No. 200600256

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Syngenta Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR 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 PERMITTED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

PEPPER

'4228AA'

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-fifth day of November, in the year two thousand and eight.

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: Syngenta Seeds, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME:

3. VARIETY NAME: 4228AA

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*: 600 N. Armstrong Place, Boise, ID 83704

5. TELEPHONE *(include area code)*: 208-322-7272

6. FAX *(include area code)*: 208-327-9319

FOR OFFICIAL USE ONLY

PVPO NUMBER: #200600256

FILING DATE: July 28, 2006

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

8. IF INCORPORATED, GIVE STATE OF INCORPORATION: DE

9. DATE OF INCORPORATION: February 25, 1975

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Ms. Kim Briggs
Syngenta Seeds, Inc.
6338 Highway 20-26
Nampa, ID 83687

FEES RECEIVED

FILING AND EXAMINATION FEES: $ 4382.00
DATE 7-28-06

CERTIFICATION FEE: $ 768.00
DATE 10/16/08

11. TELEPHONE (Include area code): 208-465-8522

12. FAX (Include area code): 208-467-4559

13. E-MAIL: kim.briggs@syngenta.com

14. CROP KIND *(Common Name)*: Pepper

16. FAMILY NAME *(Botanical)*: Solanaceae

15. GENUS AND SPECIES NAME OF CROP: *Capsicum annuum*

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 COMMERICALIZATION.

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)*
g. ☒ Filing and Examination Fee ($4,382), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD 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)*

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
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 tuber 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	
Charleen Orthel			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Charleen Orthel			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Registration Specialist	7/27/2006		

(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 "Treasureroftheo 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

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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 o f 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, **See d 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.*

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.)*

See Attached.

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).)*

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

2006 0 0 2 5 6

First Transfer of hybrids relating to 4228AA by country:

Date	Country	Circumstances
Jul-06	Argentina	Commercial Sale
Mar-06	Canada	Trial to observe plant performance and fruit characteristics under commercial greenhouse conditions
Apr-06	Colombia	Trial to observe plant performance, fruit quality and characteristics.
Aug-05	Mexico	Trial to observe plant performance, fruit quality and characteristics.
Jun-06	Mexico	Commercial Sale
Jul-06	US	Commercial Sale

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Exhibit A

Origin and History of the Pepper Variety "4228AA"

PVP: 200600256

The jalapeno parent line 4228AA was developed as part of an on going research effort to create improved jalapeno germplasm. In the process, 4228AA was developed with a vigorous plant height.

The population labeled 4228AA is a dihaploid jalapeno pepper that was derived from a F6 selected material from the cross 4228. In 1994, the original cross 4228 was developed from a variety that was obtained from New Mexico State University (please see description below), which was used as the female (0445A) and a variety that was derived from single seed descent (SSD) from the hybrid Mitla, Seminis Seeds, (0466C) which was used as the male.

In 1990, the variety 0445A was obtained from New Mexico State University (NMSU) as a gift from Dr. Paul Bosland. 0445A was originally donated to NMSU by Everardo Zamora from Sonora University, Hermosillo, Sonora, Mexico. 0445A can be referenced at NMSU as NMCA 10558 and seed can currently be requested from Dr. Bosland of this variety. Dr. Bosland sent this material to the USDA Grin system in 1994. It is an espinalteco type jalapeno collected from Veracruz, Mexico. At Naples, Florida, 0445A was grown in the field and single plant selection of selfed fruits was made for improved jalapeno fruit characteristics (pedigree selection). 0445A was selected in this manner for 5 generations for these desired traits and used as a female in the formation of 4228AA (please see description below) when crossed to 0466C.

In 1992 Mitla (0446), a commercial hybrid (F1) variety from Seminis Seeds was grown in Naples, Florida. F2 seed from 20 plants (selfed seed – one fruit from each plant was harvested and seed was bulked) was harvested and put into a Single Seed Descent program in the greenhouse for five subsequent generations of selfing individual plants to create F7 families. About 300 F7 families (each Single Seed descent family was produced from a single plant that can be traced back to the original seed in the F2 generation) were evaluated for improved fruit and plant characteristics in the field where the variety designated as 0466C was selected. 0466C was used as the male to produce the variety 4228 when crossed with 0445A (please see description below) female.

In 1994, the variety 4228 was produced using controlled pollination techniques in the greenhouses in Naples, Florida. 0445A (F5-pedigree selection) and 0466C (F7 Family from Single seed descent) were grown in the greenhouse. Flowers from 0445A (female) were emasculated and pollen from 0466C (male) was crossed to produce F1 seed in the greenhouse and designated as hybrid 4228. 4228 F1 seed was grown in the field and F2 seed was harvested from selfed fruits (20 fruits were harvested from 20 plants, one fruit from each plant and seed was bulked). F2 seed was grown in the field and single plant selection – pedigree (selfed fruits were harvested at each generation) was made for four subsequent generations for improved fruit characteristics to produce 4228A (F6 generation–pedigree selected seed).

In 2001, 4228 F6 seed was grown in growth chambers in Gilroy, California and used to grow donor plants for anther culture. Anthers from these plants were collected for anther culture and put into a tissue culture environment on a nutrient medium to create embryos and subsequent haploid plants. These haploid plants were treated with colchcine to double the chromosome number and create dihaploid plants (instant inbreds or pure lines). The dihaploid plant later designated 4228AA was used to create hybrids in 2002 and these hybrids were selected through hybrid combination performance. Hybrid seed using the variety 4228AA was trialed internally within Syngenta from 2003 to 2005 with the first sales of the hybrid produced from this variety in Mexico occurring in August, 2005.

4228AA has been observed to be uniform and stable for three generations during the seed increase period. No variants or off-types have been observed in Woodland, California to produce foundation seed in 2005 or in a subsequent 300 plant grow-out conducted in Naples in 2006. The parental line 4228AA has been observed to be both highly stable and reproducible.

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Exhibit B
PVP 200600256

4228AA is most similar to Grande; however, 4228AA differs from Grande in plant height (116.5 cm vs. 80.4 cm respectively in Naples, Florida USA; and 105.5 cm vs. 66.1 cm respectively in Delicias, Chihuahua Mexico). I have included photographs of 4228AA and Grande grown in the greenhouse in Woodland, California, USA (please see photos and note that the poles in the photographs are 4 feet tall and the distance between the string to tie up the plants is about 1 foot – I have also included a photograph of 4228AA grown in cage at Woodland, California – these plants are being grown in the soil and poles are 4 feet tall). In addition, '4228AA' has longer pedicel length compare to 'Grande'.

per correspondence Sept 23, 2008 LMC 9-23-2008

4228AA and Grande were grown in two locations for comparison. The locations of the trials were at the Syngenta farm in Naples, Florida USA and at the farm of Mr. Jaime Lara in Delicias, Chihuahua Mexico. At both locations, 4228AA and Grande were planted in a trial with 3 replicated plots. Each plot consisted of 20 plants and each plant was carefully measured for plant height in centimeters. For each of the two locations, 60 total plants were measured (three replications-20 plants each) or a total of 120 plants per variety.

At the Naples, Florida USA location, data was taken on June 7, 2006 and plant height was measured on the two varieties with the means calculated to be: 4228AA, 116.5 cm vs. Grande, 80.4 cm. For the variety 4228AA the range of plant height (cm) was 128 to 105, maximum to minimum respectively, while for the variety Grande the range was 95 to 68 cm, maximum to minimum respectively.

At the Delicias, Chihuahua Mexico location, data was taken on July 8, 2006 and plant height was measured on the two varieties with the means calculated to be: 4228AA, 105.5 cm vs. Grande, 66.1 cm. For the variety 4228AA the range of plant height (cm) was 115 to 95, maximum to minimum respectively, while for the variety Grande the range was 73.5 to 55, maximum to minimum respectively.

The statistical analysis that was used was a T-test. For the Naples location, the T-value and probability are as follows:

t-Test: Two-Sample Assuming Unequal Variances (Naples)

	4228AA	*Grande*
Mean	116.5233333	80.48833
Variance	32.96758192	31.90071
Observations	60	60
Hypothesized Mean Difference	0	
df	118	
t Stat	34.65643799	
P(T<=t) one-tail	5.36173E-64	
t Critical one-tail	1.657869523	
P(T<=t) two-tail	1.07235E-63	
t Critical two-tail	1.980272226	

For the Delicias, Chihuahua Mexico location, the T-value and probability are as follows:

t-Test: Two-Sample Assuming Unequal Variances (Chihuahua)

	4228AA	*Grande*
Mean	105.5333	66.17667
Variance	27.75311	15.76419
Observations	60	60
Hypothesized Mean Difference	0	
df	110	
t Stat	46.21287	
P(T<=t) one-tail	3.49E-74	
t Critical one-tail	1.658824	
P(T<=t) two-tail	6.98E-74	
t Critical two-tail	1.981765	

For both locations (Naples, FL + Delicias, Chihuahua, Mexico), the T-value and probability are as follows:

t-Test: Two-Sample Assuming Unequal Variances (Naples+Chihuahua)

	4228AA	*Grande*
Mean	111.0283	73.3325
Variance	60.55398	75.26843
Observations	120	120
Hypothesized Mean Difference	0	
df	235	
t Stat	35.43221	
P(T<=t) one-tail	1.54E-96	
t Critical one-tail	1.651364	
P(T<=t) two-tail	3.08E-96	
t Critical two-tail	1.97011	

A normal distribution test was performed on this data and the analysis was deemed appropriate for this comparison. No manipulation of the data was performed. The data was normal distributed.

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Raw Data-Plant Height(cm)			
Rep	location	4228AA	Grande
1	1	113.5	74.5
1	1	121.5	71.0
1	1	105.0	80.0
1	1	112.0	76.0
1	1	118.5	79.2
1	1	119.0	68.0
1	1	128.0	75.4
1	1	117.0	86.4
1	1	119.5	78.5
1	1	117.5	95.0
1	1	108.0	78.5
1	1	112.0	80.5
1	1	124.5	76.5
1	1	125.0	86.0
1	1	124.5	83.0
1	1	113.5	75.5
1	1	122.0	74.5
1	1	111.5	75.5
1	1	111.3	81.0
1	1	110.0	91.0
2	1	111.0	76.0
2	1	110.0	79.5
2	1	112.5	82.0
2	1	120.0	77.0
2	1	114.0	75.0
2	1	118.0	88.0
2	1	123.0	74.0
2	1	124.0	85.5
2	1	111.3	79.0
2	1	118.0	87.0
2	1	107.0	80.5
2	1	111.0	82.0
2	1	123.0	81.0
2	1	120.0	84.0
2	1	125.0	77.0
2	1	118.0	81.0
2	1	121.0	79.5
2	1	110.0	90.0
2	1	113.0	74.0
2	1	109.0	85.0
3	1	122.0	80.5
3	1	125.0	69.0

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3	1	113.0	88.5
3	1	115.0	86.3
3	1	117.5	78.0
3	1	117.0	72.0
3	1	122.0	76.0
3	1	110.0	85.0
3	1	121.0	80.5
3	1	109.0	85.0
3	1	111.3	87.0
3	1	114.0	83.0
3	1	122.0	79.0
3	1	124.0	88.0
3	1	120.0	83.5
3	1	123.5	76.0
3	1	120.0	82.0
3	1	109.0	74.0
3	1	112.0	84.0
3	1	111.5	89.0
Rep	**location**	**4228AA**	**Grande**
1	2	111.0	67.0
1	2	98.0	69.5
1	2	102.0	65.0
1	2	106.0	67.0
1	2	112.0	68.0
1	2	109.0	64.5
1	2	95.0	62.0
1	2	102.0	67.0
1	2	103.0	72.0
1	2	102.0	70.3
1	2	103.0	63.6
1	2	114.0	64.4
1	2	104.0	67.0
1	2	96.0	65.5
1	2	111.5	70.3
1	2	104.0	73.5
1	2	107.0	71.5
1	2	112.0	55.0
1	2	98.5	71.0
1	2	101.0	60.0
2	2	115.0	66.0
2	2	106.5	61.0
2	2	107.0	71.2
2	2	101.5	63.0
2	2	98.0	69.0

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2	2	107.0	69.0
2	2	108.5	72.0
2	2	98.5	68.0
2	2	103.5	63.0
2	2	110.0	60.0
2	2	108.0	69.6
2	2	110.0	65.0
2	2	107.0	66.0
2	2	96.5	65.5
2	2	103.0	63.0
2	2	110.0	72.0
2	2	104.0	71.0
2	2	97.5	61.3
2	2	111.0	63.0
2	2	115.0	69.0
3	2	103.0	71.0
3	2	107.5	70.3
3	2	108.0	67.0
3	2	109.0	67.5
3	2	99.0	71.0
3	2	102.0	64.5
3	2	106.0	60.0
3	2	114.0	60.3
3	2	113.0	63.0
3	2	107.5	65.0
3	2	108.0	65.5
3	2	98.0	61.0
3	2	107.0	62.0
3	2	108.5	63.8
3	2	109.5	70.0
3	2	97.0	67.0
3	2	101.0	66.5
3	2	109.0	63.0
3	2	111.5	69.0
3	2	105.0	61.5

10

t-Test: Two-Sample Assuming Unequal Variances (Chihuahua)

	4228AA	*Grande*
Mean	105.5333	66.17667
Variance	27.75311	15.76419
Observations	60	60
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t Stat	34.65643799	
P(T<=t) one-tail	5.36173E-64	
t Critical one-tail	1.657869523	
P(T<=t) two-tail	1.07235E-63	
t Critical two-tail	1.980272226	

t-Test: Two-Sample Assuming Unequal Variances (Naples+Chihuahua)

	4228AA	*Grande*
Mean	111.0283	73.3325
Variance	60.55398	75.26843
Observations	120	120
Hypothesized Mean Difference	0	
df	235	
t Stat	35.43221	
P(T<=t) one-tail	1.54E-96	
t Critical one-tail	1.651364	
P(T<=t) two-tail	3.08E-96	
t Critical two-tail	1.97011	

4228AA Plant in Woodland, CA Greenhouse

Grande Plant in Woodland, CA Greenhouse

#20060025 6

15

2.

4228AA in Woodland Cage (Pole is 4 feet tall)

#20060025 9

Comparison 4228AA and Grande (pedicel length)

#20060025 6

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AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY
Pepper (Capsicum spp.)

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
Syngenta Seeds, Inc		4228AA
ADDRESS *(Street and No. or RD No., City, State, Zip Code, and Country)*		FOR OFFICIAL USE ONLY
600 N. Armstrong Place Boise, ID 83704		PVPO NUMBER #200600256

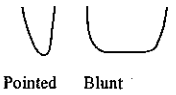
In the spaces on the left, enter the appropriate numbers that describe the characteristics of the application variety. On the right, enter the appropriate numbers that describe the characteristics of the most similar comparison variety. Right justify whole numbers by adding leading zeros if necessary. The variety that you choose for comparison should be the most similar one in terms of overall morphology, background and maturity. The comparison variety should be grown in field trials with the application variety for 2-3 location/years (environments) in the region and season of best adaptability. At least one year of trials should be conducted within the United States of America. In general, measurements of quantitative traits should be taken **from one trial on 15-25 randomly selected plants or plant parts** to obtain averages and statistics that describe a typical field of the variety. (Form technical content last updated Jan. 2003.)

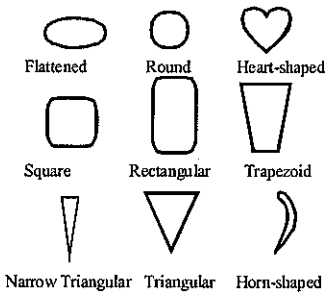
Application Variety	Comparison Variety
1. SPECIES :	
Location and Dates of Test Naples, Florida, June 7, 2006	Comparison Variety Name Grande Comparison Variety Source Seminis
1 — 1 = C. annuum 2 = C. frutescens 3 = C. baccatum 4 = C. chinense 5 = Other (specify)	1 Species (Specify if choice is 5)
2. MATURITY (In Region of Best Adaptability) :	
83 Days from transplanting until mature green stage	78 Days from transplanting until mature green stage
110 Days from transplanting until mature red or yellow stage	101 Days from transplanting until mature red or yellow stage
125 Days from direct seeding until mature green stage	115 Days from direct seeding until mature green stage
152 Days from direct seeding until mature red or yellow stage	144 Days from direct seeding until mature red or yellow stage
3. PLANT :	
2 Plant Habit : 1=Compact 2=Semi-spreading 3=Spreading 4=Other	2 Plant Habit (specify if choice is 4)
1 Plant Attitude : 1=Erect 2=Semi-erect 3=Prostrate 4=Other	1 Plant Attitude (specify if choice is 4)
116.7 cm Plant Height	79.3 cm Plant Height
100.5 cm Plant Width	94.3 cm Plant Width
23.7 cm Length of Stem from Cotyledons to First Flower	15.4 cm Length of Stem Cotyledons to First Flower
58.6 mm Length of Third Internode (from soil surface)	43.0 mm Length of Third Internode (from soil surface)
2 Basal Branches: 1=None 2=Few (2-3) 3=Many (more than 3)	2 Basal Branches
2 Branch Flexibility: 1=Willowy (Cayenne Long Red) 2=Rigid (Yolo Wonder L)	2 Branch Flexibility
3 Stem Strength (Breakage Resistance): 1=Weak 2=Intermediate 3=Strong	3 Stem Strength (Breakage Resistance)
Application Variety	Comparison Variety

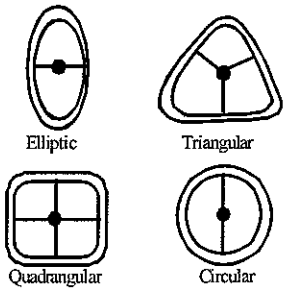
Application Variety	Comparison Variety
4. LEAVES :	
59.2 mm Leaf Width	52.9 mm Leaf Width
106.9 mm Leaf Length	103.3 mm Leaf Length
43.8 mm Petiole Length	27.3 mm Petiole Length
2 Mature Leaf Shape: 1=Lanceolate 2=Elliptic	2 Mature Leaf Shape
2 Leaf Color: 1=Light Green 2=Medium Green 3=Dark Green 4= Purple 5=Other (specify) ____	2 Leaf Color (Specify if choice is 5 ____)
Color Chart Name Royal Horticultural Society (RHS) Code 137A	Code 137A
1 Leaf and Stem Pubescence: 1=Absent (Yolo Wonder L) 2=Light 3=Moderate (Serrano) 4=Heavy (Chili Piquin)	1 Leaf and Stem Pubescence
2 Margin Undulation: 1=Absent 2=V. Weak 3=Weak 4=Medium 5=Strong 6=V. Strong	2 Margin Undulation
1 Blistering: 1=Absent 2=Very Weak 3=Weak 4=Medium 5=Strong 6=Very Strong	1 Blistering
5. FLOWERS :	
1 Number of Flowers per Leaf Axil	1 Number of Flowers per Leaf Axil
6 Number of Calyx Lobes	6 Number of Calyx Lobes
6 Number of Petals	6 Number of Petals
25.6 mm Flower Diameter	21.1 mm Flower Diameter
1 Corolla Color: 1=White 2=Purple 3=Other (Specify) ____	1 Corolla Color (Specify if choice is 3 ____)
1 Corolla Throat Markings: 1=Yellow (Tan) 2=Purple 3=Other (Specify) ____	1 Corolla Throat Markings (Specify if choice is 3 ____)
2 Anther Color: 1=Yellow 2=Purple 3=Other (Specify) ____	2 Anther Color (Specify if choice is 3 ____)
3 Style Length: 1=Less Than Stamen 2=Same as Stamen 3=Exceeds Stamen	3 Style Length
1 Self-Incompatibility: 1=Absent 2=Present	1 Self Incompatibility
6. FRUIT :	
07 Group: 1=Bell (Yolo Wonder L) 2=Pimiento (Pimiento Perfection) 3=Ancho (Mexican Chili) 4=Anaheim Chili (Sandia) 5=Cayenne (Cayenne Long Red) 6=Cuban (Cubanelle) 7=Jalapeno (Jalapeno) 8=Small Hot (Serrano) 9=Cherry (Sweet Cherry) 10=Short Wax (Floral Gem) 11=Long Wax (Sweet Banana) 12=Tabasco (Tabasco) 13=Habanero (Scotch Bonnet) 14=Other ____	07 Fruit Group (Specify if choice is 14 ____)
3 Immature Fruit Color: 1=Light Green (Cubanelle) 2=Medium Green (Long Thin Cayenne) 3=Dark Green (Yolo Wonder L) 4=Very Dark Green (Ancho Chili) 5=Yellow (Yellow Belle) 6=Purple (Violetta) 7=Ivory (Twiggy) 8=Other ____	3 Immature Fruit Color (Specify if choice is 8 ____)
Color Chart Name RHS Code 136A	Code 135A
1 Mature Fruit Color: 1=Red (Yolo Wonder L) 2=Orange 3=Orange-Yellow (Golden Calwonder) 4=Brown (Mulatto) 5=Ivory 6=Green (Permagreen) 7=Salmon 8=Lemon Yellow 9=Other ____	1 Mature Fruit Color (Specify if choice is 9 ____)
Color Chart Name RHS Code 46A	Code 53A
1 Pungency: 1=Sweet (Yolo Wonder L) 2=Hot (Jalapeno)	2 Pungency
0.0 mg Capsaicin per gram dry fruit	1.0676 mg Capsaicin per gram dry fruit
0.0 Scoville Units (dry fruit)	36,418.0 Scoville Units (dry fruit)
2 Flavor: 1=Mild Pepper Flavor 2=Moderate Pepper Flavor 3=Strong Pepper Flavor 4=Other ____	3 Flavor (Specify if choice is 4 ____)
2 Fruit Glossiness: 1=Dull 2=Moderate 3=Shiny	2 Fruit Glossiness
1 Surface Smoothness: 1=Smooth (Yolo Wonder L) 2=Rough (Long Thin Cayenne)	1 Surface Smoothness
3 Fruit Position: 1=Upright (Santaka) 2=Horizontal 3=Pendent (Jalapeno)	3 Fruit Position
2 Calyx Shape: 1=Cup-shaped (Enveloping Fruit Base) 2=Saucer-shaped (Flat, Non-Enveloping)	2 Calyx Shape
Application Variety Data	Comparison Variety Data

Saucer-shape Cupped

Application Variety Data	Comparison Variety Data
6. FRUIT (continued) :	
15.5 mm Calyx Diameter	16.0 mm Calyx Diameter
63.2 mm Fruit Length	89.4 mm Fruit Diameter
31.6 mm Fruit Diameter at Calyx Attachment	36.2 mm Fruit Diameter at Calyx Attachment
33.1 mm Fruit Diameter at Mid-point	39.3 mm Fruit Diameter at Mid-point
5.4 mm Flesh Thickness at Mid-point	5.3 mm Flesh Thickness at Mid-point
27.3 Average Number of Fruits per Plant	36.8 Average Number of Fruits per Plant
0.0 % Large Fruits (Weight Range: 0 to 0)	13.5 % Large Fruits (Weight Range 57.5g to 73.1g)
20.5 % Medium Fruits (Weight Range: 33.2g to 43.2g)	80.7 % Medium Fruits (Weight Range 32.6g to 63.6g)
79.5 % Small Fruits (Weight Range: 23.8 g to 38.7g)	5.8 % Small Fruits (Weight Range 20.9g to 35.5g)
33.5 gm Average Fruit Weight	49.8 gm Average Fruit Weight
2 Fruit Base Shape: 1=Cupped (Yolo Wonder L) 2=Rounded (Jalapeno)	2 Fruit Base Shape
2 Fruit Apex Shape: 1=Pointed (Long Thin Cayenne) 2=Blunt (Yolo Wonder L)	2 Fruit Apex Shape
4 Fruit Shape: 1=Bell (Yolo Wonder L) 2=Conical (Pimiento) 3=Elongate (Long Thin Cayenne) 4=Oblong (Jalapeno) 5=Oblate (Sunnybrook) 6=Globe (Red Cherry) 7=Other _____	4 Fruit Shape (Specify if choice is 7_____)
5 Fruit Shape (Longitudinal Section, see attached pictures): 1=Flattened 2=Round 3=Heart-shaped 4=Square 5=Rectangular 6=Trapezoid 7=Narrow Triangular 8=Triangular 9=Horn-shaped	6 Fruit Shape (Longitudinal Section)
3 Fruit Shape (Cross Section, at Level of Placenta): 1=Elliptic 2=Triangular 3=Quadrangular 4=Circular	2 Fruit Shape (Cross Section)
1 Fruit Set: 1=Scattered 2=Concentrated	1 Fruit Set
1 Interloculary Grooves: 1=Absent 2=Very Shallow 3=Shallow 4=Medium 5=Deep 6=Very Deep	1 Interloculary Grooves
0.0 % Fruits with one locule	0.0 % Fruits with one Locule
0.0 % Fruits with two locules	12.5 % Fruits with two Locules
26.5 % Fruits with three locules	70.0 % Fruits with three locules
61.2 % Fruits with four locules	17.5 % Fruits with four locules
12.3 % Fruits with five or more locules	0.0 % Fruits with five or more locules
3.86 Average Number of Locules	3.08 Average Number of Locules
54.2 mm Pedicel Length	45.2 mm Pedicel Length
4.2 mm Pedicel Thickness	5.0 mm Pedicel Thickness
2 Pedicel Shape: 1=Straight 2=Curved	2 Pedicel Shape
1 Pedicel Cavity: 1=Absent 2=Present	1 Pedicel Cavity
1.8 mm Depth of Pedicel Cavity	2.2 mm Depth of Pedicel Cavity
Application Variety Data	Comparison Variety Data







Application Variety Data	Comparison Variety Data
7. SEED :	
3 3. 3 mm Seed Cavity Length	3 9. 4 mm Seed Cavity Length
1 1. 9 mm Seed Cavity Diameter	1 3. 9 mm Seed Cavity Diameter
4 2. 5 mm Placenta Length	5 8. 4 mm Placenta Length
1 3 8 Number of Seeds per Fruit	1 9 6 Number of Seeds per Fruit
8. 0 gm per 1000 Seeds	5. 0 gm per 1000 Seeds
1 Seed Color: 1=Yellow 2=Purple	1 Seed Color
8. ANTHOCYANIN (1 = Absent; 2 = Weak; 3 = Moderate; 4 = Strong) :	
2 Seedling Hypocotyl	4 Hypocotyl
1 Stem	1 Stem
3 Node	3 Node
1 Leaf	1 Leaf
2 Pedicel	1 Pedicel
1 Calyx	1 Calyx
1 Fruit	4 Fruit
9. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; indicate Race or Strain, when known) :	
A. Viruses:	
____ Cucumber Mosaic Virus	____ Cucumber Mosaic Virus
____ Curly Top Virus	____ Curly Top Virus
1 Pepper Mottle Virus	1 Pepper Mottle Virus
9 Potato Y Virus	9 Potato Y Virus
1 Tobacco Etch Virus	1 Tobacco Etch Virus
____ Tobacco Mosaic Virus	____ Tobacco Mosaic Virus
B. Other Diseases and Insects:	
____ Anthracnose (*Gloeosporium piperatum*)	____ Anthracnose
____ Bacterial Spot (*Xanthomonas vesicatoria*)	____ Bacterial Spot
____ Cercospora Leaf Spot (*Cercospora capsici*)	____ Cercospora Leaf Spot
____ Nematode (*Meloidogyne incognita acrita*)	____ Nematode
8 Phytophthora Root Rot (*Phytophthora capsici*)	1 Phytophthora Root Rot
____ Ripe Rot (*Vermicularia capsici*)	____ Ripe Rot
____ Southern Blight (*Sclerotium rolfsii*)	____ Southern Blight
____ Verticillium Wilt (*Verticillium dahliae*)	____ Verticillium Wilt
____ Other (Specify) _____	____ Other (Specify) _____

10. COMMENTS (eg. maturity comparisons with other varieties, source of comparison variety seed, etc. Continue in Exhibit D):

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)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Syngenta Seeds, Inc.	4228AA	4228AA
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	5. TELEPHONE *(Include area code)*	6. FAX *(Include area code)*
600 N. Armstrong Place Boise, ID 83704	208-322-7272	208-327-9319
	7. PVPO NUMBER	200600256

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

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

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

Pepper '4228AA' was bred and developed by plant breeders employed by Syngenta Seeds. By agreement between the employee and Syngenta Seeds, all rights to any invention, discovery or development made by the employee while employed by Syngenta Seeds were assigned to Syngenta Seeds, with no rights retained by the employee.

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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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
Syngenta Seeds, Inc.	600 North Armstrong Pl. Boise, ID 83704	VARIETY NAME 4228AA
NAME OF OWNER REPRESENTATIVE (S)	**ADDRESS *(Street and No. or RD No., City, State, and Zip Code and Country)***	**FOR OFFICIAL USE ONLY**
Kim Briggs	6338 Highway 20-26 Nampa, Idaho 83687	PVPO NUMBER 200600256

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.

Kim Briggs — Signature

3-8-2007 — Date