No. 200800173

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Crop Development Centre

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 therefrom, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CHICKPEA

'CDC Frontier'

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-ninth day of December, in the year* ***two thousand and ten.***

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

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

Form Approved - OMB No. 0581-0055

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

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

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.

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

1. NAME OF OWNER
Crop Development Centre

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
95NN-29

3. VARIETY NAME
CDC Frontier

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
4D36 Agriculture Building.
51 Campus Drive
Saskatoon, SK S7N5A8 Canada

5. TELEPHONE *(include area code)*
306-966-5855

6. FAX *(include area code)*
306-966-5015

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PVPO NUMBER
200800173

FILING DATE
3/24/08

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
University.

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Anastasia Kubinec
Canterra Seeds
201-1475 Chevrier Blvd.
Winnipeg, MB R3T 1Y7 Canada.

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 4382.00
DATE 3/24/08

CERTIFICATION FEE:
$ 768.00
DATE 11/22/10

11. TELEPHONE (Include area code)
204-988-9750

12. FAX (Include area code)
204-487-7682

13. E-MAIL
a.kubinec@canterra.com.

14. CROP KIND *(Common Name)*
Chickpea

16. FAMILY NAME *(Botanical)*
Leguminosae

15. GENUS AND SPECIES NAME OF CROP
Cicer arietinum L.

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☑ NO

18. DOES THE VARIETY CONTAIN ANY TRANSGENES? *(OPTIONAL)*
☐ YES ☑ NO
IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION. _____

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

- a. ☑ Exhibit A. Origin and Breeding History of the Variety
- b. ☑ Exhibit B. Statement of Distinctness
- c. ☑ Exhibit C. Objective Description of Variety
- d. ☐ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☑ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☑ Exhibit F. Declaration Regarding Deposit
- g. ☑ Voucher Sample *(3,000 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- h. ☑ Filing and Examination Fee ($4,382), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

with check 3/24/08 application.

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)*
☐ YES *(If "yes", answer items 21 and 22 below)*
☑ NO *(If "no", go to item 23)*
☐ UNDECIDED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES?
☐ YES ☑ NO
IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☑ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

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?
☑ YES ☐ NO sold in Canada as certified seed in 2005
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.)*

24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☑ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a luber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner 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.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
Anastasia Kubinec			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Anastasia Kubinec			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
agent for Crop Development Centre for CDC Frontier	April 22/08		

ST-470 (02-05) designed by the Plant Variety Protection Office using Word 2003.

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#200800173

(See reverse for instructions and information collection burden statement)

GENERAL INSTRUCTIONS: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E, F; (3) for a tuber reproduced variety, verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; and (4) payment by credit card or check drawn on a U.S. bank for $4,382 ($518 filing fee and $3,864 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice)*. **NEW:** With the application for a seed reproduced variety **or by direct deposit soon after filing**, the applicant must provide at least 3,000 viable untreated seeds of the variety *per se*, and for a hybrid variety at least 3,000 untreated seeds of each line necessary to **reproduce** the variety. Partial applications will be held in the PVPO for not more than 90 days; then returned to the applicant as un-filed. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a payment by credit card or check payable to "Treasurer of the United States" in the amount of $768 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

Plant Variety Protection Office
Telephone: (301) 504-5518 **FAX:** (301) 504-5291
General E-mail: PVPOmail@usda.gov
Homepage: http://www.ams.usda.gov/science/pvpo/PVPindex.htm

SPECIFIC INSTRUCTIONS:
To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and **provide evidence** that the permanent name of the application variety (even if it is a parental, inbred line) has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: U.S. Department of Agriculture, Agricultural Marketing Service, Livestock and Seed Programs, **Seed Regulatory and Testing Branch**, 801 Summit Crossing Place, Suite C, Gastonia, North Carolina 28054-2193 Telephone: (704) 810-8870. http://www.ams.usda.gov/lsg/seed.htm.

ITEM

19a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach replicated statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

20. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

23. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

24. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

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

N/A

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.)*

Sold in USA in May 2007.

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).)*

N/A

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CDC Frontier Chickpea (*Cicer arietinum*) Plant Variety Protection Application

Exhibit A: Origin and Breeding History

CDC frontier kabuli chickpea was developed from the cross FLIP 91-22C/ICC 14912 in 1993. FLIP 91-22C was developed by the International Center for Agricultural Research in Dry Areas (ICARDA) in Aleppo, Syria. ICC 14912 was developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Pantancheru, India. The F_2-derived family breeding method was used in the development of CDC Frontier.

F_2-derived F_3 families were evaluated in the field in Saskatoon in three-row, $1.5m^2$ microplots, with selection based on improved ascochyta blight resistance, early maturity, grain yield, and appropriate seed size, seed shape and seed coat color.

Replicated yield testing of selected F_2-derived F_4 families was conducted in Saskatoon, SK, followed by multi-location testing in the F_5 generation at Saskatoon, Elrose, and Swift Current. A promising line, 95NN-29, was identified from these trials and tested in the Saskatchewan Regional Chickpea trial in 2001-2003, coordinated by the Saskatchewan Advisory Council on Grain Crops. Line 95NN-29 was re-named CDC Frontier in 2003. Breeder seed was produced in 2002 at Saskatoon, concurrent with regional testing, by bulking 24 F_5-derived F_9 pre-breeder lines.

CDC Frontier can be distinguished from direct parents by:
Seed size, days to maturity and reaction to ascochyta blight.

Statement on Uniformity and Stability:

CDC Frontier has been observed for 7 generations of increase and is stable and uniform.

Variants appear in CDC Frontier as purple flowers at an acceptable frequency of 2 in 10,000 at Breeder seed level, 4 in 10,000 at Select seed level, 6 in 10,000 at Foundation seed level, 8 in 10,000 at registered seed level and 10 in 10,000 at certified seed level, or

Variants appear in CDC Frontier as unifoliate leaf at an acceptable frequency of 2 in 10,000 at Breeder seed level, 4 in 10,000 at Select seed level, 6 in 10,000 at Foundation seed level, 8 in 10,000 at registered seed level and 10 in 10,000 at certified seed level, or

Variants appear in CDC Frontier as tall (60 cm) at an acceptable frequency of 2 in 10,000 at Breeder seed level, 4 in 10,000 at Select seed level, 6 in 10,000 at Foundation seed level, 8 in 10,000 at registered seed level and 10 in 10,000 at certified seed level, or

Variants appear in CDC Frontier as green cotyledons at an acceptable frequency of 2 in 10,000 at Breeder seed level, 4 in 10,000 at Select seed level, 6 in 10,000 at Foundation seed level, 8 in 10,000 at registered seed level and 10 in 10,000 at certified seed level.

These variants, besides the indicated characteristic at the specific acceptable levels at each seed multiplication stage are identical to the variety in all other characteristics as described in Exhibit C.

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DRAFT Exhibit B Form

Based on overall morphology, CDC Frontier (*Applicant's new variety*) is most similar to Sanford (*Most similar comparison variety(ies)*).

CDC Frontier (*Applicant's new variety*) most clearly differs from Sanford (*Most similar comparison variety(ies)*) in the following traits:

Name the specific trait, then list the value of that trait for each variety in the comparison. Attach appropriate supporting evidence (see the Guidelines for Presenting Evidence in Support of Variety Distinctness, available from the PVP Office or website).

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:	Applicant's New Variety CDC Frontier	1st Comparison Variety Sanford.	Location of Evidence
2. Color traits:			
3. Quantitative traits: eg. Days to Flower eg. Days to Mature eg. Plant Height eg. Seed Weight	52 days 124 days 51 cm 402 g/1000 seeds	57 days 136 days 39 cm 539 g/1000 seeds	Saskatoon 2002 Cadillac 2002 Saskatoon 2002 Carmanguay 2002
4. Other:			

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

4

Exhibit B: Statement of Distinctiveness

Exhibit B: Statement of Distinctiveness

Table 1, 2, and 3 describe the distinctiveness of CDC Frontier from the most similar cultivars of kabuli chickpea.

Table 1. Summary of agronomic characters (days to flowering, days to maturity, plant height and 1000 seed weight) of CDC Frontier and the checks at several locations in Saskatchewan (Saskatoon, Swift Current, Outlook, Cadillac) and Alberta (Barons and Carmangay) from 2001 and 2002 trials.

2001	Days to flowering			Days to maturity		Plant height (cm)			1000 seed weight (g)	
Variety/Location	Saskatoon	Swift Current	Outlook	Swift Current	Outlook	Saskatoon	Swift Current	Outlook	Outlook	Barons (AB)
Sanford	58	58	53	107	99	41	43	48	443	374
Amit	55	56	51	100	96	38	38	47	259	231
CDC Frontier	**56**	**56**	**52**	**101**	**97**	**32**	**37**	**47**	**375**	**335**
CV (%)	1.70	1.66	1.90	1.33	1.11	6.16	4.86	7.33	4.14	3.40
LSD (5%)	1.31	1.29	1.34	1.92	1.53	3.01	2.50	4.92	23.87	16.39

2002	Days to flowering			Days to maturity		Plant height (cm)			1000 seed weight (g)	
Variety/Location	Saskatoon	Swift Current	Outlook	Swift Current	Cadillac	Saskatoon	Swift Current	Outlook	Outlook	Carmangay (AB)
Sanford	57	56	53	142	136	39	48	57	399	539
Amit	52	55	51	134	123	49	44	51	339	312
CDC Frontier	**52**	**54**	**52**	**134**	**124**	**51**	**42**	**54**	**397**	**402**
CV (%)	1.53	1.30	2.57	0.39	1.43	13.86	4.67	7.62	6.76	6.2
LSD (5%)	1.11	0.97	1.83	0.74	2.51	9.40	2.81	5.71	19.28	18.8

(CV= coefficient of variation; LSD= Least significant difference)

Chickpea evaluation for each location and year was arranged in a randomized complete block design with three replications. A 4-row plot with plot size 1.2 m x 3.6 m was used. Data analyses were done using PROC GLM of the SAS program followed by the Least Significant Difference analysis (at 5% level). Seeding date ranged between the first and the third week of May in each year depending on the location. Summaries of four characters differentiating CDC Frontier with the other two checks from the 2001 and 2002 trials across Saskatchewan and Alberta are listed in Table 1.

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Table 2. Reaction to ascochyta blight of Amit, CDC Frontier and Sanford. Disease score was average of 10 plants under greenhouse conditions.
(Disease reaction was rated on a 0 – 9 scale; 0 = no symptoms; 9 = plants are completely blighted/dead)

	Reaction to Ascochyta blight	
Variety	Disease score	Standard error
Sanford	8.50	0.50
Amit	4.52	0.58
CDC Frontier	4.58	0.52

(Disease inoculation procedure/conditions and rating was described in: Tar'an, B., Warkentin, T.D., Tullu, A. and Vandenberg, A. 2007. Genetic Relationships among Chickpea (*Cicer arietinum* L.) Genotypes Based on the SSRs at the Quantitative Trait Loci for Resistance to Ascochyta Blight. *European Journal of Plant Pathology* 119 39–51)

Table 3. Selected SSR allele profiles at Linkage Group (LG) 1, 2, 4 and 8 differentiating cultivars Amit, CDC Frontier and Sanford. Cultivars with the same letter at a given SSR locus share the same allele.

Cultivars	LG1		LG2					LG4		LG8	
	STMS28	TS12	GA20	GA16	TR19	TA22s	TA176s	TS72	TA2	TS45	TA3
Amit	c	hj	c	a	h	b	j	f	b	c	a
CDC Frontier	c	hj	f	g	g	g	i	e	b	c	b
Sanford	b	eg	e	f	d	e	i	e	a	b	b

(The SSR marker loci and linkage group was described in: Winter P, Pfaff T, Udupa SM, Hüttel B, Sharma PC, Sahi S, Arreguin-Espinoza R, Weigand F, Muehlbauer FJ and Kahl G (1999) Characterization and mapping of sequence-tagged microsatellite sites in the chickpea (*Cicer arietinum* L.) genome. Mol Gen Genet 262:90–101

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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
GENERAL FORM FOR ANY SPECIES

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
Crop Development Centre	95NN-29	CDC Frontier

ADDRESS (Street and No. or RD No., City, State, Zip Code, and Country)
4D36 Agriculture Building
51 Campus Drive
Saskatoon, SK S7N 5A8 Canada

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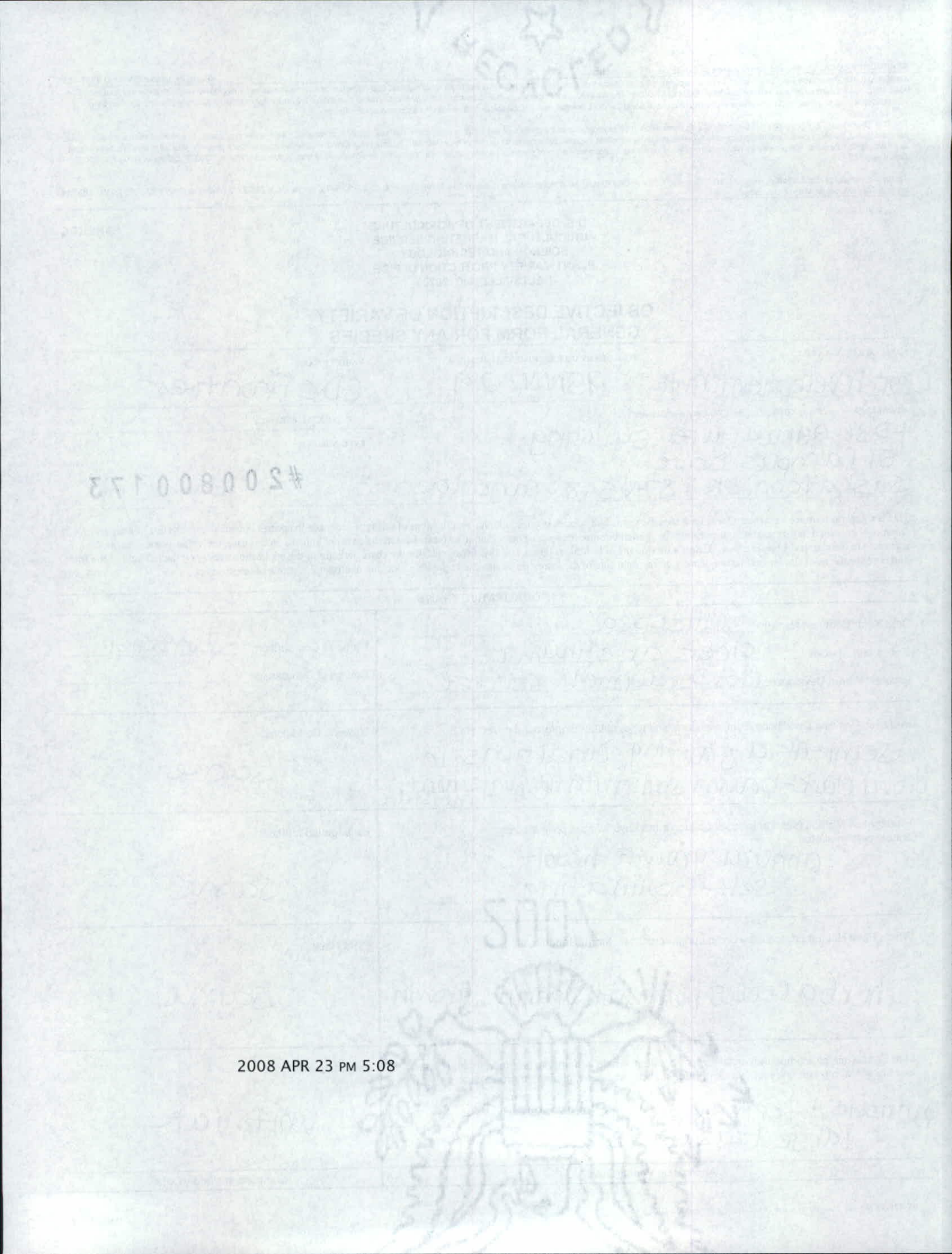
This is a general form for use when a form for a specific genus and species is not available. Applications of this type are made in species in which few varieties, if any, are commonly known. For that reason, a form cannot be drafted because the span of the variation of most characteristics is not known. In this case, the varieties are described according to the classical Linnaean way. **Using a dictionary of botanical terms and this form,** describe the characteristics of the application variety on the left side of the form **and** describe the most similar comparison variety on the right side of the form. Be as specific as possible. Include photographic prints of the varieties.

1. QUALITATIVE TRAITS

Crop Kind (Common Name): Chickpea Genus and Species: Cicer arietinum L. Location Where Developed: Crop Development Centre	Name of Comparison: Sanford. Source of Comparison:
Preferred Growing Conditions (light, moisture, soil type, pot/bedding/ground cover, etc.): Semi-arid growing conditions in brown, dark-brown soils with adequate heat, moisture.	Growing Conditions: same
Propagation Method (seed/tuber/cuttings/etc.; inbred/hybrid/open pollinated/etc.; annual/perennial/etc.): annual growth habit. Self-pollinating	Propagation Method: same
Whole Plant Habit (herbaceous/woody; upright/prostrate; thorns; tendrils; etc.): herbaceous plant with upright growth.	Plant Habit: same
Leaf Shape (simple/compound; arrangement on stem; whole leaf shape; leaf margin; leaf base; leaf apex; leaf attachment; leaf venation; pubescence; waxiness; glands; fragrance; etc.): pinnate "fern type" leaf with large leaflet size	Leaf Shape: unifoliate
Application Variety Data	Comparison Variety Data



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1. QUALITATIVE TRAITS (continued)

Application Variety Data	Comparison Variety Data (Sanford)
Flowers (inflorescence type; floret shape; bud; sepals; petals; stigma; stamen; pollen; etc.) white flowers	Flowers: same
Fruits (type; surface features; attachment; seeds; etc.)	Fruits and Seeds:

2. QUANTITATIVE TRAITS

		Trait	Average (Mean)	Standard Deviation	Sample Size	Trait	Average (Mean)	Standard Deviation	Sample Size
		Number of Chromosomes (1N)				Number of Chromosomes (1N)			
MATURITY	From Direct Seeding	Days from emergence to first flower				Days from emergence to first flower			
		Days from emergence to 50% of plants in flower				Days from emergence to 50% of plants in flower			
		Days from first flower to last flower				Days from first flower to last flower			
	From Trans-Planting	Days from transplant to first flower				Days from transplant to first flower			
		Days from transplant to 50% of plants in flower				Days from transplant to 50% of plants in flower			
		Days from first flower to last flower				Days from first flower to last flower			
	From Pack Trials	Days from emergence to first flower				Days from emergence to first flower			
		Days from emergence to 50% of plants in flower				Days from emergence to 50% of plants in flower			
		Days from first flower to last flower				Days from first flower to last flower			
PLANT		mm Plant Height at Maturity				mm Plant Height at Maturity			
		mm Plant Width (Spread) at Maturity				mm Plant Width (Spread) at Maturity			
		Number of Stems Arising from Base of Plant				Number of Stems Arising from Base of Plant			
		mm Main Stem Length				mm Main Stem Length			
		mm Main Stem Diameter at Mid-point				mm Main Stem Diameter at Mid-point			
		Number of Branches (arising from lower half of main stem)				Number of Branches (arising from lower half of main stem)			
		Branch Angle from Main Stem				Branch Angle from Main Stem			
		Application Variety Data				Comparison Variety Data			

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2. QUANTITATIVE TRAITS (continued)

	Application Variety Data				Comparison Variety Data			
	Trait	Average (Mean)	Standard Deviation	Sample Size	Trait	Average (Mean)	Standard Deviation	Sample Size
LEAVES	Leaf Angle from Main Stem				Leaf Angle from Main Stem			
	mm Width of Leaf				mm Width of Leaf			
	mm Length of Leaf Including Petiole				mm Length of Leaf Including Petiole			
	mm Thickness of Leaf				mm Thickness of Leaf			
	mm Length of Petiole				mm Length of Petiole			
	mm Width of Leaflet				mm Width of Leaflet			
	mm Length of Leaflet				mm Length of Leaflet			
INFLORESCENCE	mm Inflorescence Height from Ground				mm Inflorescence Height from Ground			
	mm Inflorescence Width (Diameter)				mm Inflorescence Width (Diameter)			
	mm Depth of Head or Inflorescence				mm Depth of Head or Inflorescence			
	Number of Florets Per Inflorescence				Number of Florets Per Inflorescence			
	mm Length of Peduncle				mm Length of Peduncle			
INDIVIDUAL FLORET	Number of Sepals per Floret				Number of Sepals per Floret			
	Number of Petals per Floret				Number of Petals per Floret			
	Number of Anthers per Floret				Number of Anthers per Floret			
	Number of Stigmas per Floret				Number of Stigmas per Floret			
	mm Floret Diameter				mm Floret Diameter			
	mm Eye Diameter				mm Eye Diameter			
	mm Petal Length (ray flower if Compositae)				mm Petal Length (ray flower if Compositae)			
	mm Petal Width (ray flower if Compositae)				mm Petal Width (ray flower if Compositae)			
	mm Disk Flower Length (Compositae only)				mm Disk Flower Length (Compositae only)			
	mm Disk Flower Width (Compositae only)				mm Disk Flower Width (Compositae only)			
	mm Sepal Length				mm Sepal Length			
	mm Sepal Width				mm Sepal Width			
	Application Variety Data				Comparison Variety Data			

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2. QUANTITATIVE TRAITS (continued)

	Application Variety Data				Comparison Variety Data			
	Trait	Average (Mean)	Standard Deviation	Sample Size	Trait	Average (Mean)	Standard Deviation	Sample Size
INDIVIDUAL FRUIT	mm Fruit Length				mm Fruit Length			
	mm Fruit Width				mm Fruit Width			
	mm Fruit Thickness				mm Fruit Thickness			
	gm Fruit Weight				gm Fruit Weight			
	mm Fruit Rind or Skin Thickness				mm Fruit Rind or Skin Thickness			
	mm Fruit Flesh Thickness				mm Fruit Flesh Thickness			
	Number of Locules (Cavities) per Fruit				Number of Locules (Cavities) per Fruit			
	mm Cavity Width				mm Cavity Width			
	mm Cavity Length				mm Cavity Length			
	Number of Seeds per Fruit				Number of Seeds per Fruit			
SEEDS	mg Weight per 1000 Seeds				mg Weight per 1000 Seeds			
	mm Seed Length				mm Seed Length			
	mm Seed Width				mm Seed Width			
	mm Seed Thickness				mm Seed Thickness			
OTHER								

3. PLANT COLORS

	Color Verbal Name	Color Chart Code	Name of Color Chart		Color Verbal Name	Color Chart Code	Name of Color Chart
Example	Light Blue	106C	RHS				
Hypocotyl Color				Hypocotyl Color			
Cotyledon Color				Cotyledon Color			
Brace Root Color				Brace Root Color			
Main Stem Color, Mature				Main Stem Color, Mature			
Leaf or Leaflet Color, Dorsal				Leaf or Leaflet Color, Dorsal			
Leaf or Leaflet Color, Ventral				Leaf or Leaflet Color, Ventral			
Leaf or Leaflet Venation Color				Leaf or Leaflet Venation Color			
Leaf Color, Other (describe location or placement)				Leaf Color, Other (describe location or placement)			
	Application Variety Data				Comparison Variety Data		

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3. PLANT COLORS (continued)

Application Variety Data				Comparison Variety Data			
	Color Verbal Name	Color Chart Code	Name of Color Chart		Color Verbal Name	Color Chart Code	Name of Color Chart
Petiole Color				Petiole Color			
Tendril Color				Tendril Color			
Thorn Color				Thorn Color			
Bud (Unopened Flower) Color				Bud (Unopened Flower) Color			
Stigma Color				Stigma Color			
Style Color				Style Color			
Ovary (Immature Flower) Color				Ovary (Immature Flower) Color			
Pollen Color				Pollen Color			
Anther Color				Anther Color			
Filament Color				Filament Color			
Petal Color, Main				Petal Color, Main			
Petal Color, Edges (Picotee)				Petal Color, Edges (Picotee)			
Petal Color, Blotches				Petal Color, Blotches			
Petal Color, Streaks				Petal Color, Streaks			
Petal Color, Spots				Petal Color, Spots			
Petal Color, Veins				Petal Color, Veins			
Petal Color, Eye				Petal Color, Eye			
Petal Color, Throat				Petal Color, Throat			
Petal Color, Disk Flowers (Compositae only)				Petal Color, Disk Flowers (Compositae only)			
Floral Color, Other (describe location or placement)				Floral Color, Other (describe location or placement)			
Sepal Color				Sepal Color			
Mature Fruit Color, Skin				Mature Fruit Color, Skin			
Mature Fruit Color, Flesh				Mature Fruit Color, Flesh			
Fruit Color, Other (describe location or placement)				Fruit Color, Other (describe location or placement)			
Seed Coat Color				Seed Coat Color			
Seed Embryo Color				Seed Embryo Color			
Seed Structure Color, Other (describe location or placement)				Seed Structure Color, Other (describe location or placement)			
Application Variety Data				Comparison Variety Data			

Note: Common Color Charts: RHS = Royal Horticultural Society Colour Chart
Munsell = Munsell Book of Color
HCC = Horticultural Colour Chart
BCC = British Colour Council Dictionary of Colour Standards

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4. DISEASE, INSECT AND ENVIRONMENT RESISTANCE
(Rate from 1 (most susceptible) to 9 (most resistant))

Application Variety Data	Comparison Variety Data
___ Powdery Mildew	___ Powdery Mildew
___ Other (Specify) _____	___ Other (Specify) _____
___ Aphids	___ Aphids
___ Other (Specify) _____	___ Other (Specify) _____
___ Heat	___ Heat
___ Cold	___ Cold
___ Lodging	___ Lodging
___ Wind	___ Wind
___ Other (Specify) _____	___ Other (Specify) _____

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Hay, R., P.M. Synge. 1991. *The Colour Dictionary of Garden Plants with House and Greenhouse Plants.* Bloomsbury Books, London.
Munsell Color Chart for Plant Tissues. Macbeth. P.O. Box 230 Newburgh, N.Y. 12551-0230
The Wise Garden Encyclopedia. 1990. HarperCollins Publishers. New York, N.Y.

COMMENTS (Attach photographic prints; Continue in Exhibit D)

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TG/143/4
ORIGINAL: English
DATE: 2005-04-06

UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

#2008000173

CHICK-PEA

UPOV code: CICER_ARI

(*Cicer arietinum* L.)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Cicer arietinum L.	Chick-Pea	Pois chiche	Kichererbse	Garbanzo

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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TABLE OF CONTENTS PAGE

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Cicer arietinum* L.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seed.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

3 000 seeds

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should be stated by the applicant.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

The minimum duration of tests should normally be two independent growing cycles.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 "Examining Distinctness".

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics:

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MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

3.4 Test Design

Each test should be designed to result in a total of at least 100 plants, which should be divided between two or more replicates.

The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations should be made on 20 plants or parts taken from each of 20 plants.

3.6 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

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4.2 Uniformity

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 For the assessment of uniformity, a population standard of 1 % and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 100 plants, 3 off-types are allowed.

4.3 Stability

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Flower: color (characteristic 7)
(b) Seed: color (1 month after harvest) (characteristic 13)
(c) Seed: shape (characteristic 16)
(d) Seed: ribbing (characteristic 17)
(e) Time of flowering (80% of plants with at least one flower) (characteristic 18)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

(*) Asterisked characteristic – see Chapter 6.1.2

QL: Qualitative characteristic – see Chapter 6.3
QN: Quantitative characteristic – see Chapter 6.3
PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG: single measurement of a group of plants or parts of plants – see Chapter 3.3.2
MS: measurement of a number of individual plants or parts of plants - see Chapter 3.3.2
VG: visual assessment by a single observation of a group of plants or parts of plants - see Chapter 3.3.2
VS: visual assessment by observation of individual plants or parts of plants - see Chapter 3.3.2

(a)-(b) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.

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7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. (*)	**MS/ VS**	**Plant: habit (after flowering)**	**Plante: port (après floraison)**	**Pflanze: Wuchsform (nach der Blüte)**	**Planta: porte (después de la floración)**		
QN		erect	dressé	aufrecht	erecto	Cascari, Casoar, Castor, Jazz Sombrero	1
		semi-erect	demi-dressé	halbaufrecht	semierecto	Flamenco, Lambada	3
		prostrate	étalé	liegend	postrado	Sirtaki	5
2.	**VS**	**Plant: ramification**	**Plante: ramification**	**Pflanze: Verzweigung**	**Planta: ramificación**		
QN	**(a)**	weak	faible	gering	débil	Castor, Jazz, Lambada	3
		medium	moyenne	mittel	media	Cascari, Rondo, Sombrero, Flamenco	5
		strong	forte	stark	fuerte		7
3. (*)	**MS/ VG**	**Plant: height (when pods fully developed)**	**Plante: hauteur (à complet développement des gousses)**	**Pflanze: Höhe (wenn Hülsen voll entwickelt)**	**Planta: altura (cuando las vainas estén completamente desarrolladas)**		
QN		short	courte	niedrig	baja	Castor, Sombrero	3
		medium	moyenne	mittel	media	Cabri, Cascari, Sirtaki, Twist	5
		tall	haute	hoch	alta	Elvar, Lambada, Salsa	7
4. (*)	**VS**	**Stem: anthocyanin coloration**	**Tige: coloration anthocyanique**	**Stengel: Anthocyanfärbung**	**Tallo: pigmentación antociánica**		
QL	**(a)**	absent	absente	fehlend	ausente	Sirtaki, Twist, Flamenco	1
		present	présente	vorhanden	presente	Castor, Sombrero	9

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		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
5. (*)	**VS**	**Foliage: intensity of green color**	**Feuillage: intensité de la couleur verte**	**Laub: Intensität der Grünfärbung**	**Follaje: intensidad del color verde**		
QN	**(a)**	light	claire	hell	claro	Sirtaki	3
		medium	moyenne	mittel	medio	Cascari, Salsa	5
		dark	foncée	dunkel	oscuro	Lambada, Rondo, Sombrero	7
6. (*)	**MS/ VS**	**Leaflet: size**	**Foliole: taille**	**Blattfieder: Größe**	**Folíolo: tamaño**		
QN	**(a)**	very small	très petite	sehr klein	muy pequeño	Castor	1
		small	petite	klein	pequeño	Flamenco, Sirtaki	3
		medium	moyenne	mittel	medio	Cascari, Salsa, Twist	5
		large	grande	groß	grande	Casoar, Flamenco	7
		very large	très grande	sehr groß	muy grande	Lambada	9
7. (*)	**VG**	**Flower: color**	**Fleur: couleur**	**Blüte: Farbe**	**Flor: color**		
QL		white	blanche	weiß	blanco	Sirtaki, Twist	1
		purplish pink	rose pourpre	purpurrosa	rosa violáceo	Castor, Sombrero	2
8. (*)	**MS/ VS**	**Pod: peduncle length**	**Gousse: longueur du pédoncule**	**Hülse: Länge des Stiels**	**Vaina: longitud del pedúnculo**		
QN	**(b)**	short	court	kurz	corta	Castor, Sombrero	3
		medium	moyen	mittel	media	Cascari	5
		long	long	lang	larga	Flamenco, Jazz	7
9. (*)	**VS**	**Pod: size**	**Gousse: taille**	**Hülse: Größe**	**Vaina: tamaño**		
QN	**(b)**	very small	très petite	sehr klein	muy pequeño	Castor	1
		small	petite	klein	pequeño		3
		medium	moyenne	mittel	medio	Rondo	5
		large	grande	groß	grande	Jazz	7
		very large	très grande	sehr groß	muy grande	Flamenco	9

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		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
10.	**VG**	**Pod: intensity of green color**	**Gousse: intensité de la couleur verte**	**Hülse: Intensität der Grünfärbung**	**Vaina: intensidad del color verde**		
QN	**(b)**	light	claire	hell	claro		3
		medium	moyenne	mittel	medio	Cascari, Flamenco, Twist	5
		dark	foncée	dunkel	oscuro	Sombrero	7
11.	**MS/ VS**	**Pod: length of beak**	**Gousse: longueur du bec**	**Hülse: Länge des Schnabels**	**Vaina: longitud del pico**		
QN	**(b)**	short	court	kurz	corta	Sombrero	3
		medium	moyen	mittel	media	Cascari, Castor, Sirtaki	5
		long	long	lang	larga	Flamenco, Jazz	7
12. (*) (+)	**MS**	**Pod: number of seeds**	**Gousse: nombre de graines**	**Hülse: Anzahl Samen**	**Vaina: número de semillas**		
QN		predominantly one	essentiellement une	vorwiegend einer	predominantemente una	Twist	1
		one and two	une et deux	einer und zwei	una y dos	Elvar, Flamenco	2
		predominantly two	essentiellement deux	vorwiegend zwei	predominantemente dos	Cascari, Sombrero	3
13. (*)	**VG**	**Seed: color (1 month after harvest)**	**Graine: couleur (1 mois après récolte)**	**Samen: Farbe (1 Monat nach der Ernte)**	**Semilla: color (1 mes después de la cosecha)**		
PQ		yellow	jaune	gelb	amarillo		1
		beige	beige	beige	beige	Cabri, Sirtaki	2
		yellowish brown	brun jaunâtre	gelblichbraun	marrón amarillento		3
		brown	brune	braun	marrón	Castor	4
		reddish brown	brun rougeâtre	rötlichbraun	marrón rojizo	E04	5
		black	noire	schwarz	negro	Sombrero	6

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		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
14.	**VG**	**Seed: intensity of color (as for 13)**	**Graine: intensité de la couleur (comme pour 13)**	**Samen: Intensität der Farbe (wie unter 13)**	**Semilla: intensidad del color (como en 13)**		
QN		light	claire	hell	claro		3
		medium	moyenne	mittel	medio		5
		dark	foncée	dunkel	oscuro		7
15. **(*)** **(+)**	**MG**	**Seed: weight**	**Graine: poids**	**Samen: Gewicht**	**Semilla: peso**		
QN		low	petit	gering	bajo	Pedrosillano	3
		medium	moyen	mittel	medio	Amparo, Amit, Cabri, Cascari	5
		high	élevé	hoch	alto	Bianka, Castellano, Jazz	7
		very high	très élevé	sehr hoch	muy alto	Blanco lechoso, Lambada, Salsa	9
16. **(*)** **(+)**	**VG**	**Seed: shape**	**Graine: forme**	**Samen: Form**	**Semilla: forma**		
PQ		round	ronde	rund	redonda	Cascari, Elvar	1
		round to angular	ronde à angulaire	rund bis kantig	entre redonda y angular	Flamenco, Sirtaki	2
		angular	angulaire	kantig	angular	Castor, Sombrero	3
17. **(*)**	**VG**	**Seed: ribbing**	**Graine: sinuosités**	**Samen: Rippung**	**Semilla: acostillado**		
QN		absent or very weak	absentes ou très faibles	fehlend oder sehr gering	ausente o muy débil	Cabri, Cascari	1
		weak	faibles	gering	débil		3
		medium	moyennes	mittel	medio	Flamenco, Jazz, Twist	5
		strong	fortes	stark	fuerte	Sombrero	7
		very strong	très fortes	sehr stark	muy fuerte	Castor	9

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		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
18. (*)	**MG**	**Time of flowering (80% of plants with at least one flower)**	**Époque de la floraison (80% des plantes avec au moins une fleur)**	**Zeitpunkt der Blüte (80 % der Pflanzen mit mindestens einer Blüte)**	**Época de floración (80% de las plantas con al menos una flor)**		
QN		very early	très précoce	sehr früh	muy precoz	Salsa	1
		early	précoce	früh	precoz	Cabri, Sirtaki	3
		(medium)	moyenne	mittel	intermedia	Cascari, Sombrero	5
		late	tardive	spät	tardía	Casoar	7
		very late	très tardive	sehr spät	muy tardía	Castor	9
19. (*)	**VG**	**Time of dry seed maturity**	**Époque maturité du grain sec**	**Zeitpunkt der Trockenreife**	**Época de madurez del grano seco**		
QN		very early	très précoce	sehr früh	muy precoz	Castor	1
		early	précoce	früh	precoz	Cabri, Casoar, Sombrero	3
		(medium)	moyenne	mittel	intermedia	Flamenco, Sirtaki	5
		late	tardive	spät	tardía	Lambada, Salsa, Twist	7

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8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Foliage: observations on the foliage which should be made at the time of flowering.

(b) Pod: all observations on the pod should be made at the green stage of seeds fully developed in size.

8.2 Explanations for individual characteristics

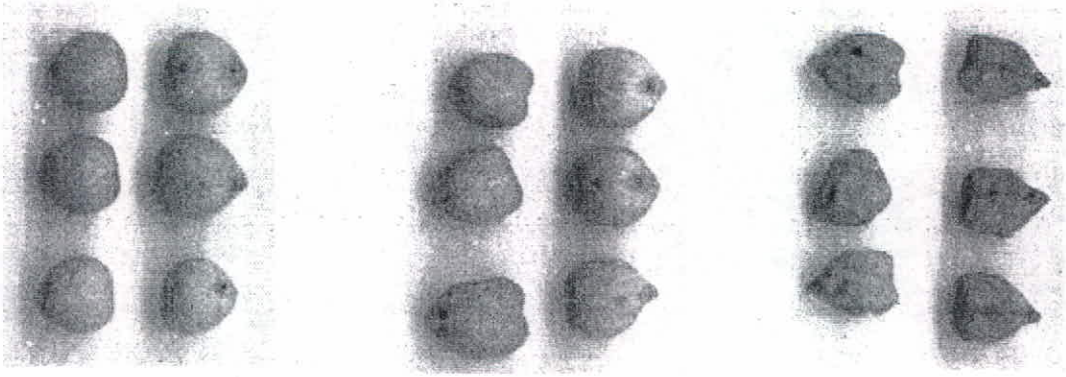
Ad. 12: Pod: number of seeds

predominantly one:	percentage of pods with at least 2 seeds =< 10%
one and two:	10 % < percentage of pods with at least 2 seeds =< 60%
predominantly two:	60 % < percentage of pods have at least 2 seeds

Ad. 15: Seed: weight

The seed weight should be measured on two samples of 100 seeds.

Ad. 16: Seed: shape



1	2	3
round	round to angular	angular

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9. Literature

ICRISAT, ICARDA and IBPGR, 1985: "Chick-pea descriptors", IBPGR Secretariat, Rome, IT, 15 pp.

Maesen, L.J.G. van der, 1972: "Cicer L., a monograph of the genus with special reference to the chick-pea (C. arietinum L.), its ecology and cultivation", Meded. Landbouwhogeschool, Wageningen, NL, 72, pp. 1-136

Saxena, M.C. and Singh, K.B., 1987: "The Chick-pea", C.A.B. International (ICARDA), SY, 409 pp.

Smartt, J., 1990: "Grain Legumes" (especially Chapter 6: "Pulses of the classical world, pp. 176-244), Cambridge University Press, Cambridge, GB

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10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
		Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name: *Cicer arietinum* L.

1.2 Common Name: Chick-Pea

2. Applicant

Name: Meridian Seeds LLC.

Address: 1240 Diversion Drive ~~Saskatoon, SK~~ West Fargo, ND, USA 58078
201-1475 Chevrier Blvd. Winnipeg, MB Canada R3T 1Y7

Telephone No.: ~~204-988-9760~~ ~~1-866-282-7333~~

Fax No.: ~~1-866 847-2840~~ ~~204-487-7682~~

E-mail address: ~~a.kubinec@meridianseeds.com~~ a.kubinec@cantera.com

Breeder (if different from applicant): Tom Warkentin

3. Proposed denomination and breeder's reference

Proposed denomination (if available): CDC Frontier

Breeder's reference: 95NN-29

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TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a)	controlled cross (please state parent varieties)	[✓]
(b)	partially known cross (please state known parent variety(ies))	[ ]
(c)	unknown cross	[ ]

4.1.2 Mutation (please state parent variety) [ ]

4.1.3 Discovery and development (please state where and when discovered and how developed) [ ]

4.1.4 Other (please provide details) [ ]

4.2 Method of propagating the variety

(a)	Self-pollination	[✓]
(b)	Cross-pollination	[ ]
(c)	Other (please provide details)	[ ]

Note: 4.1.1 a. Parents: FLIP 91-22C
ICC 14912

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (3)	**Plant: height (when pods fully developed)**		
	short	Castor, Sombrero	3[ ]
	medium	Cabri, Cascari, Sirtaki, Twist	5[✓]
	tall	Elvar, Lambada, Salsa	7[ ]
5.2 (7)	**Flower: color**		
	white	Sirtaki, Twist	1[✓]
	purplish pink	Castor, Sombrero	2[ ]
5.3 (12)	**Pod: number of seeds**		
	predominantly one	Twist	1[✓]
	one and two	Elvar, Flamenco	2[ ]
	predominantly two	Cascari, Sombrero	3[ ]
5.4 (13)	**Seed: color (1 month after harvest)**		
	yellow		1[ ]
	beige	Cabri, Sirtaki	2[✓]
	yellowish brown		3[ ]
	brown	Castor	4[ ]
	reddish brown	E04	5[ ]
	black	Sombrero	6[ ]

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	Characteristics	Example Varieties	Note
5.5 (15)	**Seed: weight**		
	low	Pedrosillano	3[ ]
	medium	Amparo, Amit, Cabri, Cascari	5[✓]
	high	Bianka, Castellano, Jazz	7[ ]
	very high	Blanco lechoso, Lambada, Salsa	9[ ]
5.6 (16)	**Seed: shape**		
	round	Cascari, Elvar	1[ ]
	round to angular	Flamenco, Sirtaki	2[✓]
	angular	Castor, Sombrero	3[ ]
5.7 (18)	**Time of flowering (80% of plants with at least one flower)**		
	very early	Salsa	1[ ]
	early	Cabri, Sirtaki	3[ ]
	medium	Cascari, Sombrero	5[✓]
	late	Casoar	7[ ]
	very late	Castor	9[ ]
5.8 (19)	**Time of dry seed maturity**		
	very early	Castor	1[ ]
	early	Cabri, Casoar, Sombrero	3[ ]
	medium	Flamenco, Sirtaki	5[✓]
	late	Lambada, Salsa, Twist	7[ ]

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6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Seed: weight*	*medium*	*very high*
Amit	Seed Shape	Round	Ram-head shape

Comments:

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[#]7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [✓]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [✓]

(If yes, please provide details)

7.3 Other information

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [✓]

(b) Has such authorization been obtained?

Yes [ ] No [✓]

If the answer to (b) is yes, please attach a copy of the authorization.

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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9. Information on plant material to be examined or submitted for examination.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [✓]

(b) Chemical treatment (e.g. growth retardant, pesticide) Yes [ ] No [✓]

(c) Tissue culture Yes [ ] No [✓]

(d) Other factors Yes [ ] No [✓]

Please provide details of where you have indicated "yes".

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature Date 27 Feb 07

[End of document]

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

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

1. NAME OF APPLICANT(S)
Crop Development Centre

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
95NN-29

3. VARIETY NAME
CDC Frontier

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*
4D36 Agriculture Building.
51 Campus Drive
Saskatoon, SK S7N 5A8
Canada

5. TELEPHONE *(Include area code)*
306-966-5855

6. FAX *(Include area code)*
306-966-5015

7. PVPO NUMBER
#200800173

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

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** ☐ YES ☑ NO
Canada.

10. 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.

11. Additional explanation on ownership *(Trace ownership from original breeder to current owner. Use the reverse for extra space if needed)*:
The variety CDC Frontier chickpea was developed through plant breeding and selection methods by plant breeders employed by the Crop Development Centre. The variety was developed specifically for the Crop Development Centre.

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.

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

EXHIBIT F
DECLARATION REGARDING DEPOSIT

NAME OF OWNER (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	TEMPORARY OR EXPERIMENTAL DESIGNATION
Crop Development Centre	4D36 Agriculture Building 51 Campus Drive Saskatoon, SK S7N5A8 Canada	95NN-29
		VARIETY NAME CDC Frontier
NAME OF OWNER REPRESENTATIVE (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	FOR OFFICIAL USE ONLY
Anastasia Kubinec Canterra Seeds	201-1475 Chevrier Blvd. Winnipeg, MB R3T 1Y7 Canada	PVPO NUMBER #200800173

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.

Signature

Date April 22/08

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