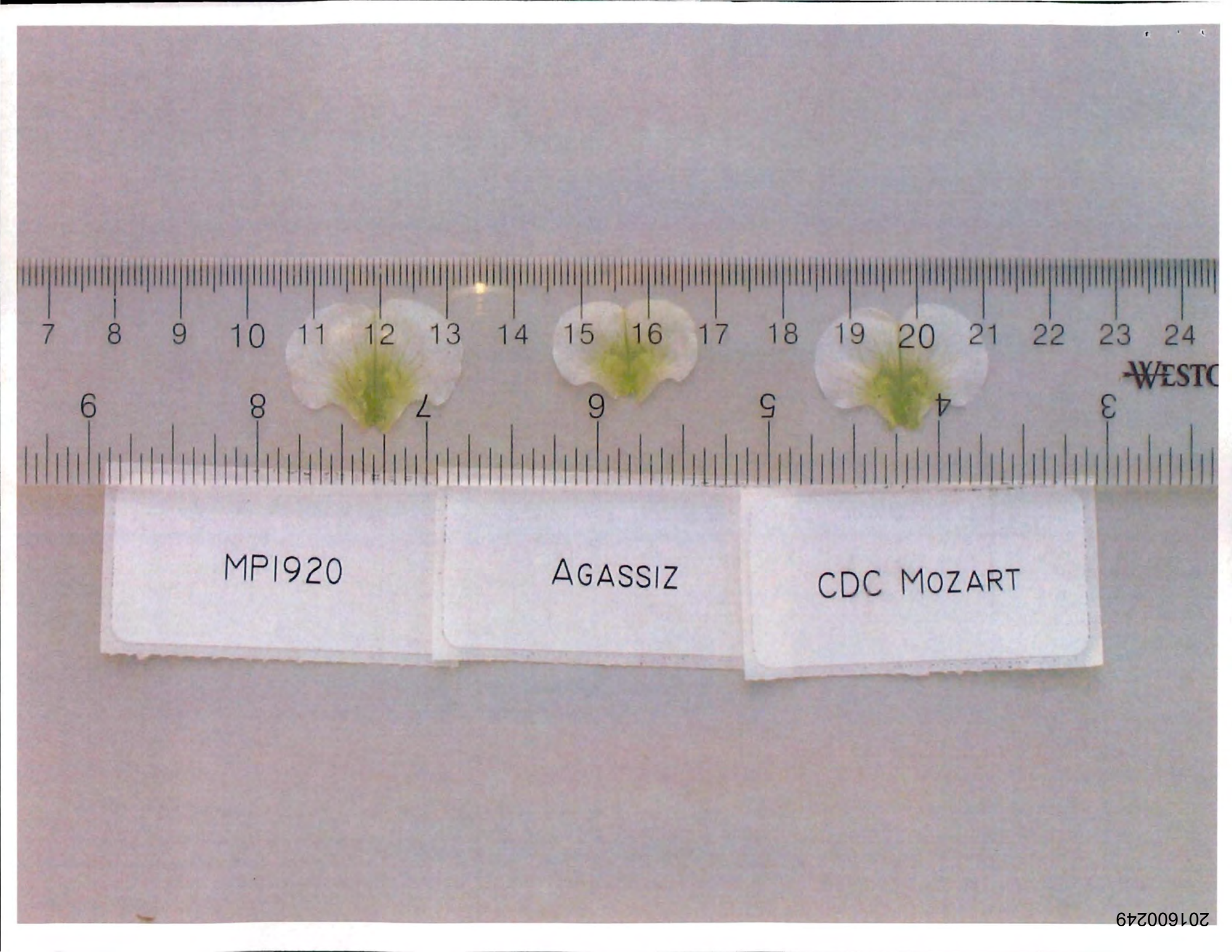


MPI920

AGASSIZ

CDC MOZART



A photograph showing three dried flower specimens placed on a ruler for scale. The ruler is marked in centimeters and millimeters. The specimens are labeled with their respective identifiers: MPI920, AGASSIZ, and CDC MOZART. The flowers are light-colored with a greenish-yellow center. The ruler is a Westcott brand ruler.

MPI920

AGASSIZ

CDC MOZART





CDC MOZART



AGASSIZ



MPI920



## PVP EXHIBIT D

### APPENDIX II

#### METHODS AND ILLUSTRATIONS

##### **2.1 Plant: stem fasciation**

The expression of fasciation varies considerably with environmental conditions, although the presence or absence of fasciation is usually clear.

##### **3.1 Stem: vine length**

The observations should be made on harvested plants at mature green seed stage. The measurement should include nodes with scale leaves. Both plant height at flowering and stem length at mature green seed stage may vary with site and season due to different responses to day length, temperature and soil moisture. Both characteristics are good discriminators within years at one site, however, and allow the separation of different varieties.

##### **3.2 Stem: number of nodes up to and including the first flowering node**

The expression can vary due to flower abortion under certain environmental conditions. Nodes with scale leaves should be included.

##### **3.3 Stem: anthocyanin colouration of axil**

The observations should be made on varieties with anthocyanin colouration. The colour can be reddish purple, or pink.

##### **3.4 Stem: type of anthocyanin colouration of axil**

The observations should be made only on varieties with anthocyanin. The assessment of the expression of colouration of the axil should be made over the whole plant; double rings may not always be clearly defined at any one particular node. The latter is best observed on the underside of the stipules.

##### **4.2 Leaf: average maximum number of leaflets**

The maximum expression should be recorded over the whole plant. Although appearing to be continuously expressed, this characteristic is stable. Occasional plants may have a larger number of leaflets. The maximum number of leaflets for a sample of plants should be recorded and an average value calculated.



PEA OBJECTIVE DESCRIPTION

**4.7 Leaflet/stipules: dentation**

**4.8 leaflet/stipules: degree of dentation**

The observations should be made over the whole main stem, above the lowest six nodes (including basal nodes).



1 - very weak



3 - weak



5 - medium



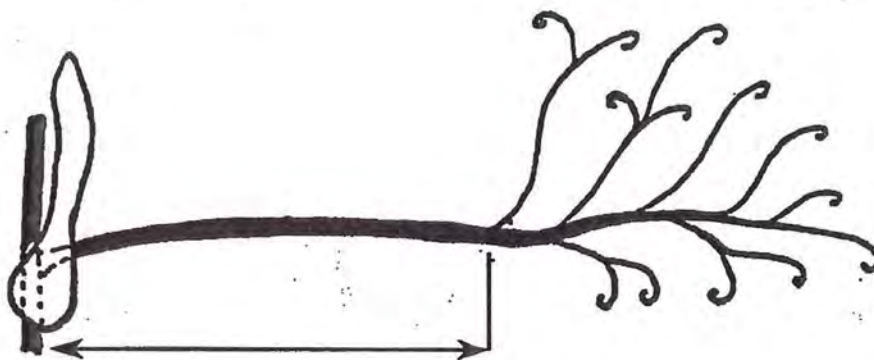
7 - strong



9 - very strong

**4.9 Leaf or tendril: petiole length (varieties without leaflets only)**

The observations should only be made at the second fertile node on varieties without leaflets. The length should be recorded from the axil to the point where the first tendril occurs.



**PEA OBJECTIVE DESCRIPTION**

---

**5.1 Stipule: development**

Rudimentary stipules are lanceolate and surface area is reduced significantly by up to 80%. Plants with 'Rabbit-eared' stipules are not examples of rudimentary stipules.

**5.2 Stipule: 'rabbit-eared' stipules**

'Rabbit-eared stipules are parallel, rather than divergent, with pointed tips.



1 - absent



9 - present

**5.3 Stipule: length**

**5.4 Stipule: width**

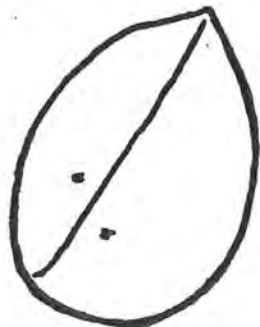
The observations should be made at the second fertile node. Detach stipules from the plant and flatten. Ensure measurement of width of stipule is at widest part of stipule.

## PEA OBJECTIVE DESCRIPTION

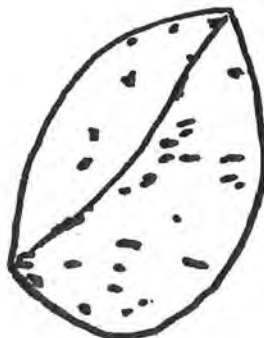
### 5.6 Stipule: flecking

#### 5.7 maximum density of flecking

The observations should be made over the whole plant. Ensure that foliage at the lowest nodes has not senesced before assessment. The plant should have at least eight nodes, since flecking in some varieties may not be expressed at lower nodes.



1 - very sparse



3 - sparse



5 - medium



7 - dense



9 - very dense

### 6.3 Maximum number of flowers per node

The observations should be made only on non-fasciated varieties. The maximum number of flowers per node should be calculated as a mean of a recorded sample. The observations should be made when highest nodes show signs of producing flowers which do not develop beyond the bud stage.



PEA OBJECTIVE DESCRIPTION

**6.4 Flower: anthocyanin colouration of wing**

The observations should be made only on varieties with anthocyanin. The colour of the standard can be influenced by environmental conditions but the colour of the wing is less affected. There are three discontinuous types currently known in commerce.

**6.6 Flower: width of standard**

**6.7 Flower: shape of base of standard**

The observations should be made on a sample from 20 different plants. The standard should be detached from the flower and flattened on a hard surface. The width should be measured at the widest point.



1 - strongly raised

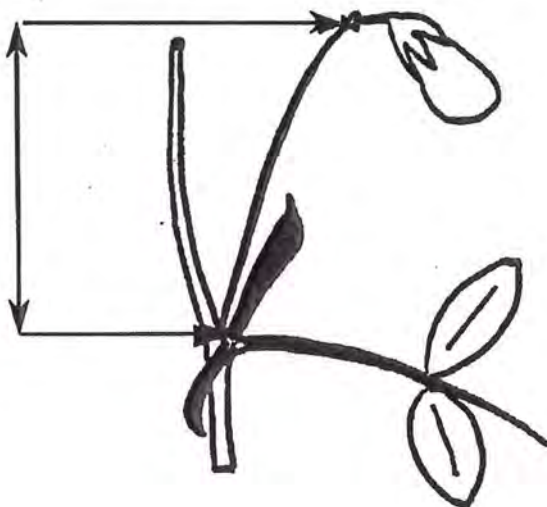
3 - raised

5 - level

7 - arched

9 - strongly arched

**6.9 Flower: length of peduncle from stem to first flower (measure from axil to the first node or bend in the peduncle)**



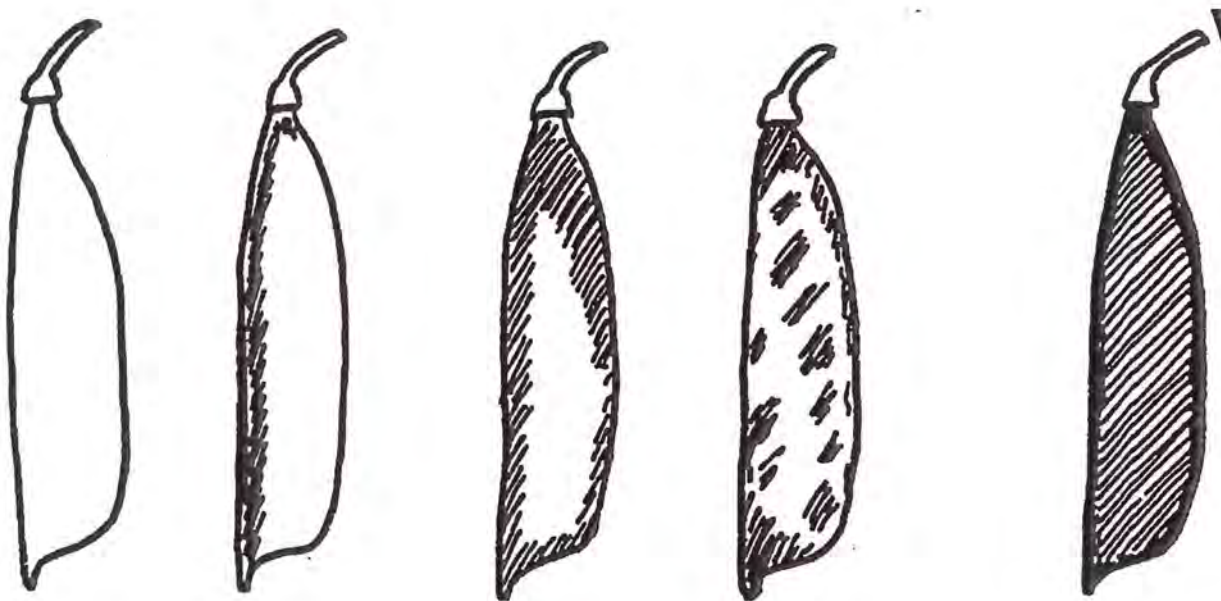
## PEA OBJECTIVE DESCRIPTION

### 7.1 Pod: length

The length should be measured at the second fertile node on a sample of 20 plants. Pods should be fully developed or swollen, not showing any signs of senescence. Green seed should be firm and becoming starchy.

### 7.2 Pod: maximum width

The maximum width should be measured at the second fertile node on a sample of 20 plants. Pods should not show any signs of senescence. The measurements should be taken from suture to suture on unopened pods.



### 7.4 Pod: parchment

absent                      \_\_\_\_\_ partially present \_\_\_\_\_                      entirely present

(1) The observation should be made on a sample from different plants when the pods are dry and papers. (Snap peas are best recorded when green, in order to minimise fungal infection which obscures assessment.)

(2) The pod should be opened along the suture without damaging the edges of the two valves. The distribution of sclerenchyma, which makes up the parchment, may either be observed by staining with Phoroglucinol in Hydrochloric Acid, or by reflecting light (preferably daylight) on the inside of the pod wall.

If parchment for any pod is difficult to determine, pods from other nodes on the same plant should be examined.

PEA OBJECTIVE DESCRIPTION



7.5 Pod: degree of curvature



1 - absent or medium strong  
 3 - weak  
 5 -  
 7 - strong  
 9 - very strong

(curvature)

7.6 Pod: direction of seed bearing suture



## PEA OBJECTIVE DESCRIPTION

**7.7 Pod: shape of distal part**

1 - pointed

2 - blunt

The observations should be made only on varieties without thickened pod wall. They should be made on a sample of plants and on several nodes of each plant when pods are fully developed, but before any senescence. Care should be taken where pods are strongly curved, where the beak is longer than the pod tip, or where parchment is not entire. Some varieties have a blunt tip which is rounded, but the beak is higher up the pod.

**7.8 Pod: colour**

- (1) Each state should be treated separately.
- (2) Varieties with yellow pods may also have milky yellowish peduncles and sepals. In the presence of anthocyanin, colouration of the pods will appear pale red.
- (3) The appearance of green pods is the result of yellow, purple and blue-green colours not being

## PEA OBJECTIVE DESCRIPTION

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expressed.

(4) Blue-green pods are dark and slightly bluish, but not as blue as blue-green foliage. The colour develops with time and may be more accentuated in hotter, drier conditions.

(5) The expression of purple pods can be variable and unstable, disappearing on the same plant or being reduced in its distribution on the pod.

### 7.9 Pod: strings of suture

The observations should be made on fully developed pods. If assessed when pods are not fully developed, strings of suture will be absent or partial. The expression is best observed when temperatures exceed 20 degrees Centigrade. With cooler conditions and/or more developed pods, strings of suture will appear later than normal. The occurrence of less wrinkled seeds in compound starch grain types appears to be associated with the absence or reduction of strings of suture.

### 7.10 Pod: anthocyanin colouration of suture

The observations should be made on varieties with anthocyanin. They should be made over the whole plant when pods are well developed and are beginning to dry out.

### 7.11 Pod: spots of anthocyanin colouration on outer wall

The observations should be made only on varieties with anthocyanin. They should be made over the whole plant when pods are well developed and are beginning to dry out. If present, several fine spots of anthocyanin appear on the pod wall - often in an area around, or on top of, the underlying seeds.

### 7.13 Pod: intensity of green colour of immature seed

(1) The observations should be made when the seed is firm, but before seeds become starchy to taste.

(2) Seed colour of green cotyledon types may appear creamy white before the seed is fully developed.

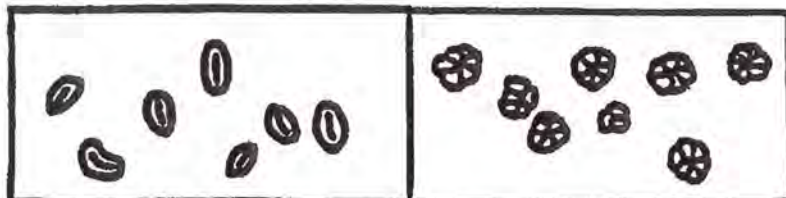
(3) Varieties with blue-green pods may also have very dark green seed colour.

## 8.0 DRY SEED CHARACTERISTICS

The seed should be mature and preferably not severely bleached, the assessment should be carried out within nine months after harvest. For varieties with anthocyanin pigment, tannins in the testa often darken with age, (usually after nine months) obscuring many characteristics. The observation is most clear under conditions of bright natural light; the assessment of some characteristics is difficult under artificial light.

### 8.1 Seed: shape of starch grain

## PEA OBJECTIVE DESCRIPTION



(1) After removing the testa, fine fragments of tissue should be extracted from the cotyledon and examined after have in added water and been squashed

gently between two microscope slides. Too much pressure during squashing results in fragmentation of the grains, too little pressure will not provide a layer thin enough for easy examination. This works best on pea flour (finely ground pea seed).

(2) A microscope with transmitted light, using x16 eye-pieces and either x10 or x40 objectives, is most suitable for examination. For examination of compound grains, the larger objectives will be required.

(3) Simple grains resemble wheat seeds or coffee beans in shape, often with what looks like a suture line running along their length.

(4) Compound grains look irregularly star-shaped and appear to be made of a number of segments. The center of the grains may appear cross-shaped. Too much pressure during squashing causes fragmentation.

1 - simple

2 - compound

## 8.2 Seed: colour of cotyledon

The expression varies with environmental conditions:

- (i) bleaching, caused by sunlight or chemical changes in the plant, can remove colour from both green and yellow cotyledon seeds;
- (ii) colour becomes dull with age, even if seed is stored in cold, dark conditions;
- (iii) colour can darken in the presence of high amounts of Tragacanth oil occurring on the underside of the testa. This fades as the seed ages.

There is a range of colour from yellow to orange yellow and from pale to dark green.

## 8.3 Seed: marbling of testa

The observations should be made only on varieties with anthocyanin. The marbling is most easily observed on seeds which have tannin in the testa, but can also occur on seeds without tannin, giving the impression of slightly dirty seeds; this is known as ghost marbling.



**8.4 Seed: violet or pink spots on testa**

The observation should be made only on varieties with anthocyanin. Only clearly defined faint or intense spots of anthocyanin should be recorded.

**8.5 Seed: black colour of hilum**

(1) The hilum colour can be influenced by the presence of tannin in the testa. If any loose tissue is present, the hilum area should be lightly polished with a cloth before recording.

(2) Spontaneous mutation from melanin absent to melanin present can occur. This appears to be more prevalent in coloured flowered types. The mutation rate is unknown.

**8.7 Seed: shape**

The shape can be influenced by environmental conditions, although it is generally consistent from year to year, provided the seed has reached its full development.

**8.8 Seed: wrinkling of cotyledon**

The observations should be made on harvested seed. 'Golf ball' and large dimples should be ignored as these can also be found on smooth seeded (non-wrinkled) types. Cylindrically shaped seed types should be assessed carefully, because some are smooth seeded.

**8.9 Seed: dimpled cotyledons**

The observations should be made on varieties with simple starch grains and unwrinkled seeds only. The expression appears as a slight "rippling" of the testa surface and should not be confused with wrinkling. Most "marrowfat" varieties have dimpled seeds.

**8.10 Seed: size**

The observations should be made on harvested seed only. The weight varies markedly from site to site but can be useful as a discriminator; it varies to a lesser extent from season to season at one site. Immature and infected seeds should be excluded; the seed should be dry (approximately 10-15% moisture content) at time of recording.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE  
APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

FOR OFFICIAL USE ONLY	
PVPO NUMBER	

EXHIBIT E - STATEMENT OF THE BASIS OF OWNERSHIP

1 Name of Owner Agriculture & Agri-Food Canada, Lacombe	2. Temporary Designation or Experimental Name MP1920, P0405 12	3 Variety Name AAC Carver
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4. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.  YES  NO

As the US licensee, Meridian Seeds is applying for PVP on the owner's behalf (i.e. Agriculture & Agri-Food Canada, Lacombe).

5. Is the applicant a U.S. national or a U.S. based entity? If no, give name of country.  YES  NO

6. Is the applicant the original owner?  YES  NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?  YES  NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?  YES  NO If no, give name of country **CANADA**

7. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

The breeder of this variety Dr. DengJin Bing is employed by Agriculture and Agri-Food Canada. A a Crown employee, as per Section 3 of the Public Servants Inventions Act P-32 of Canada all inventions made by public servants acting within the scope of their duties belong to her Majesty the Queen in Right of Canada. Management of inventions owned by the Crown is delegated to government departments and to individuals who have been authorized to sign on behalf of the Crown.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet 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 UPOV 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 UPOV 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 owner, both the original owner and the applicant must meet one of the above criteria.

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