

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Wisconsin Alumni Research Foundation

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.)



Attest:

No.

Commissioner Plant Variety Protection Office Agricultural Marketing Service

POTATO

'TUNDRA'

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 eleventh day of September, in the year two thousand and fourteen.

. Vilval

Secretary of Agriculture

REPRODUCE LOCALLY. Include form number and dat	e on an reproductions	Form Approved - OMB No. 0551-0055					
U.S. DEPARTMENT OF AGRICULTURAL MARK SCIENCE AND TECHNOLOGY - PLANT	AGRICULTURE ETING SERVICE VARIETY PROTECTION OFFICE	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 FOR PLANT VARIETY (Instructions and information collection	PROTECTION CERTIFICATE	Application is n (7 U.S.C. 2421,	equired in order to determine if a plant variet). Information is held confidential until certifi	y protecii cate is is:	on certificate is to be Issued sued (7 U.S.C. 2426).		
1. NAME OF OWNER		2. TEMPORAF	RY DESIGNATION OR EXPERIMENTAL NA	ME 3. 1	ARIETY NAME		
WISCONSIN ALUMNI RESEARCH	Н	W2310	-3	Т	TUNDRA		
4. ADDRESS (Street and No., or R.F.D. No., City, St	tate, and ZIP Code, and Country)	5. TELEPHON	E (include area code)		FOR OFFICIAL USE ONLY		
614 WALNUT STREET				PVF	PO NUMBER		
P.O. BOX 7365	· .	6. FAX (include	area code)		201300469		
MADISON, WI 7365				FIL	NG DATE		
7. IF THE OWNER NAMED IS NOT A "PERSON", G FORM OF ORGANIZATION (corporation, partnership association, etc.)	IVE 8. IF INCORPORATED, GIVE STATE OF INCORPORATION	9. DATE OF IN	ICORPORATION		8/12/2013		
non-profit organization							
10. NAME AND ADDRESS OF OWNER REPRESEN Bennett J. Berson	ITATIVE(S) TO SERVE IN THIS APPLICATION	ON. (First person	listed will receive all papers)	FEE	FILING AND EXAMINATION FEES: \$ 4,382		
Quarles & Brady LLP					DATE8/12/2013		
33 East Main St; Suite 900				Ē	CERTIFICATION FEE:		
Madison, WI 5370 3				D	DATE		
11. TELEPHONE (Include area code)	12. FAX (Include area code)		13. E-MAIL		<u> </u>		
608-251-5000	608-251-9166		bennett.berson@quarle	S.CON			
				INANO	SENES (OF HONAL)		
15. GENUS AND SPECIES NAME OF CROP		ON HYBRID?	IF SO, PLEASE GIVE THE ASSIGNED U	SDA-API	IS REFERENCE NUMBER FOR THE		
Solanum tuberosum I			COMMERCIALIZATION	ETHEG	ENETICALLY MODIFIED PLANT FOR		
			20. DOES THE OWNER SPECIFY THAT	SEED O	F THIS VARIETY BE SOLD ONLY AS A CLASS		
			OF CERTIFIED SEED? (See Section	n 83(a) of	the Plant Variety Protection Act)		
19. CHECK APPROPRIATE BOX FOR EACH ATTA (Follow instructions on reverse)	CHMENT SUBMITTED		YES (If "yes", answer items 2 NO (If "no", go to item 23)	21 and 22	beiow)		
a. Exhibit A. Origin and Breeding History of the	e Variety		21. DOES THE OWNER SPECIFY THAT	SEED O	F THIS VARIETY BE LIMITED AS TO		
b. Exhibit B. Statement of Distinctness			NUMBER OF CLASSES?				
c. Exhibit C. Objective Description of Variety			YES 🗆 NO				
d. Exhibit D. Additional Description of the Varia	ety (Optional)		IF YES, WHICH CLASSES?	UNDAT			
e. Exhibit E. Statement of the Basis of the Own	ners Ownership	<i></i>	NUMBER OF GENERATIONS?	32ED U	F THIS VARIETT BE LIWITED AS TO		
 Coucher Sample (3,000 viable untreated set that tissue culture will be deposited and meintained in 	eas or, for tuber propagated vaneties, ventica a an approved public repository)	1001	YES 🗆 NO				
g. Filing and Examination Fee (\$4,382), made	payable to "Treasurer of the United		IF YES, SPECIFY THE NUMBER 1,2	3, etc. F	OR EACH CLASS.		
				RED [
23. HAS THE VARIETY (INCLUDING ANY HARVES FROM THIS VARIETY BEEN SOLD, DISPOSED	TED MATERIAL) OR A HYBRID PRODUCE	D S. OR	(If additional explanation is necessary 24. IS THE VARIETY OR ANY COMPON INTELLECTUAL PROPERTY RIGHT	, piease i ENT OF (PLANT)	use the space indicated on the reverse.) THE VARIETY PROTECTED BY BREEDER'S RIGHT OR PATENT)?		
			🗆 yes 🛢 No				
IF YES, YOU MUST PROVIDE THE DATE OF F FOR EACH COUNTRY AND THE CIRCUMSTA	FIRST SALE, DISPOSITION, TRANSFER, OF NCES. (Pieese use space indicated on reven	RUSE /se.)	IF YES, PLEASE GIVE COUNTRY, DA	ATE OF I	ILING OR ISSUANCE AND ASSIGNED dicated on reverse.)		
25. The owners declare that a viable sample of basis necessary for propagation of the variety. For first propagated variety or vegetatively propagated p will be maintained for the duration of the certifics The undersigned owner(s) is(are) the owner of the owner o	c seed will be furnished directly to an accepta st generation hybrids, this includes all parents arent of the variety, a tissue culture, or veget ate. his sexually reproduced or tuber propagated p	able depository in al lines. Seed will ative sample will i plant variety, and	support of the variety within three months of be replenished upon request in accordance be deposited in a public repository within the believe(s) that the variety is new, distinct, up	filing. E with suc se month niform, ar	tasic seed includes all propagating material h regulations as may be applicable. For a tuber s of the cartificate fee request letter date. These d stable as required in Section 42, and is		
entitled to protection under the provisions of Sec	tion 42 of the Plant Variety Protection Act. On	wner(s) is (are) in	tormed that talse representation herein can	jeopardiz	e protection and result in penalties.		
SIGNATURE OF OWNER	Bren	SIGNA	TURE OF OWNER				
NAME (Please print or type)	T A	NAME	(Please print or type)				
1Sennett	J. Derson		201	L3 AL	G 12 AM10:07		
Owner's Reaveral	etre Aug. 9. 2013	Сарас			-		
	J	A	I				

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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 1400 Independence Avenue, S.W., Room 4512 – South Building, Mail Stop 0274, Washington, DC 20250-0274. <u>Retain one copy for your files</u>. 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: 202-260-8983
 FAX: 202-260-8976

 General E-mail: PVPOmail@usda.gov

 Homepage: http://www.ams.usda.gov/pvpo

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 Varlety) 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.)

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 Peperwork Reduction Act of 1995, en 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 astimated 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, ege, disability, and where applicable, sax, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited ST-470 (07-01-2009) designed by the Plant Variety Protection Office

bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contect USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or cell (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Exhibit A

Origin and Breeding History of the Variety Tundra (W2310-3)

1. Genealogy and Breeding Method

1a. Genealogy

Fig. 1. Genealogy of the chip potato variety Tundra



1b. Breeding Method:

As observed in Fig. 1, Tundra (W2310-3) was selected from a population created from the cross of Pike x S440. Pike is a chip processing potato variety that was used due its desirable tuber shape, shallow eyes and tuber size and also for its tolerance to common scab caused by *Streptomyces scabies*. S440 was used as a parental line to increase longer cold storage ability beyond what is observed in Pike and with the objective of selecting a potato chipping variety with longer cold storage ability than what is observed in Snowden, the standard long storage chipping variety. Thus, the objective was to select a clone that may combine the longer storage ability that can be inherited from S440 and the common scab tolerance observed in Pike.

2. Subsequent Stages of Selection

The cross Pike x S440 was made in 1995 and a population of 550 seedling tubers were generated. In 1996, 302 clones were planted as single plants (single hills) in the field at the Rhinelander Agricultural Research Station. The clone was increased in 4 hills plots in 1997, 8 hills in 1998, 20 hills in 1999, 40 hills in 2000 and 40 hills or more since 2001. In 2001, 02, 04 and 05, W2310-3 was further evaluated in replicated yield trials at the Hancock and Rhinelander Agricultural Research Stations. It was also evaluated in the Wisconsin State Variety Trial in 2003 and 2006, in the common scab trials in WI 2002,03, 05, 06 and Alliston, Canada:06, in the SpudPro Candidate trial: 2004 and 2005, Quad State Trial: 2005, North Central Potato Variety Trial: 2006 and 2008, Agronomic Trials: 2006, WI Vegetable and Pathology Trials: 2006 and the National Chip Processing Trial: 2008 and 2010. W2310-3 was named as "Tundra" in December of 2010 by Wisconsin Potato and Vegetable Growers Association SpudPro committee.

Uniformity and Stability and Variants of Tundra (W2310-3)

Tundra has been observed from 1997-2010, most closely in replicated trials from 2001-05 in Wisconsin locations including Rhinelander, Hancock and Antigo and out of states collaborative trials conducted during 2006-10 over nine U.S. locations including CA, FL, ID, MI, MN, NC, ND, OR, PA, and three locations in the Canadian provinces of MB, NB and ON. Over these locations, and the corresponding seed multiplication lots in Wisconsin, Tundra has been determined to be genetically uniform and stable from year to year and location to location with no evidence of variants with respects to the traits described in Exhibit C of this application.

<u>Exhibit B</u> Statement of Distinctness Tundra (W2310-3)

Based on observations and research data from of Tundra as specified in Exhibit A, Tundra is most similar to Snowden, a standard long storage chip potato variety, however, Tundra differs from Snowden with respect to the following traits:

1. Tundra is most similar to Snowden; however, Tundra produces light sprouts with strong anthocyanin coloration (4 on a 1-5 scale, see Fig. 2), whereas Snowden produces light sprouts with medium anthocyanin pigmentation 3 in a 1-5 scale, see Fig. 2).

Fig. 2. Comparison of the shape and pigmentation of light sprouts of Tundra (W2310-3) vs the shape and pigmentation of Snowden, its most similar variety.



- 2. Tundra is most similar to Snowden; however, Tundra produces 3-4 primary leaves whereas Snowden produces 2-3 leaflet pairs.
- 3. Tundra is most similar to Snowden; however, Tundra produces 8-11 secondary and tertiary leaves, whereas Snowden produces only between 1-4 secondary and tertiary leaves.

- 4. Tundra is most similar to Snowden; however, Tundra produces 7-11 inflorescences/plant whereas Snowden produces 2-7 inflorescences/plant.
- 5. Tundra is most similar to Snowden; however, Tundra produces flowers with predominant grayish pink inner and outer surface corolla color (inner corolla color = 2.5R 8/2, outer corolla color 5R 8/2, Munsell table) whereas Snowden inner and outer corolla color is predominantly white (5GY 9/1).



Fig. 3. Comparison of the corolla color of Tundra (left) and Snowden (right)

6. Tundra is most similar to Snowden; however, Tundra produces tubers with shallow to intermediate eyes in the stem and bud ends as shallow to intermediate lateral eyes whereas Snowden produces tubers with deep eyes in stem bud ends, as well as deep lateral eyes.

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

Form Approved OMB NO 0581-0055 displays a valid OMB control number.

According to the Paperwork Reduction Act of 1996, an egency 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 8,5 hours per response, including the time for reviewing instructions, asarching existing data sources, gathering and maintaining the data needed, and completing and reviewing the solitection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its progrems and activities on the basis of race, color, national origin, age, disability, and where applicable, eax, merital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefa, reprisei, or because all or part of an individual's income is derived from any public essistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require atternative means for communication of program information (Brailie, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2800 (voice and TDD).

To file a completint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Weshington, D.C. 20250-0410, or cell (800) 795-3272 (volce) or (202) 720-8382 (TDD). USDA is an equal opportunity provider and employer.

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

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY

Potato (Solanum tuberosum L.)

INSTRUCTIONS

The Objective Description Form:

The objective description form lists characteristics to be used as the basis for developing the description of potato varieties. It is designed to guide the applicant in describing a variety in detail so a meaningful comparison with other potato varieties can be accomplished. It is recommended that this form be completed in as much detail as possible to ensure an accurate description. Please fill in the requested data and place the appropriate number that describes the varietal characters typical of this potato variety and the reference varieties in the respective boxes.

Test Guidelines:

Any statistical and trial (field test) data that may be necessary to support the variety description should be attached to this form. Please include for trial data the plot size, number of replications, number of plants, plant spacing, trial locations and growing periods. Trials should normally be conducted at one place, in the region that the variety has been adapted for, with a minimum of one growing period in the United States. All comparative data should be determined from varieties entered in the same trials. The size of the plots should be such that plants or parts of plants may be removed for measuring and counting without prejudice to the observations which must be made at the end of the growing period. As a minimum, each test should include a total of 60 plants which should be divided between two or more replicates. Separate plots for observation and measuring can only be used if they have been subject to similar environmental conditions. To determine color for a plant or plant parts a recognized standard color chart must be used such as the Royal Horticultural Soclety (RHS) Color Chart or Munsell Color Chart (MCC).

Reference Varieties:

The application variety should be compared to at least one reference variety preferably a set of reference varieties. The reference varieties should be market class standard varieties currently grown in the United States and or the variety (ies) most similar. The following varieties are recommended as market class standards to be used as reference varieties:

Yellow-flesh table-stock	Yukori Gold
Round-white table-stock	Superior
Chip-processing	Atlantic, Snowden, Norchip
Frozen-processing	Russet Burbank
Russet table-stock	
Red table-stock	

If the applicant does not use one of the recommended reference varieties by the PVP office, a complete description of the reference variety should be submitted by the applicant (Exhibit C).

Exhibit C (Potato)

Characteristics:

Light sprout characteristics are supplied in **Figure 1**. The plant type and growth habit characteristics are collected at early first bloom. **Figure 2** is supplied to help visualize the growth habit. For this descriptor, look at the stems rather than the stems and foliage. Plant maturity is measured at natural vine senescence.

Stem characteristics are also collected at early bloom. Stem anthocyanin coloration is divided into two descriptors: Location and intensity. **Figure 3** is supplied to give an example of stem wings.

Leaf characteristics are observed at early first bloom. Fully-developed leaves located on the middle third of the plant should be used. Leaf pubescence refers to general trichomes. Figure 4 is supplied for examples of leaf silhouette. Leaf stipules are shown in Figure 5 for visual definition. Figure 6 is supplied to define leaf characteristics. Figure 7 should be used to describe terminal and primary leaflet shape. Figures 8 and 9 are used to describe the terminal and primary leaflets pairs, collect 10 fully developed petioles (with leaves attached from each replication) and take the average number of secondary and tertiary leaflets. Glandular trichomes should be described in the Additional Comments and Characteristics (Descriptor 15).

Inflorescence characteristics should be measured at early first bloom. **Figures 10, 11 and 12** are supplied to describe anther and stigma shape, respectively. Corolla, calyx, anther, stigma, and pollen should be observed on newly opened flowers. Berry production should be based on field-grown plants rather than greenhouse plants.

Tuber characteristics should be observed following harvest. Figures 13 and 14 are available to describe distribution of secondary color and tuber shape, respectively.

Disease and pest reactions should be based upon specific tests or statistical analysis rather than just field observations, rating 1 as Highly Resistance and 9 as Highly Susceptible, please follow the scale on each descriptor. Other diseases or pests reactions not requested can be described if it is felt that it would be helpful to determine novelty of the variety.

Quality characteristics should be described according to the market use.

If the plant is transgenic, this gene insertion(s) should be described.

Chemical identification and any other characteristics can be described if they are helpful in distinguishing the variety.

Legend:

V = Application Variety

R1-R4 = Reference Varieties

* = Both the reference variety (ies) and application variety must be described for characteristics designated with an asterisk.

IAME OF APPLICANT (S) /ISCONSIN ALUMNI RESEARCH JUNDATION VARIETY NAME TUNDRA	
DDRESS (Street and No. or RD No., City, State, Zip Code, and Country) 14 WALNUT STREET .O. BOX 7365 IADISON, WI 53707-7365, USA	
EFERENCE VARIETIES: Enter the reference variety name in the appropriate box.	
Application Variety (V) Reference Variety 1 (R1) Reference Variety 2 (R2) Reference Variety 3 (R3) Reference	rence Variety 4 (R4)

Application Variety (V)	Reference Variety 1 (R1)	Reference vanety 2 (R2)	Reference variety 3 (R3)	Reference variety 4 (R4)
TUNDRA	SNOWDEN	ATLANTIC		

MARKET CHARACTE	RISTICS:				
*MARKET CLAS 1 = Yellow-flesh 5 = Russet Tabl	S : Tablestock 2 = Round-whit setock 6 = Other	le Tablestock 3 = Chip-p	processing 4 = Frozen	-processing	
V 3	R1 3	R2 3	R3	R4	
LIGHT SPROUT CHA	RACTERISTICS: (See Figur	e 1)			
*LIGHT SPROU 1 = Spherical	: GENERAL SHAPE 2 = Ovold 3 = Conica	4 = Broad cylindrica	5 = Narrow cylindrice	al 6 = Other	
V 1	R1 1	R2 1	R3	R4	
*LIGHT SPROU					
1 = Absent	2 = Weak 3 = Medium	4 = Strong 5 = Ve	ary Strong		
1 = Absent	PODESCENCE OF 2 = Weak 3 = Medium	4 = Strong 5 = Ve	B 2	R4	
1 = Absent	R1 2 BASE: ANTHOCYANIN CO	4 = Strong 5 = Ve $R2 3$ DLORATION	R3	R4	
1 = Absent V 2 •LIGHT SPROU 1 = Green 2	BASE: ANTHOCYANIN CC Red-violet 3 = Blue-viol	4 = Strong 5 = Ve R2 3 DLORATION let 4 = Other(describe	ery Strong R3	R4	
1 = Absent V 2 *LIGHT SPROU: 1 = Green 2 V 3	BASE: FOBESCENCE OF 2 = Weak 3 = Medium BASE: ANTHOCYANIN CC = Red-violet 3 = Blue-viol R1 2	$\begin{array}{c c} \textbf{A} = \text{Strong} & \textbf{5} = \text{Ve} \\ \hline \textbf{R2} & \textbf{3} \\ \hline \textbf{OLORATION} \\ \text{let} & \textbf{4} = \text{Other}(\text{describe}) \\ \hline \textbf{R2} & \textbf{2} \\ \hline \end{array}$	R3 R3 R3 R3	R4	
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1 = Absent V 2 *LIGHT SPROU 1 = Green 2 V 3 *LIGHT SPROU 1 = Absent V 4 *LIGHT SPROU	BASE: POBLACE OF 2 = Weak 3 = Medium BASE: ANTHOCYANIN CC = Red-violet 3 = Blue-viol R1 2 BASE: INTENSITY OF AN 2 = Weak 3 = Medium R1 3 TIP: HABIT	$A = Strong \qquad 5 = Vei$ $R2 \qquad 3$ $Coloration$ $A = Other(describe)$ $R2 \qquad 2$ $THOCYANIN COLORATII 4 = Strong \qquad 5 = Vei R2 \qquad 3$	R3 R3 R3 R3 R3 R3 R3 R3 R3	R4	
1 = Absent V 2 *LIGHT SPROU 1 = Green 2 V 3 *LIGHT SPROU 1 = Absent V 4 *LIGHT SPROU 1 = Closed	BASE: FOBESCENCE OF 2 = Weak 3 = Medium BASE: ANTHOCYANIN CC BASE: ANTHOCYANIN CC Red-violet 3 = Blue-viol R1 2 BASE: INTENSITY OF ANT Pewak 3 = Medium R1 2 Image: R1 3 = Medium Image: R1 3 = Medium	$A = Strong \qquad 5 = Vei$ $R2 \qquad 3$ $Cloration et \qquad 4 = Other(describe) R2 \qquad 2 THOCYANIN COLORATI 4 = Strong \qquad 5 = Vei R2 \qquad 3 Den$	R3 R3 R3 R3 R3 R3 R3 R3 R3	R4	

2. LIGHT SPROUT CHARACTERISTICS: (continued) LIGHT SPROUT TIP: PUBESCENCE 1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong **R1 R3 R4** V **R2** 3 3 4 LIGHT SPROUT TIP ANTHOCYANIN COLORATION 4 = Other(describe) 2 = Red-vlolet 3 = Blue-violet 1 = Green V **R1 R2 R3 R4** 2 3 1 LIGHT SPROUT TIP: INTENSITY OF ANTHOCYANIN COLORATION (IF PRESENT) 1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong **R3 R**4 ν **R**1 R2 3 3 1 LIGHT SPROUT ROOT INITIALS: FREQUENCY 1 = Absent 2 = Some 3 = Abundant R1 2 **R3 R4** R2 2 \mathbf{V} 2 3. PLANT CHARACTERISTICS: GROWTH HABIT: (See Figure 2) 3 = Erect (>45° with ground) 5 = Semi-erect (30-45° with ground) 7 = Spreading **R3 R4** 5 **R1** 5 **R2** 5 TYPE: 1 = Stem (Follage open, stems clearly visible) 3 = Leaf (Foliage closed, stems hardly visible) 2 = Intermediate **R2 R3** V **R4 R**1 2 2 2 MATURITY: Days after planting (DAP) at vine senescence V 120 **R1** 124 R2 115 **R3 R4**

V April 23 R1 April 23 R2 April 23 R3 *REGIONAL AREA: April 23 R3	K4
	[
4 = Mid-Atlantic Erect (VI, NC, SC, South NJ, FL) 5 = South (LA, TX, AZ, NE) 6 = Canada 7 = Europe 8 = England 9 = Latin America 10 = Brazil 11 = Other	(ME, NY, PA, NJ, MD, M
V 2 R1 2 R2 2 R3	R4

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	sent 3= W	/eak 5 = M	edium 7	/ = 3(10	ng 9=	Verv Stro	1 T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
V	3	R 1	1]	R2	3		23		R4			
STEM 1 = Ab	WINGS: (Sent 3 =)	ee Figure 3) Weak 5 = !	Vedium	7 = Str	ong 9=	- Very Str	ong						
V	5	R 1	7]	R2	1		3		R4			
CHAR	ACTERISTIC	:											
LEAF 1 = Ye	COLOR: (0 llowing-gree	bserve fully n 2 = Oliv	<i>develope</i> e-green	d leaves 3 = Me	s located edium Gr	' <i>on middi</i> een 4:	e 1/3 of p = Dark Gi	lant) een 5 :	= Grey-gree	n 6=0	ther		
V	3	R1	3		R2	3	I	3		R4			
LEAF (Obsei	COLOR CH	ART VALUE	: Royal	Horticul on mide	ture Soci die 1/3 of	lety Color plant and	Chart of circle th	Munsell C appropr	Color Chart) nart)	<u></u>		
V	5G4/2	R 1	2.5G4	k	R2	2.5G4	2 I	3		R4			
	PUBESCEN		Y: 3 = Mediu	 Im 4	= Think	6 – H	- <u> </u>	• • •		<u></u>			
1-70		D 1	2	7	D7	2	,] [,	22		D1]	
1 V	12	- I I I I	14	1									
L					112	· ·		S				J	
LEAF 1 = No	PUBESCEN ne 2 = 5	CE LENGTI Short 3 =	l: Medium	4 =	Long	5 = Very	Long				1	J	
LEAF 1 = No	PUBESCEN ne 2 = 5	CE LENGTI Short 3 =	l: Medium 2	 4 =	Long R2	5 = Very	Long	3		R4	<u> </u>	J	
LEAF 1 = No V (Note I	PUBESCEN ne 2 = 5 3 Descriptor #1	CE LENGTI Short 3 = R1 15 can be us	1: Medium 2 ed to des	4 =	Long R2 e type ar	5 = Very 3 and length	Long R of the gla	3 Indular tric		R4 erved.)		J	
LEAF 1 = No (Note I • LEA 1 = Ck	PUBESCEN ne 2 = 5 3 Descriptor #7 F SILHOUE osed 3 =	CE LENGTI Short 3 = 15 can be us TTE: (See F Medium	I: Medium 2 ed to des igure 4) 5 = Oper	4 =	Long R2 e type ar	5 = Very 3	Long R of the gla	3 Indular tric		R4		J	
LEAF 1 = No V (Note I 1 = Ck	PUBESCEN ne 2 = 5 3 Descriptor #1 5 SILHOUE 0sed 3 = 3	CE LENGTI Short 3 = 15 can be us TTE: (See F Medium	I: Medium 2 ed to des Figure 4) 5 = Oper 2	4 =	Long R2 e type ar	5 = Very 3 and length	Long R of the gla	3 Indular tric	homes obs	R4 erved.)	· · ·	J	
LEAF 1 = No (Note I • LEA 1 = Clo	PUBESCEN ne 2 = 5 3 Descriptor #1 F SILHOUE Desed 3 = 3	CE LENGTI Short 3 = 15 can be us TTE: (See F Medium R1	I: Medium 2 ed to des igure 4) 5 = Oper	4 =	Long R2 e type ar R2	5 = Very 3 ad length 3	Long R of the gla	3 Indular tric	homes obs	R4 erved.)		J	
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LEAF 1 = No V (Note I * LEA 1 = Ck V PETIO 1 = Ab V	PUBESCEN ne 2 = 5 3 Descriptor #1 5 SILHOUE 0sed 3 = 3 LES ANTHO sent 3 = 3	CE LENGTI Short 3 = R1 15 cen be us TTE: (See F Medium R1 CCYANIN CC Weak 5	I: Medium 2 ed to des 5 = Oper 2 DLORATI = Medium	4 = cribe th n ION: 7 =	Long R2 e type ar R2 strong R2	5 = Very 3 ad length 3 9 = V	Long R of the gla Yery Stron	3 Indular tric		R4 erved.) R4		J	
LEAF 1 = No V (Note I • LEA 1 = Ck V PETIO 1 = Ab	PUBESCEN ne 2 = 5 3 Descriptor #1 F SILHOUE Desed 3 = 3 LES ANTHO Sent 3 = 3	CE LENGTI Short 3 = R1 15 can be us TTE: (See F Medium R1 OCYANIN C Weak 5 R1 R1	I: Medium 2 Image: second conditions Image: second condition conditions Second conditions Image: second conditions Second conditions	4 = cribe th n ION: 7 =	Long R2 e type ar R2 = Strong R2	5 = Very 3 ad length 3 9 = V 3	Long R of the gla Yery Stron	3 Indular tric 3 9 3	homes obs	R4 erved.) R4			
LEAF 1 = No V (Note I * LEA 1 = Ck V PETIO 1 = Ab LEAF 1 = Ab	PUBESCEN ne 2 = 5 3 Descriptor #1 F SILHOUE Seed 3 = 3 LES ANTHO Sent 3 = 3 STIPULES S Seart 3 =	CE LENGTI Short 3 = R1 15 can be us TTE: (See F Medium R1 OCYANIN CO Weak 5 R1 SIZE: (Se Fig Small 5	I: Medium 2 Image: search of the se	4 = hordbe th ION: 7 = 1 7 =	Long R2 e type ar R2 = Strong R2 = Large	5 = Very 3 ad length 3 9 = V 3	Long R of the gla Yery Stron	3 ndular tric	homes obs	R4 erved.) R4 R4			
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LEAF 1 = No V (Note I) \bullet LEA 1 = Ck V PETIO 1 = Ab V LEAF 1 = Ab V LEAF 1 = Ab V	PUBESCEN ne 2 = 5 3 Descriptor #1 5 SILHOUE 3 = 3 ULES ANTHO 3 = 3 STIPULES S Desent 3 = 3 NAL LEAFL	CE LENGTI Short 3 = R1 15 can be us TTE: (See F Medium R1 OCYANIN C: Weak 5 R1 SIZE: (Se Fig Small 5 R1 SIZE: SHAPE	I: Medium 2 ed to des 5 = Oper 2 DLORATT = Medium 1 1 (See Figu	4 = cribe th n ion: 7 = 1 7 = 1 7 = 1 7 = 1 7 = 1 7 =	Long R2 e type ar R2 = Strong R2 = Large R2 nd 7)	5 = Very 3 ad length 3 9 = V 3	Long The gla I I I I I I I I I I I I I I I I I I I	3 ndular tric 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		R4 erved.) R4 R4			
LEAF 1 = No (Note I * LEA 1 = Ck V PETIO 1 = Ab V LEAF 1 = Ab 1 = Ab V TERMI 1 = Na	PUBESCEN ne 2 = 5 3 Descriptor #1 5 SILHOUE 3 = 3 ULES ANTHO 3 = 3 STIPULES S Basent 3 = 3 NAL LEAFL mowly ovate	CE LENGTI Short 3 = R1 I5 can be us TTE: (See F Medium R1 OCYANIN C Weak 5 R1 SIZE: (Se Fig Small 5 R1 LET SHAPE 2 = Mediu	I: Medium 2 Image: Comparison of the second secon	4 = cr/be th n ION: 7 = 	ICZ Long R2 e type ar R2 Strong R2 = Large R2 nd 7) roadly Ov	5 = Very 3 ad length 3 9 = V 3 5	Long For the gla Jery Stron Lanceol	3 ndular tric 3 9 3 3 3 43 3 43 5 =		R4 erved.) R4 R4 R4	a 7=0	blong 6) = Other

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	rte 2 = Ci	uspidate	3 = Acu	minate 4	na 8) 4 = Obtuse	5 = Oth	er			_		
V	3	R 1	3	R	2 3	F	3		R4			
• TER 1 = Cur	MINAL LEA neate 2 = .	F LET BASE Acute 3	SHAPE = Obtus	: (See Figur e 4 = Co	e9) rdate 5:	= Truncate	6 = Lob	ed 7=	Other			
V	4	R 1	3	R	2 4		3		R4	`		
TERN 1 = Abs	IINAL LEAF I sent 2 = \$	L ET MARGI Slight 3 =	N WAVII Weak	NESS: 4 = Mediun	n 5=Stra	ong						
V	2	R 1	3		2 2	I	3		R 4			
NUMBI	er of prim	ARY LEAFL	.ET PAIF	35 : (See Fig	jure 6)							
AVER/	AGE: 3.14	R 1	2.85	F	2 7.2	F	3		R4			
RANG	L	L	J	J 1		<u> </u>	· · · · · · · · · · · · · · · · · · ·		ţ t			
V	3 to 4	4 R	1 2	to 3	R2	7 ta	9	R3	to		R4	to
1 = Acu	1te 2 = Cu	spidate 3	I = Acum	inate 4=	Obtuse 1	5 = Other _	3	7	R4			
1 = Acu V PRIM 1 = Ver	ate 2 = Cu 3 3 ARY LEAFL 2	spidate 3 R1 ET SIZE: = Small	3 = Med	inate 4 =	Obtuse (2 3	5 = Other _	3		R4			
1 = Acu V PRIM 1 = Ver	Ite 2 = Cu 3 3 ARY LEAFL 2 y Small 2 3 3	spidate 3 R1 ET SIZE: = Smell	3 = Acum 3 = Med R1	inate 4 = R ium 4 = 1 3	Obtuse 1 2 3 _arge 5 =	5 = Other _ • Very Larg • 2 4	3		R4 3		R4	
1 = Acu V PRIM 1 = Ver V PRIMA 1 = Nar	Ite 2 = Cu 3 ARY LEAFL y Small 2 3 RY LEAFLE rowly ovate	spidate 3 R1 R1 ET SIZE: = Small Small [] T SHAPE: [] 2 = Mediur []	3 = Acum 3 = Med R1 : (See Figu	Ium 4 = 1 Ium 4 = 1 3 Jres 6 and 7) 3 = Broadly	Obtuse 1 2 3	Very Larg	3 5 = Elli	R	R4 3	/ = Oblong	R4	ər
1 = Acu V PRIM V PRIMA 1 = Nar	Ite 2 = Cu 3 ARY LEAFL y Small 2 3 RY LEAFLE rowly ovate 2	spidate 3 R1 R1 ET SIZE: = Small Small [] T SHAPE: [] 2 = Mediur [] R1 []	3 = Acum 3 = Med R1 : (See Figu n ovate 1	Ium 4 = 1 Ium 4 = 1 3 Jres 6 and 7 3 = Broadly	Obtuse 3 2 3 arge 5 = 1 1 2 2 2	Very Larg	3 5 = Eilij 23] R prical 6	R4 3 = Ovate R4	/ = Oblong	R 4 8 = Oth	ər
1 = Acu V PRIMA 1 = Ver V PRIMA 1 = Nar V PRIMA 1 = Cur	Ite 2 = Cu ARY LEAFL Small 2 3 RY LEAFLE Towiy ovate 2 RY LEAFLE heate 2 =	spidate 3 R1 R1 = Small [] T SHAPE: [] 2 = Medlur [] R1 [] T BASE SH. Acute 3 =	3 = Acum 3 = Med R1 (See Figu n ovate 1 APE: (S = Obtuse	inate 4 = R Ium 4 = I 3 Jres 6 and 7) 3 = Broadly R ee Figures 6 4 = Cord	Obtuse 3 2 3	Very Larg	23 3 5 = Ellij 23 6 = Lobed	T = Ot	R4 3 = Ovate R4 her	7 = Oblong	R4 8 = Oth	9r
1 = Acu V PRIMA 1 = Ver V PRIMA 1 = Nar V	Ite 2 = Cu ARY LEAFL y Small 2 3 RY LEAFLE Towly ovate 2 RY LEAFLE teate 2 = 1 4	spidate 3 R1 ET SLZE: = Small T SHAPE: (2 = Mediur R1 T BASE SH. Acute 3 = R1	3 = Acum 3 = Med R1 (See Figu n ovate 1 APE: (S Obtuse 3	inate 4 = R Ium 4 = I 3 Jres 6 and 7 3 = Broadly Broadly R ee Figures 6 4 = Cord	Obtuse 3 2 3	Very Larg	23 5 = Ellip 23 6 = Lobed 23	R 6 7 = Ot	R4 3 = Ovate R4 her R4	7 = Oblong	R 4 8 = Oth	9r
1 = Acl PRIMA 1 = Ver V PRIMA 1 = Nar V PRIMA 1 = Cur V NUMBI AVERA	Ite 2 = Cu ARY LEAFL y Small 2 3 RY LEAFLE Towiy ovate 2 RY LEAFLE Towiy ovate 2 RY LEAFLE Towiy ovate 2 RY LEAFLE Comparison 2 = 1 4 Comparison 2 = 1 Comparison 2 = 1 Compar	R1 ET SIZE: = Small T SHAPE: (2 = Mediur R1 T BASE SH. Acute 3 = R1 NDARY AN	3 = Acum 3 = Med R1 (See Figure n ovate 1 APE: (S Obtuse 3 ID TERT	Image 4 = Image R Image 4 = 0 Jures 6 and 7 J = Broadly R Image Figures Image Figures Image Figures Image Figures Image R Image R Image R Image R	Obtuse 3 2 3 arge 5 = 0 0 0 0 2 2 2 2 3 5 = 1 2 4 2 4	S = Other _ Very Larg 2 4 Lanceolat runcate F (See Figu	3 5 = Eilij 3 6 = Lobed 3 re 6)	6 7 = Ot	R4 3 = Ovate R4 her R4	7 = Oblong	R 4 8 = Oth	ər
1 = Acl PRIMA 1 = Ver V PRIMA 1 = Nar V PRIMA 1 = Cur V NUMBI AVERA	Ite 2 = Cu 3 ARY LEAFL y Small 2 3 RY LEAFLE rowly ovate 2 RY LEAFLE rowly ovate 2 AGE: 9.5	spidate 3 R1 ET SIZE: = Small T SHAPE: (2 = Mediur R1 T BASE SH. Acute 3 = R1 DNDARY AN R1	3 = Acum 3 = Med R1 = (See Figure n ovate 1 APE: (S Obtuse 3 ID TERT 2.64	inate 4 = R Ium 4 = I 3 Jres 6 and 7 3 = Broadly Broadly R ee Figures 6 4 = Cord R IARY LEAFI	Obtuse 3 2 3 arge 5 = 0 0 0 0 2 2 2 4 2 4 2 4 2 4 2 9.15	5 = Other _ Very Larg 2 4 Lanceolat runcate (See FigL (See FigL	3 5 = Eill 3 6 = Lobed 3 re 6)	R otical 6 7 = Ot	R4 3 = Ovate R4 her R4 R4	7 = Oblong	R4 8 = Oth	ər

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5. LEAF CHARACTERISTICS: (continued)

\mathbf{V}	8.4		R1	3.38	1	R2	6.6		R3			R4		1		
								l]			L]		
	to	9		2	to	7	R2	5	to 9		R3	t	<u> </u>	ר ר	R4	to
• [~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u> </u>					K2	<u> </u>	0 0					L		
NUMBE	R OF FL	ORET	SANFLO	RESCE	NCE:											
AVERA	GE:															
V	9		R1	9.8]	R2	8.8	ſ	R3			R4]		
		J						Ĺ	100					J		
V		11	R	1 8	to	12	R2	6	to 13		R3	t	0	ר ר	R4	t
		<u> </u>		· ·	~~~~~	·										
CORO	ILA INN	er su	RFACE	COLOR	CHAR	T VALUE	: Royali	Horticul	iture Socie	aty Colo	r Char	t of Muns	ell Color	Chart)Measu	re pred
color of	newly op	en flow	er and c	ircle the	approp	riate colo	r chart)				_					
V	2.5R	8/2		R1	5GY	9/1		2	2.5R8/2		R	3			R4	
] [_					<u> </u>				I			L	
CORO		TER SI	URFACE		R CHAR	RT VALU	E: Roya	I Hortic	ulture Soc	ciaty Co	lor Cha	art o Mu	nsell Colo	or Cha	Meas	ure pre
	newly opi	Bri Tiow	er and c	arcie the	арргор		r cnart)	·		,	·				·····	
V	5R8/2	2		R1	5GY9	9/ 1		2 5	5R8/2		R	3			R4	
* CORO 1 = Whi 11 = Pu Pink-Wh 24 = Re 12 = Ott	DLLA INN Ite 2 = F rple-violet nite 1:3 dViolet-W her	ER SU Red-vic 13 19 = 1 /hite H	RFACE blet 3 = = Violet- Pink-Wh alo 25	COLOR Blue-vid White 1: ite 3:1 = BlueV	t: (Mea blet 4 : 1 14 : 20 = Piu iolet-Wh	sure pred = Cream = Violet- nk-White hite 1:1	dominant 5 = Rea White 1:3 Halo 2 ⁻ 26 = Blu	color o d-purpi 1 = Rec eViolet	f newly op e 6 = Bli = Violet-W IVlolet-Wt -White 1:3	ben flow ue 7 = /hite 3:1 hite 1:1 3 27 =	rer, if fi Pink 16 22 = BlueV	owers an 8 = Pin = Violet- RedViok iolet-Whi	e bi-color k-white White Ha at-White ' te 3:1 2	9 = P 9 = P 10 17 1:3 2 28 = Bl	e use the urple ' = Pink- 3 = Red ueViolet	e ratio (10 = Vi White ' Violet-Viol
* CORO 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Ott	DLLA INN ite 2 = F rple-violet nite 1:3 dViolet-W her 9	ER SU Red-vic 13 19 = 1 hite H	RFACE = Violet- Pink-Wh alo 25 R1	COLOR Blue-vic White 1: ite 3:1 = BlueV	t: (Mea blet 4 : 1 14 : 20 = Pin iolet-Wh	sure pree = Cream = Violet- nk-White hite 1:1	dominant 5 = Re White 1:3 Halo 2 26 = Blu 9	color o d-purpi 1 = Rec eViolet	f newly op e 6 = Bli = Violet-W iVlolet-W -White 1:3 R3	ben flow ue 7 = /hite 3:1 hite 1:1 3 27 =	rer, if fi Pink 16 22 = BlueV	B = Pin = Violet- RedViok iolet-Whi	e bi-color k-white White Ha at-White te 3:1 2	please 9 = P lo 17 1:3 2 28 = Bl	e use the urple ' ' = Pink- 3 = Red ueViolet	e ratio (10 = Vi White ' Violet- -White
CORO 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth V COROL 1 = Ven	DLLA INN ite 2 = F rple-violet dViolet-W her 9	ER SU Red-vic 13 19 = 1 Thite H PE: (S 2 = R	RFACE blet 3 = = Violet- Pink-Wh alo 25 R1 ee Figur	COLOR = Blue-vie White 1: ite 3:1 = BlueV 	:: (Mea blet 4 : 1 14 : 20 = Pir iolet-Wh	sure prei = Cream = Violet- nk-White tite 1:1 R2 4 = Sei	dominant 5 = Re White 1:3 Halo 2' 26 = Blu 9 9	color o d-purpi 1 = Rec eVioiet	f newly op e 6 = Bli = Vlolet-W IVlolet-Wr -White 1:3 R3	ben flow ue 7 = /hite 3:1 hite 1:1 3 27 =	er, if fi ∶ Pink │ 16 22 = BlueV	R4	e bi-color k-white White Ha at-White te 3:1 2	pleas 9 = P lo 17 1:3 2 28 = Bl	e use tha urple ' ' = Pink- 3 = Red ueViolet	e ratio 10 = V White Violet- -White
CORO 1 = Wh 11 = Pu Pink-Wh 24 = Re 12 = Oth V COROL 1 = Veny	DLLA INN Ite 2 = F rple-violentite 1:3 dVloiet-W her 9 y rotate	ER SU Red-vic 13 19 = hite H 2 = R 2 = R	RFACE = Violet Pink-Wh alo 25 R1 ee Figur	COLOR = Blue-vic White 1: ite 3:1 = BlueV 1 = 10) 3 = Pent	t: (Mea blet 4 : 1 14 : 20 = Pin iolet-Wh	esure pree = Cream = Violet. nk-White hte 1:1 R2 4 = Set	dominant 5 = Re White 1:3 Halo 2' 26 = Blu 9 mi-stellate	color o d-purpi 1 = Rec eViolat	f newly op e 6 = Bi = Violet-W Violet-W -White 1:3 R3 Stellate	2en flow ue 7 = /hite 3:1 hite 1:1 3 27 =	er, if fl Pink 16 22 = BlueV	RedViok	e bi-color k-white White Ha at-White te 3:1 2	<pre> please 9 = P lo 17 1:3 2 28 = Bl]] </pre>	e use the urpie ' ' = Pink- 3 = Red ueViolet	e ratio I0 = V White Violet- -White
CORO 1 = Wh 11 = Pu Pink-Wh 24 = Re 12 = Ott V COROL 1 = Veny	DLLA INN Ite 2 = F rple-violet 13 dViolet-W her 9 .LA SHAF y rotate 2	ER SU Red-vic 13 19 = 1 Thite H PE: (S 2 = R	RFACE slet 3 = = Violet. Pink-Wh alo 25 R1 ee Figur bate R1	COLOR = Blue-Vid White 1: ite 3:1 = BlueV 1 = 10) 3 = Pent 3	t: (Mea blet 4 : 1 14 : 20 = Pin iolet-Wh	esure pree = Cream = Violet- nk-White tite 1:1 R2 4 = Sec R2	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 ml-stellate 3	color o d-purpi 1 = Rec eViolet	f newly op e 6 = Bil = Violet-W tViolet-Wi -White 1:3 R3 Stellate R3	2en flow ue 7 = /hite 3:1 hite 1:1 3 27 =	er, if fl Pink 16 22 = BlueV	Red	e bi-color k-white White Ha at-White 1 te 3:1 2	please 9 = P lo 17 1:3 2 28 = Bl	e use the urple ' ' = Pink- 3 = Red ueViolet	e ratio 10 = V White Violet- -White
CORO 1 = Wh 11 = Pur Pink-Wr 24 = Re 12 = Ott V COROL 1 = Very ZESCE	PLLA INN Ite 2 = F rple-violed hite ite 1:3 dViolet-W her 9 LA SHAF y rotate 2	ER SU Red-vic 13 19 = 1 Thite H PE: (S 2 = R 2	RFACE olet 3 = = Violet- Pink-Wh alo 25 R1 ee Figur otate R1 R1	COLOR = Blue-Vit White 1: ite 3:1 = BlueV 1 = 10) 3 = Pent 3 CS:	t: (Mea olet 4 : 1 14 : 20 = Pii iolet-Wh	esure pree = Cream = Violet- nk-White hte 1:1 R2 4 = Sec R2	dominant 5 = Re White 1:3 Halo 2 26 = Blu 9 mi-stellate 3	color o d-purpi 15 1 = Rec eViolat	f newly of e 6 = Bil = Violet-W tViolet-Wt -White 1:3 R3 Stellate R3	2007 See flow 2007 See See See See See See See See See Se	rer, if fl Pink 16 22 = BlueV	Red	e bi-color k-white White Ha at-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bl]</pre>	e use the urple ' ? = Pink- 3 = Red ueViolet	e ratio I0 = V White Violet-' -White
CORO 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth V COROL 1 = Veny V COROL 1 = Veny COROL 1 = Abstrong COROL 1 = Veny COROL 1 = Abstrong COROL 1 = Veny COROL 1 = Abstrong COROL 1 = Abstrong 1 =	DLLA INN Ite 2 = F rple-violentite 1:3 idViolet-W her 9 LA SHAF y rotate 2 NCE CHA ANTHOC ent 3 =	ER SU Red-vic 19 = 1 PE: (S 2 = R RACT RACT	RFACE Solet 3= = Violet- Pink-Wh alo 25 R1 ee Figur bate R1 ERISTIC	COLOR Blue-Vid White 1: ite 3:1 = BlueV 1 1 e 10) 3 = Pent 3 CS: RATION Medium	t: (Mea blet 4 : 20 = Pin lolet-Wh	esure pree = Cream = Violet- nk-White tite 1:1 4 = Seu R2 Strong	dominant 5 = Rei White 1:3 Halo 2' 26 = Blu 9 mi-stellate 3 9 = Very	color o d-purpl 15 1 = Rec eViolet	f newly op e 6 = Bi = Violet-W IViolet-Wf -White 1:3 R3 Stellate R3	2en flow ue 7 = /hite 3:1 hite 1:1 3 27 =	rer, if fl Pink 16 22 = BlueV	R4	e bi-color k-white White Ha st-White Ha st-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]</pre>	e use th urple ' ' = Pink- 3 = Red ueViolet	e ratio 10 = V White Violet- White
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COROL 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth V COROL 1 = Veny V COROL 1 = Veny COROL 1 = Veny COROL 1 = Veny COROL 1 = Veny V	PLLA INN Ite 2 = F rple-violet ite 1:3 dVlolet-W her 9 LA SHAF y rotate 2 NCE CHA ANTHOC ent 3 = 2	ER SU Red-vic 19 = 1 Thite H PE: (S 2 = R RACT	RFACE = Violet- = Violet- Pink-Wh alo 25 R1 ee Figur ctate R1 ERISTIC S = R1	COLOR Blue-Vid White 1: ite 3:1 = BlueV 1 9 10) 3 = Pent 3 CS: RATION Medium 1	: (Mea blet 4 : 1 14 : 20 = Pin iolet-Wh]] 7 = 5	esure pree = Cream = Violet- nk-White tite 1:1 4 = Sec R2 Strong R2	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 mi-stellate 3 9 = Very 3	color o d-purpl 15 1 = Rec eViolet	f newly op e 6 = Bil = Violet-W tViolet-Wi -White 1:3 R3 Stellate R3 R3	2en flow ue 7 = /hite 3:1 hite 1:1 3 27 =	rer, if fl Pink 16 22 = BlueV	R4	e bi-color k-white White Ha st-White Ha st-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bl]]</pre>	e use th urple ' ' = Pink- 3 = Red ueViolet	e ratio I0 = V White Violet- -White
COROL 1 = Whi Pink-Wr 24 = Re 12 = Ott V COROL 1 = Very COROL CALYX 1 = Absu	PLLA INN Ite 2 = F rple-violed ite 1:3 Violet-W 9 LA SHAF 9 LA SHAF 2 NCE CHA ANTHOO emt 3 = 2 R COLOF	ER SU Red-vic 13 19 = hite H PE: (S 2 = R RACT RACT	RFACE Jet 3 = = Violet- Pink-Wh alo 25 R1 ee Figur otate R1 ERISTIC N COLO 5 = R1 R1	COLOR E Blue-Vi: White 1: ite 3:1 = BlueV 1 6 10) 3 = Pent 3 CS: RATION Medium 1 UE: Ro	t: (Mea olet 4: 20 = Pir iolet-Wh]] agonal] 7 = \$	sure prei = Cream = Violet- nk-White 1:1 R2 4 = Sei R2 Strong R2	dominant 5 = Re White 1:3 Halo 2' 26 = Blu 9 mi-stellate 3 9 = Very 3	color o d-purpl 15 1 = Rec eViolet	f newly of e 6 = Bil = Violet-W Wolet-W -White 1:3 R3 Stellate R3 R3 R3	see Column	er, if fli Pink 16 22 = BlueV	R4	e bi-color k-white White Ha at-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]]]</pre>	e use the urple ' ' = Pink- 3 = Red ueViolet	e ratio (10 = Vi White Violet- -White
COROL 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth 24 = Re 12 = Oth COROL 1 = Veny COROL 1 = Abset COROL 1 = Abset 1	DLLA INN Ite 2 = F rple-violet ite 1:3 QViolet-W P 9 LA SHAF y rotate 2 NCE CHA ANTHOO ent 3 = 2 R COLOF ed and cirr	ER SU Red-vic 19 = 1 19 = 1 11	RFACE = Violet- Pink-Wh alo 25 R1 ee Figur cotate R1 ERISTIC N COLO 5 = R1 R1 RT VAL appropi	COLOR Blue-Vid White 1: ite 3:1 = BlueV 1 a 10) 3 = Penti 3 CS: RATION Medium 1 UE: Ro fate colo	:: (Mea blet 4: 20 = Pin iolet-Wh]] agonal]] 7 = \$] yal Hort	esure pree = Cream = Violet- nk-White tite 1:1 4 = Sec R2 Strong R2 iculture S	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 mi-stellate 3 9 = Very 3	color o d-purpl 15 1 = Rec eViolet	f newly op e 6 = Bil = Violet-W tViolet-Wi -White 1:3 R3 Stellate R3 R3 R3 ert of Mun	Seen flow ue 7 = /hite 3:1 hite 1:1 3 27 =	rer, if flue Pink 16 22 = BlueV or Cha	R4	e bi-color k-white White Ha st-White Ha st-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]]]]</pre>	e use th urple ' = Pink- 3 = Red ueViolet	e ratio (10 = V White Violet- -White
COROL 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Ott V COROL 1 = Very COROL 1 = Very COROL 1 = Very COROL 1 = Very COROL 1 = Very COROL 1 = Pust COROL 1 = Very COROL 1 = Pust COROL 1 = Very COROL 1 = Abst COROL V COROL 1 = Abst COROL V COROL	DLLA INN Ite 2 = F rple-violed ite 1:3 dVlolet-W 9 LA SHAF 9 LA SHAF 9 LA SHAF 9 R COLOF ed and cir 2.578/	ER SU Red-vic 13 19 = hite H PE: (S 2 = R RACT RACT SYANII SYAN	RFACE Jet 3 = Violet- Pink-Wh alo 25 R1 ee Figur obate R1 ERISTIC N COLO 5 = R1 RT VAL appropi R 1	COLOR Blue-Vit White 1: ite 3:1 = BlueV 1 3 = Pent 3 CS: RATION Medium 1 UE: Ro fate colo	:: (Mea blet 4: 1 14: 20 = Pin iolet-Wh]] agonal] 7 = §] yal Hort r chart)	Esure pret = Cream = Violet- nk-White tite 1:1 R2 4 = Set R2 Strong R2 iculture S	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 9 mi-stellate 3 9 = Very 3 Society Co	color o d-purpl 15 1 = Rec eViolet (strong	f newly of e 6 = Bil = Violet-W Wiolet-W White 1:3 R3 Stellate R3 ert of Mun	sen flow ue 7 = /hite 3:1 nite 1:1 3 27 =	rer, if flue Pink 16 22 = BlueV or Cha	R4	e bi-color k-white Ha at-White S te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]]]]]]]]]]]]]]]]]]]</pre>	e use the urple ' ? = Pink- 3 = Red ueViolet	e ratio (10 = Vi White Violet- -White
COROL 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth 24 = Re 12 = Oth COROL 1 = Veny COROL 1 = Veny COROL COROL 1 = Veny COROL	DLLA INN Ite 2 = F rple-violed ite 1:3 dVloiet-W 9 J.LA SHAF y rotate 2 NCE CHA ANTHOC ent 3 = 2 R COLOF ed and cir 2.5Y8/	ER SU Red-vic 19 = 1 19 = 1 19 = 1 PE: (S 2 = R 2 = R RACT Cle the RACT	RFACE Violet- Pink-Whalo 25 R1 ee Figur bate R1 ERISTIC N COLO 5 = R1 RT VAL appropi	COLOR Blue-Vi White 1: ite 3:1 = BlueV 1 a 10) 3 = Penti 3 CS: RATION Medium 1 UE: Ro fate colc 2.5Y8,	: (Mea blet 4: 1 14: 20 = Pin lolet-Wh]] agonal]] 7 = \$] yal Hort r chart)	esure pree = Cream = Violet- nk-White the 1:1 R2 4 = Sec R2 Strong R2 iculture S	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 mi-stellate 3 9 = Very 3 Society Co	color o d-purpl 15 1 = Rec eViolet	f newly op e 6 = Bil = Violet-W tViolet-Wi -White 1:3 R3 Stellate R3 R3 art of Mun R3	sen flow ue 7 = /hite 3:1 nite 1:1 3 27 =	rer, if fli Pink 16 22 = BlueV or Cha	R4	e bi-color k-white White Ha st-White Ha st-White 1 te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]]]]]] a newly]</pre>	e use th urple ' = Pink- 3 = Red ueViolet	e ratio (10 = V White Violet- -White
COROL 1 = Whi 11 = Pun Pink-Wr 24 = Re 12 = Ott 2 =	PLLA INN Ite 2 = F rple-violed hite 1:3 Violet-We 9 LA SHAF y rotate 2 NCE CHA ANTHOC ent 2 R COLOF ed and cir 2.5Y8/ R SHAPE ad cone	ER SU Red-vic 13 19 = hhite H PE: (S 2 = Ri PE: (S 2 = Ri RACT RACT RACT RACT : (See 2 = (See (See(See(See(See(See(See(See(See(Se	RFACE Jet 3 = Violet- Pink-Wh alo 25 R1 ee Figure bate R1 ERISTIC N COLO 5 = R1 RT VAL appropi R1 Figure 1 Narrow	COLOR Blue-Vit Blue-Vit ite 3:1 = BlueV 1 e 10) 3 = Pent 3 CS: RATION Medium 1 UE: Ro fate colc 2.5Y8, 1) cone	: (Mea blet 4: 1 14: 20 = Pin iolet-Wh] agonal] 7 = 5] yal Hort r chart)]] 3 = Pea	isure prei = Cream = Violet- nk-White tite 1:1 R2 4 = Sei R2 Strong R2 iculture S R2	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 9 3 9 = Very 3 Society Co 2.5Y8/ d cone	color o d-purpl 15 1 = Rec eViolet [] strong olor Chi ID 4 = L	f newly of e 6 = Bil = Violet-W Wolet-W White 1:3 R3 Stellate R3 ert of Mun R3 ert of Mun	sen flow ue 7 = /hite 3:1 /hite 1:1 3 27 =	rer, if fli Pink 16 22 = BlueV or Cha	R4	e bi-color k-white Ha at-White S te 3:1 2	<pre>please 9 = P lo 17 1:3 2 28 = Bi]]]]]]]]]]]]]]]]]]]</pre>	e use th urple ' = Pink- 3 = Red ueViolet	e ratio (10 = Vi White Violet- -White
COROL 1 = Whi 11 = Pu Pink-Wr 24 = Re 12 = Oth 24 = Re 12 = Oth COROL 1 = Veny COROL 1 = Post COROL 1 = Veny COROL 1 = Oth COROL 1 = Veny COROL 1 = Oth COROL 1 = Oth CORO	DLLA INN Ite 2 = F rple-violed ite 1:3 dVloiet-W her 9 LA SHAF y rotate 2 NCE CHA ANTHOC ent 3 = 2 R COLOF ed and cir 2.5Y8/ R SHAPE ad cone 2	ER SU Red-vic 19 = 1 19 = 1 19 = 1 PE: (S 2 = R RACT Cle the Cle the 10 : (See 2 =	RFACE Jolet 3 = = Violet- Pink-Wh alo 25 R1 ee Figur control R1 ERISTIC N COLO 5 = R1 R1 R1 Figure 1 Narrow D 1	COLOR Blue-Vid White 1: ite 3:1 = BlueV 1 a 10) 3 = Penti 3 CS: RATION Medium 1 UE: Ro fate colc 2.5Y8, 11) cone 2	: (Mea blet 4: 20 = Pin iolet-Wh]] agonal] 7 = S] yal Hort r chart) / / O 3 = Pea	estree pree = Cream = Violet- nk-White tite 1:1 R2 4 = Sec R2 Strong R2 iculture S iculture S R2 ar-shape	dominant 5 = Rei White 1:3 Halo 2 26 = Blu 9 mi-stellate 3 Society Co 2.5Y8/ d cone	color o d-purpl 15 1 = Rec eViolet [] strong plot Chi plot Chi plot Chi qlot Chi	f newly op e 6 = Bil = Violet-W tViolet-Wi -White 1:3 R3 Stellate R3 ert of Mur R3 ert of Mur R3 oose 5	sen flow ue 7 = /hite 3:1 /hite 1:1 3 27 =	rer, if flue Pink 16 22 = BlueV or Cha	R4	e bi-color k-white White Ha st-White J te 3:1 2	<pre> please 9 = P lo 17 1:3 2 28 = Bi]]] a newly] </pre>	e use th urple ' = Pink- 3 = Red ueViolet	e ratio (10 = Vi White Violet- -White

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6.	INFLORESCENCE	CHARACTERISTICS:	(continued)

V	2	R1 2	R2	3	R3	R4	
STIGM 1 = Сај	A SHAPE: (Se bitate 2 = Cl	e Figure 12) avate 3 Bi-l	obed				
V	1	R1 2	R2	1	R3	R4	
STIGM	A COLOR CH/	ART VALUE:	Royal Horticulture S	Society Color	Chart of Munsel Co	lor Chart Circle the appro	priate color chart)
V	5G5/6	R 1	5G5/6	R2	5G5/6	R3	R 4
BERRY 1 = Abs	PRODUCTIO ent 3 = Lo	N: (Under field) w 5 = Mode	conditions) arate 7 = Heavy	y 9 = Ver	у Неаvy		
V	5	R1 3	R2	3	R3	R4	
	ACTERISTICS						
• PRE 1 = Wh 10 = Pu	DOMINANT SK ite 2 = Light Irple 11 = Da	SIN COLOR: t Yellow 3 = ark purple-black	Yellow 4 = But 12 = Other	f 5 = Tar	n 6 = Brown 7	' = Pink 8 = Red 9	= Purplish-red
V	2	R1 2	R2	2	R3	R4	
PREDO	MINANT SKIN	I COLOR CHAI	RT VALUE: Royal	Horticulture	Society Color Chart	Munsell Color Chart (Ci	rcle the appropriate col
V	2.5Y7/4	R1	2.5Y7/4	R2	2.5Y7/4	R3	R4
SECON 1 = Abs	DARY SKIN C ent 2 = Pr	OLOR:	describe)				
V	1	R 1	1	R2	1	R3	R4
		[1		
SECON	IDARY SKIN C		VALUE: Royal H	orticulture S	ociety Color Chart or	Munsell Color Chart (Circ	le the appropriate color
V		R 1		R2		R3	R4
SECON 1 = Eve	DARY SKIN C s 2 = Evebr	OLOR DISTRI	BUTION: (See Figu ashed 4 = Sca	ure 13) ttered 5	= Spectacled 6 =	Stippled 7 = Other	
		D 1		[]	D2		
•			<u> </u>		KJ	K 4	
	EXTURE: poth 2 = Ro	ugh (flaky)	3 = Netled 4 = 1	Russetted	5 = Heavily russet	ed 6 = Other	
SKIN T 1 = Smo		R1 3	R2	3	R3	R4	
SKIN T 1 = Sma V	2						

TUBER SHAPE (See FigUR 34) 3 = Oval 4 = Oblog 5 = Long 6 = Other V 2 R1 2 R2 2 R3 R4 TUBER THICKNESS: 1 = Round 2 = Modum thick 3 = Slightly flattened 4 = Flattaned 5 = Other R4		ACTERISTICS	: (continued)							
V 2 R1 2 R2 2 R3 R4 TUBER THICKNESS: 1 = Round 2 = Medium thick 3 = Slightly flattened 4 = Flattened 5 = Other V 2 R1 2 R2 2 R3 R4 TUBER THICKNESS: V 2 R1 2 R2 R3 R4 TUBER LENGTH (mm): AVERAGE: V 66.6 R1 79.9 R2 66.3 R3 R4 RANGE: V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE: V 238 R1 198 R2 211 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 59.1 R1 72.4 R2 62.3 R3	• TUBE 1 = Con	R SHAPE: (See npressed 2	= Figure 14) = Round 3 =	Ovai 4 = Obio	ng 5 = La	ng 6 = Other_			<u> </u>	
TUBER THICKNESS: 1 = Round 2 = Nedium thick 3 = Slightly flattened 4 = Flattened 5 = Other V 2 R1 2 R2 2 R3 R4 TUBER LENGTH (mm): AVERAGE: V 66.6 R1 79.9 R2 66.3 R3 R4 TUBER LENGTH (mm): AVERAGE: V 66.6 R1 79.9 R2 66.3 R3 R4 AVERAGE: V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 196 R2 211 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 R4 V 59.1	V	2	R1 2	R2	2	R3	F	R4		
V 2 R1 2 R2 2 R3 R4 TUBER LENGTH (mm): AVERAGE: V 66.6 R1 79.9 R2 66.3 R3 R4 RANGE: V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 236 R1 196 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 48 to 107 R2 42 <t< th=""><th>TUBER 1 = Rou</th><th>THICKNESS: nd 2 = Med</th><th>ium thick 3 =</th><th>Slightly flattened</th><th>4 = Fla</th><th>tened 5 = Othe</th><th>۰۳</th><th></th><th></th><th></th></t<>	TUBER 1 = Rou	THICKNESS: nd 2 = Med	ium thick 3 =	Slightly flattened	4 = Fla	tened 5 = Othe	۰۳			
TUBER LENGTH (mm): AVERAGE: V 66.6 R1 79.9 R2 66.3 R3 R4 RADRE: V 47 to 111 R1 52 to 130 R2 42 to R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 69.1 R1 72.4 R2 62.3 R3 R4 V 42 to 82 R4 to STANDARD DEVIATION: V 4.5 R1 4.8 to 107 R2 4.2 to 82 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g	V	2	R1 2	R2	2	R3] [F	R4		
V 66.6 R1 79.9 R2 66.3 R3 R4 RANGE: V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 59.1 R1 72.4 R2 62.3 R3 R4 STANDARD DEVIATION: V 42 to 82 R1 48 to 7.53 R1 14.3 R2 8.7 R3 R4 <th>TUBER AVERA</th> <th>LENGTH (mm GE:</th> <th>):</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	TUBER AVERA	LENGTH (mm GE:):							
RANGE: V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 AVERAGE: V 42 to 82 R1 48 to 72.42 to 82 R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 V 238 R1 198 R2 211 R3 R4	V	66.6	R1 79.9	R2	66.3	R3	F	k 4		
V 47 to 111 R1 52 to 130 R2 42 to 103 R3 to R4 to STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 STANDARD EVIATION: V 42 to 82 R1 48 to 107 R2 42 to 82 R3 to V 42 to 82 R1 14.8 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 7.53 R1 14.8 R2 211 R3 R4	RANGE		L				J L			
STANDARD DEVIATION: V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 STANDARD DEVIATION: V 42 to 82 R3 to R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	V	47 to 11	1 R1	52 _{to} 130	R2	42 to 103	R3	to	R4	to
V 12.35 R1 15.5 R2 11.1 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 V 59.1 R1 72.4 R2 62.3 R3 R4 STANDARD DEVIATION: V 42 to 82 R3 to R4 to V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	STAND	ARD DEVIATIO	DN:							
AVERAGE WEIGHT OF SAMPLE TAKEN: V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 42 to 82 R1 48 to 107 R2 42 to 82 R3 to R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	V	12.35	R1	15.5	R2	11.1	R3		R4	
V 238 R1 198 R2 211 R3 R4 TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RAMEE: V 59.1 R1 72.4 R2 62.3 R3 R4 RAMEE: V 42 to 82 R1 48 to 107 R2 42 to 82 R3 to R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	AVERA	GE WEIGHT O	F SAMPLE TAI	CEN :	J <u> </u>		,	· · ·		
TUBER WIDTH (mm) AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 42 to R4 to STANDARD DEVIATION: R1 14.3 R2 8.7 R3 R4 V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): R1 198 R2 211 R3 R4	V	238	R 1	198	R2	211	R 3		R4	
AVERAGE: V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 42 to 82 R1 48 to 7.53 R1 48 to 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	TUBER	WIDTH (mm)		I	J []	1				
V 59.1 R1 72.4 R2 62.3 R3 R4 RANGE: V 42 to 82 R1 48 to 107 R2 42 to 83 to R4 to V 42 to 82 R1 48 to 107 R2 42 to 84 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	AVERA	GE:								
RANGE: V 42 to R1 48 to R2 42 to R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	V	59.1	R1 72.4	R2	62.3	R3	F	<u>.</u>		
V 42 to R1 48 to R2 42 to R4 to STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 0 R4 10 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	RANGE	:	L			L				
STANDARD DEVIATION: V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	v	42 to 82	R1	48 to 107	R2 4	2 to 82	R3	to	R4	to
V 7.53 R1 14.3 R2 8.7 R3 R4 AVERAGE WEIGHT OF SAMPLE TAKEN (g): V 238 R1 198 R2 211 R3 R4	STAND		DN:							
AVERAGE WEIGHT OF SAMPLE TAKEN (g):	v	7.53	R1	14.3	R2	8.7	R3		R4	
V 238 R1 198 R2 211 R3 R4	AVERA	GE WEIGHT O		(EN (g):	J L	I	, L	<u></u>		
	V	238	D 1	198	Do	211	R3		R4	

7.

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AVERAGE:	
V 46.1	R1 56.3 R2 48.7 R3 R4
RANGE:	
V 28 to	88 R1 32 to 83 R2 39 to R4 to
STANDARD DEVIA	ATION:
V 6.59	R1 10.6 R2 5.3 R3 R4
LL	
V 238	R1 198 R2 211 R3 R4
TUBER EYE DEPTI	н:
1 = Protruding 3	3 = Shallow 5 = Intermediate 7 = Deep 9 = Very deep
V 3	R1 5 R2 4 R3 R4
TUBER LATERAL E	EYES:
1 = Protruding 3	3 = Shallow 5 = Intermediate 7 = Deep 9 = Very deep
V 3	R1 5 R2 4 R3 R4
LI	
NUMBER EYE/TUB	BER:
AVERAGE:	
V 7.5	R1 8.8 R2 10.1 R3 R4
RANGE:	
V 4 to	13 R1 4 to 16 R2 6 to 18 R3 to R4 to
DISTRIBUTION OF	TUBER EYES:
1 = Prédominantly a	
V 2	R1 2 R2 2 R3 R4
PROMINENCE OF 1	TUBER EYEBROWS:
	Slight provision $2 = Nadtum provision = 4 = Van complement = 5 = Other$
1= Absent 2 = S	

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V 1	R1 1	R2	1 R.	B R	4
PRIMARY TUBER FLI chart)	ESH COLOR CHART	VALUE: Royal Horticult	ure Society Color Chart of	unsell Color Chart Circle th	e appropriate
V 2.5Y8/4	R1 2.5	(8/4 R2	2.5Y8/4 R	B R	4
SECONDARY TUBER 1 = Absent 2 = 1	Present, please descri	be:			
SECONDARY TUBER 1 = Absent 2 = 1	Present, please descri	be:	R3	R4	
SECONDARY TUBER	Present, please descri	R2 1	R3	R4	e the appropr
SECONDARY TUBER	Present, please descri	R2 1	R3	R4	e the approp



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8. DISEASES CHARACTERISTICS: DISEASES REACTION: 0 = Not Tested 1 = Highly Resistant 2 = Resistant Few Symptoms 3 = Resistance Few Lessions in Number and Size 4 = Moderately Resistance 5 = Intermedia Susceptible 6 = Moderate Susceptible 7 = Susceptible 9 = Highly Susceptible LATE BLIGHT: (Phytophthora) **R2 R1 R3 R4** V 7 7 5 EARLY BLIGHT: (Alternaria) V **R1 R**2 **R3 R4** 6 6 4 SOFT ROT (Erwinia) **R**1 R2 **R3 R4** V 0 0 0 **COMMON SCAB (Streptomyces)** V **R2 R3 R4** 4 **R**1 7 6 **POWDERY SCAB (Spongospora)** R2 **R3 R4** V 0 **R**1 0 0 DRY ROT (Fusarium) **R3 R4** V 0 **R**1 0 R2 0 POTATO LEAF ROLL VIRUS (PLRV) V **R1 R2** 0 **R3 R4** 0 0

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8. DISEASES CHARACTERISTICS: (continued)



9. PESTS CHARACTERISTICS:

PEST REACTION: 0 = Not Tested 1 = Highly Resistant 2 = Resistant Few Symptoms 3 = Resistance Few Lessions in Number and Size 4 = Moderately Resistance 5 = Intermedia Susceptible 6 = Moderate Susceptible 7 = Susceptible 9 = Highly Susceptible

COLORADO POTATO BEETLE (CPB) (Leptinotarsa)



10. GENE TRAITS: INSERTION OF GENES: 1 = YES 2 = NO IF YES, describe the gene(s) introduced or attach information: 11. QUALITY CHARACTERISTICS: CHIEF MARKET: SPECIFIC GRAVITY (wt. air/wt. air - wt. water) 2 = 1.060-1.069 3 = 1.070-1.079 4 = 1.080-1.089 5 = >1.090 1 = <1.060 **R3** R4 **R2 R**1 4 4 V 4 TOTAL GLYCOALKALOID CONTENT (mg./100 g. fresh tuber) **R3 R1** 28.0 **R**2 18.1 R4 11.0 V OTHER QUALITY CHARACTERISTICS: Describe any other quality characteristics that may aid in identification, (e.g., chip-processing, french fry processing, baking, boiling, after-cooking darkening). Please attach data and corresponding protocol. for data and protocol please see 'Exhibit D' Chip processing 12. CHEMICAL IDENTIFICATION: Describe chemical traits of the candidate variety that aid in its identification (e.g., protien or DSN electrophoresis). Please attach data and the corresponding protocol.

ISOZYMES	1 = YES	2 = NO	
IF YES, atta	ch informati	on	

2 = NO 14. DNA PROFILE: 1 = YES

IF YES, attach information

15. ADDDITIONAL COMMENTS AND CHARACTERISTICS:

Include any additional descriptors that would be useful in distringuishing the candidate variety.

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The characteristic should be observed after about 10 weeks to obtain a good differentiation in the collection.



Small stipular leaf

General structures

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Medium stipular leaf

Large stipular leaf

Flaure 6: Leaf Dissection



Figure 7: Terminal Leaflet Shape/Primary Leaflet Shape



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Figure 9: Terminal Leaflet Shape of Base/Primary Leafelet Shape of Base



Figure 10: Corolla Shape



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Huaman, Z., Williams, J.T., Salhuana, W. and Vincent, L. Descriptors for the cultivated potato and the maintenance and distribution of germplasm collections. 1977. International Board for Plant Genetic Resources. Rome, Italy.

Potato (Solanum tuberosum L.) Guidelines for the conduct of tests for distinctness, uniformity and stability. International union for the protection of new varieties of plants (UPOV). 2004-03-31.

<u>Exhibit D</u> Additional Descriptive Information

Table 1. Specific Gravity of Tundra compared to Snowden: Tundra is most similar to Snowden; however, data from 37 replicated trials conducted between 2001 and 2011 indicated that Tundra differs from Snowden by having consistently higher specific gravity. According to a t-paired test of the 37 locations the probability of error in concluding this difference = 0.0000091. Specific gravity was recorded as weight of the tuber in air compared to the weight of the same tubers in water.

(weight in air)-(weight in water)						
Year	Trial	Location	Tundra (W2310-3)	Snowden		
2011	USPB/SFA	Howard City, MI	1.083	1.075		
2011	USPB/SFA	CA	1.099	1.090		
2011	USPB/SFA	Florida	1.089	1.076		
2011	USPB/SFA	Мо	1.076	1.064		
2011	USPB/SFA	NC	1.099	1.094		
2011	USPB/SFA	ID	1.099	1.093		
2011	USPB/SFA	ME	1.087	1.085		
2011	USPB/SFA	MI	1.083	1.075		
2011	USPB/SFA	ND	1.091	1.096		
2011	USPB/SFA	OR	1.074	1.079		
2011	USPB/SFA	PA	1.084	1.075		
2011	USPB/SFA	WI	1.085	1.081		
2010	USPB/SFA	Florida	1.075	1.073		
2010	USPB/SFA	Aberdeen, ID	1.093	1.094		
2010	USPB/SFA	Presque Isle, ME	1.094	1.094		
2010	USPB/SFA	Howard City, MI	1.082	1.077		
2010	USPB/SFA	Charleston, Mo	1.074	1.074		
2010	USPB/SFA	Chest Spring, PA	1.090	1.085		
2010	USPB/SFA	Red River Valley, ND	1.081	1.079		
2010	USPB/SFA	Hancock, WI	1.087	1.088		
2010	USPB/SFA	Tyrrell County, NC	1.075	1.074		
2008	NCR	Montcalm, MI	1.092	1.091		
2008	NCR	Becker, MN	1.086	1.092		
2008	USPB/SFA	Tyrrell County, NC	1.094	1.094		
2008	NCR	Scottsbluff, NE	1.086	1.075		
2008	NCR	Tappen, ND	1.100	1.096		
2008	NCR	Howard City, MI	1.079	1.071		
2008	NCR	Hopple, ND-dry	1.099	1.101		
2007	USPB/SFA	Tyrrell County, NC	1.084	1.083		
2006	SPP	Hancock, WI	1.090	1.084		
2006	SPP	Rhinelander, WI	1.090	1.081		
2006	NCR	Montcalm, MI	1.087	1.080		
2003	WVT	Hancock, WI	1.089	1.087		
2002	Han2	Hancock, WI	1.092	1.081		
2002	Rhil	Rhinelander, WI	1.099	1.089		
2001	Hanl	Hancock, WI	1.081	1.075		
2001	Rhil	Rhinelander, WI	1.091	1.081		
		Minimum	1.074	1.064		
	37 Trials	Maximum	1.100	1.101		
8 years		Average Specific Gravity	1.0875	1.0833		
		Standard Deviation	0.0076	0.0087		
		T paired-test (Probability)	0.00	00091***		

SG = Weight of tubers in air

Note: USPB/SFA= United States Potato Board/Snack Food Association Trial. NCR= North Central Potato Regional Trial. SPP = Wisconsin SpudPro Trial. WVT= Wisconsin Variety Trial. Han1, Han2 and Rhi1 = Wisconsin Breeding Trials conducted at the Hancock and Rhinelander Agricultural Research Stations. Chip Color and Glucose Values of Tundra compared to Snowden (Long Storage Tests): Tundra is most similar to Snowden; however, data from storage tests conducted over three years and two locations indicate that Tundra fry color is consistently lighter than Snowden (higher Agtron values and lower USPB chip scores), when potatoes are fried from cold (42 and 45F storage) after seven month of storage. Similarly, glucose values are lower. Chipping scores were read using an Agtron M30 reflectance color meter. The instrument was standardized using the red mode, with the black reference disc (00) at 0 and the white disk at 90. The chips, 20-25 were crushed by hand to provide an even distribution of the sample and then placed in a 16 cm diameter sample cup and positioned on the viewer. Samples were read in triplicate and the mean of the measurements calculated. Tuber glucose content was evaluated using an YSI 2700 Industrial Analyzer and an YSI 2365 glucose membrane kit (Yellow Spring Instrument Co., Inc., Yellow Spring, OH) following Sowokinos et al. (2000) procedures.



Literature cited

Sowokinos, J.R., C.C. Shock, T.D. Stieber, and E.P. Eldredge. 2000. Compositional and enzymatic changes associated with sugar-end defects in Russet Burbank potatoes. Amer. J. Pot. Res. 77:47-56.

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EXHIBIT E STATEMENT OF THE BASIS OF OWNERSHIP	confidential until the certificate is issued (7 U.S.C. 2426).					
1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME				
WISCONSIN ALUMNI RESEARCH FOUNDATION	W2310-3	TUNDRA				
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)				
614 WALNUT STREET P.O. BOX 7365						
MADISON, WI 53707-7365, US	7. PVPO NUMBER					
8. Does the applicant own all rights to the variety? Mark an "X" in the	l e appropriate block. If no, please expla	In. YES NO				
9. Is the applicant a U.S. national or a U.S. based entity? If no, give	name of country. X YES	NO				
10. Is the applicant the original owner?	NO If no, please answer <u>one</u>	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)?						
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 origi	nel breeder to current owner. Use the n	everse for extra space if needed):				
PLEASE NOTE:						
Plant variety protection can only be afforded to the owners (not licen	sees) who meet the following criteria:					
 If the rights to the variety are owned by the original breeder, that p national of a country which affords similar protection to nationals of 	person must be a U.S. national, national of the U.S. for the same genus and spec	of a UPOV member country, or les.				
If the rights to the variety are owned by the company which emplo nationals of a UPOV member country, or owned by nationals of a genus and species.	yed the original breeder(s), the compan country which affords similar protection	y must be U.S. based, owned by to nationals of the U.S. for the same				
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 di Act for definitions.	rected the final breeding. See Section	41(a)(2) of the Plant Variety Protection				
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