No. 200400139

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

The Idaho Research Foundation, Inc. representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and the United States of America, as represented by the Secretary of Agriculture

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.)

POTATO

'GemStar Russet'

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 seventeenth day of March, in the year* ***two thousand and ten.***

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

BUREAU OF ENGRAVING AND PRINTING

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RAD 9/23/09

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

The Idaho Research Foundation, Inc. representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and the United States of America, as represented by the Secretary of Agriculture

PO Box 442337
University of Idaho
Moscow, ID 83844-2337
USA

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME

A9014-2

3. VARIETY NAME

GemStar Russet

5. TELEPHONE *(include area code)*

208-885-7173

6. FAX *(include area code)*

208-885-6654

FOR OFFICIAL USE ONLY

PVPO NUMBER

200400139

FILING DATE

March 11, 2004

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

Non-profit

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

Idaho

9. DATE OF INCORPORATION

1947

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

9/23/09 RAD

Dr. Stephen Love
Aberdeen R&E Center
1693 S 2700 W
Aberdeen, ID 83210

Gaylene Anderson 208-885-4550 gaylene@uidaho.edu
Licensing Associate
University of Idaho
Office of Technology Transfer Morrill Hall 414
P.O. Box 443003
Moscow, ID 83844-3003

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 3652.00
DATE 3/11/2004

CERTIFICATION FEE:
$ 768.00
DATE 10/20/2009

11. TELEPHONE *(Include area code)*

208-397-4181

12. FAX *(Include area code)*

208-397-4311

13. E-MAIL

slove@uidaho.edu

14. CROP KIND *(Common Name)*

Potato

16. FAMILY NAME *(Botanical)*

Solanaceae

15. GENUS AND SPECIES NAME OF CROP

Solanum tuberosum

17. IS THE VARIETY A FIRST GENERATION HYBRID?

☐ YES ☒ NO

18. DOES THE VARIETY CONTAIN ANY TRANSGENES? ***(OPTIONAL)***

☐ YES ☒ NO

RAD 9/21/09

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. ☒ Voucher Sample *(2,500 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 ($3,652), 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	
Alison Nowakowski			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Alison Nowakowski			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Asst. Director, IRF, Inc.	02/26/2004		

(See reverse for instructions and information collection burden statement)

ST-470 (04-03) designed by the Plant Variety Protection Office using Word 2002.

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INSTRUCTIONS

GENERAL: 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; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties 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; (4) check drawn on a U.S. bank for $3,652 ($432 filing fee and $3,220 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. 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 check payable to "Treasurer of the United States" in the amount of $432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 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 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.)*

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).)*

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.)*

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.

DRAFT Exhibit A Form

1. Describe the genealogy (back to and including public and commercial varieties, lines, or clones used) and the breeding method(s).

GemStar Russet was derived from a sexual hybridization made at the University of Idaho's Aberdeen Research and Extension Center in 1990. It resulted from a cross of Gem Russet (female parent) and A8341-5 (male parent). It was first selected in the field in 1992 and subsequently evaluated for 11 Years.

2. Give the details of subsequent stages of selection and multiplication.

Year	Detail of Stage	Selection Criteria
1992 1999-2001	It was first field selected in 1992. In 1999-2001 GemStar Russet was entered and evaluated in the Western Regional Variety Trials. GemStar Russet was selected for use in the early to medium season russet tablestock and french fry processing markets.	Yield, maturity, appearance, specific gravity, resistance to tuber defects, and storage fry color, and resistance to field diseases including verticillium wilt and common scab.

3a. Is the variety uniform? [✓] Yes ____ No

How did you test for uniformity?

GemStar Russet has been clonally propagated since the first year of selection. The variety has remained stable and shown uniformity during all subsequent years of maintenance and propagation.

3b. Is the variety stable? X Yes ____ No

How did you test for stability? Over how many generations?

GemStar Russet has been clonally propagated for 11 years of evaluations. It has shown stability in over ten generations. It has not produced recognizable variants.

4. Are genetic variants observed or expected during reproduction and multiplication? ____ Yes X No

If yes, state how these variants may be identified, their type and frequency.

No variants have been observed in over 11 years of evaluations.

Continue on additional pages if necessary.

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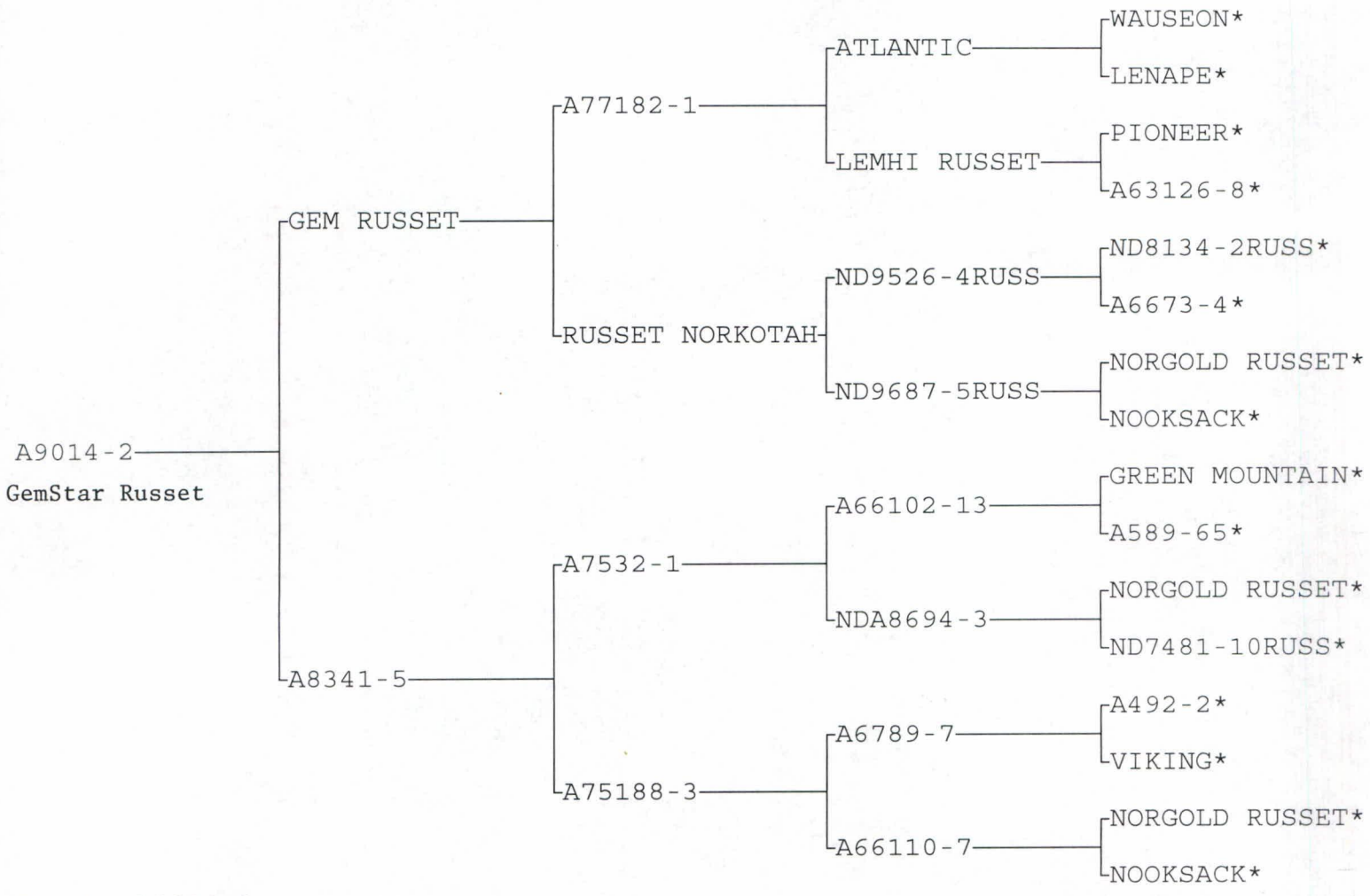
CLONE: A9014-2

200400139



CLONE: A9014-2
BREEDER: YEAR:
INSTITUTIONS:
CITATION:

TUBER TYPE: LONG
SKIN TYPE: MED RUSS
FLOWER COLOR: WHITE
MATURITY CLASS: MEDIUM
YIELD CATEGORY: MED HIGH
USAGE CLASS: DUAL
OTHER INFORMATION:
SYNONYMS:

* PEDIGREE CONTINUES BEYOND FOURTH GENERATION IN DATABASE

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Application for Plant Variety Protection Certificate

Exhibit B: Statement of Distinctness
Variety: A9014-2 (~~Unnamed~~) (GemStar Russet)
Owner: Idaho Agricultural Experiment Station

A9014-2 is distinct from Russet Burbank, the best comparative variety. The plants of A9014-2 are earlier maturing than those of Russet Burbank and produce tubers with a shorter shape and darker russet skin (Exhibit C). The tubers of A9014-2 have fewer eyes than those of Russet Burbank (Exhibit C). In direct comparisons with Russet Burbank, A9014-2 tubers have better fry color following cold storage (40°F), and a much higher vitamin C content (See Exhibit D).

In Exhibit C, other differences are documented between the two varieties. Compared with Russet Burbank, A9014-2 has a more closed plant type and leaf silhouette, fewer secondary and tertiary leaflets, fewer flowers, less anthocyanin pigmentation on the calyx, presence of viable pollen, and fewer eyes on the tuber. A9014-2 is also more resistant to PVX, corky ringspot, and verticillium wilt than is Russet Burbank, but more susceptible to PVY and leafroll virus. Tubers of A9014-2 have a lower glycoalkaloid content than do tubers of Russet Burbank.

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DRAFT Exhibit B Form

Based on overall morphology, GemStar Russet (*Applicant's new variety*) is most similar to Russet Burbank (*Most similar comparison variety(ies)*).

GemStar Russet (*Applicant's new variety*) most clearly differs from Russet Burbank (*Most similar comparison variety(ies)*) in the following traits:

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

Eg. Leaf Pubescence ***Eg. Leaf Color*** ***Eg. Plant Height***	***heavy pubescence*** ***Dark Green (5GY 3/4)*** ***200 cm +/- 10 cm (N=25)***	***glabrous*** ***Light Green (2.5GY 8/10)*** ***250 cm +/- 15 cm (N=25)***	***photograph attached*** ***Munsell Color Chart*** ***statistics attached***
1. Qualitative traits: GemStar Russet is most similar to Russet Burbank however, Gemstar has more closed plant type and leaf silhouette.	Applicant's New Variety GemStar Russet GemStar Russet plant type foliage closed, stem hardly visible. Leaf silhouette is closed.	1st Comparison Variety Russet Burbank Russet Burbank plant type is foliage open, stems clearly visible. Leaf silhouette is open.	Location of Evidence Exhibit C
2. Color traits: Gemstar Russet has darker russet skin color than Russet Burbank. It also has less anthocyanin pigmentation on the calyx.	Gemstar Russet skin color is greyed-orange 165 B RHS. Anthocyanin pigmentation on the calyx is absent.	Russet Burbank skin coloration is grey-brown 199 C RHS. Anthocyanin pigmentation is weak but present.	Royal Horticultural Society (RHS) color chart. Exhibit C
3. Quantitative traits: Gemstar Russet has better fry color following cold storage (40F), and higher Vitamin C content than Russet Burbank	Mean fry color in 2000 was 1.58 and 1.42 in 2001. Vitamin C content was 31.6 and 31.7 respectively	Mean fry color for Russet Burbank was 3.5 in 2000 and 3.2 in 2001. Vitamin C content was 22.7 and 18.6 respectively.	Exhibit D 2000 Pr> F 0.0147 fry color, 0.0060 Vit C. 2001 Pr>F 0.002 fry color, 0.0135 Vit C
4. Other: GemStar Russet is different from parent variety Gem Russet in leaf color, leaf silhouette, and tuber color.	GemStar Russet leaf color is RHS #144 A , leaf silhouette is closed, tuber skin color RHS 165 B.	Gem Russet leaf color is RHS #146 A, leaf silhouette is medium open, tuber skin color is RHS 199 B	Exhibit C and exhibit C for Gem Russet.

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

6e

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GEMSTAR RUSSET

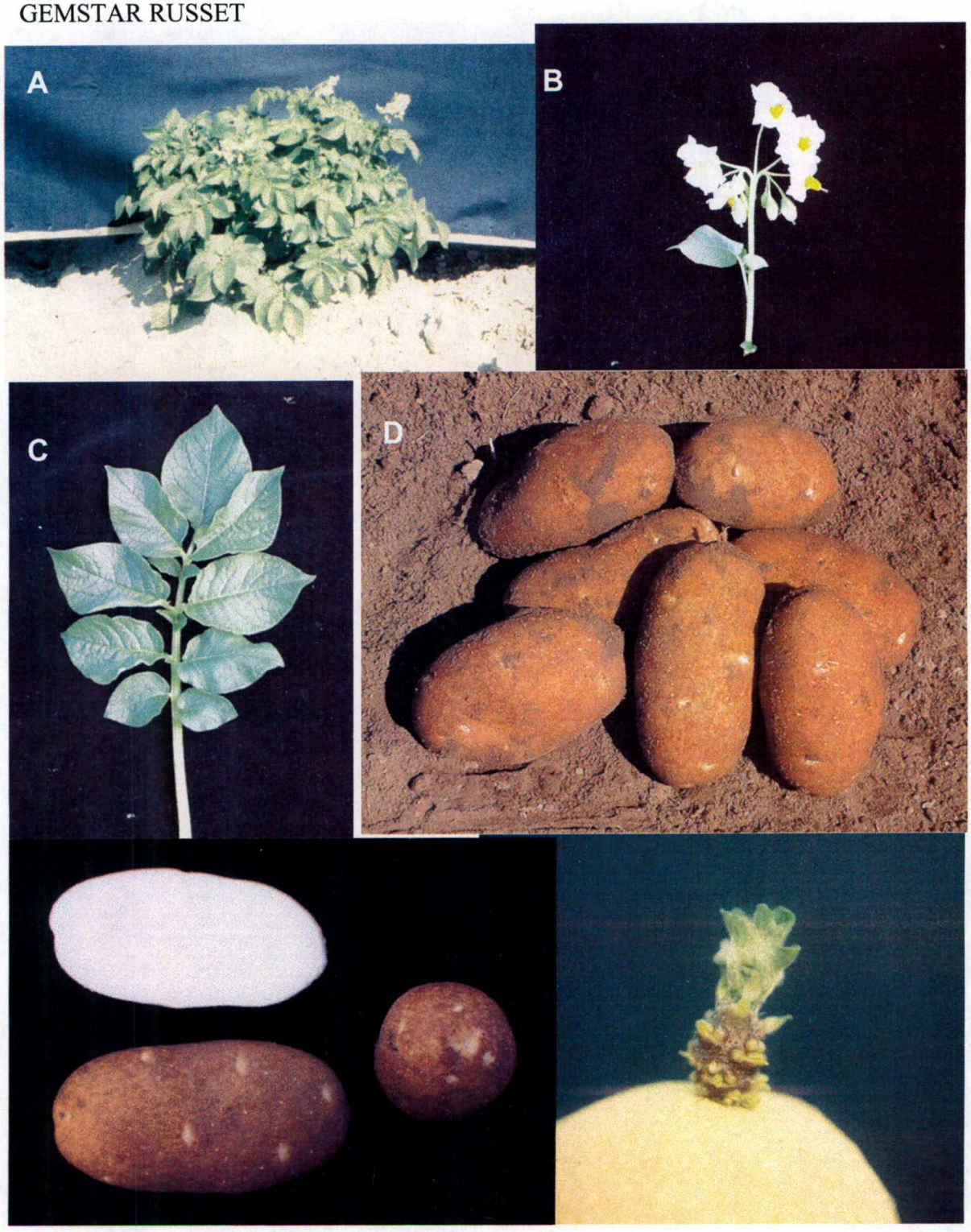

Figure 2. Photographs of GemStar Russet showing a) whole plant, b) flower, c) compound leaf, d) field tubers, e) external and internal tuber appearance and tuber flesh color, and f) light sprout.

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RUSSET BURBANK

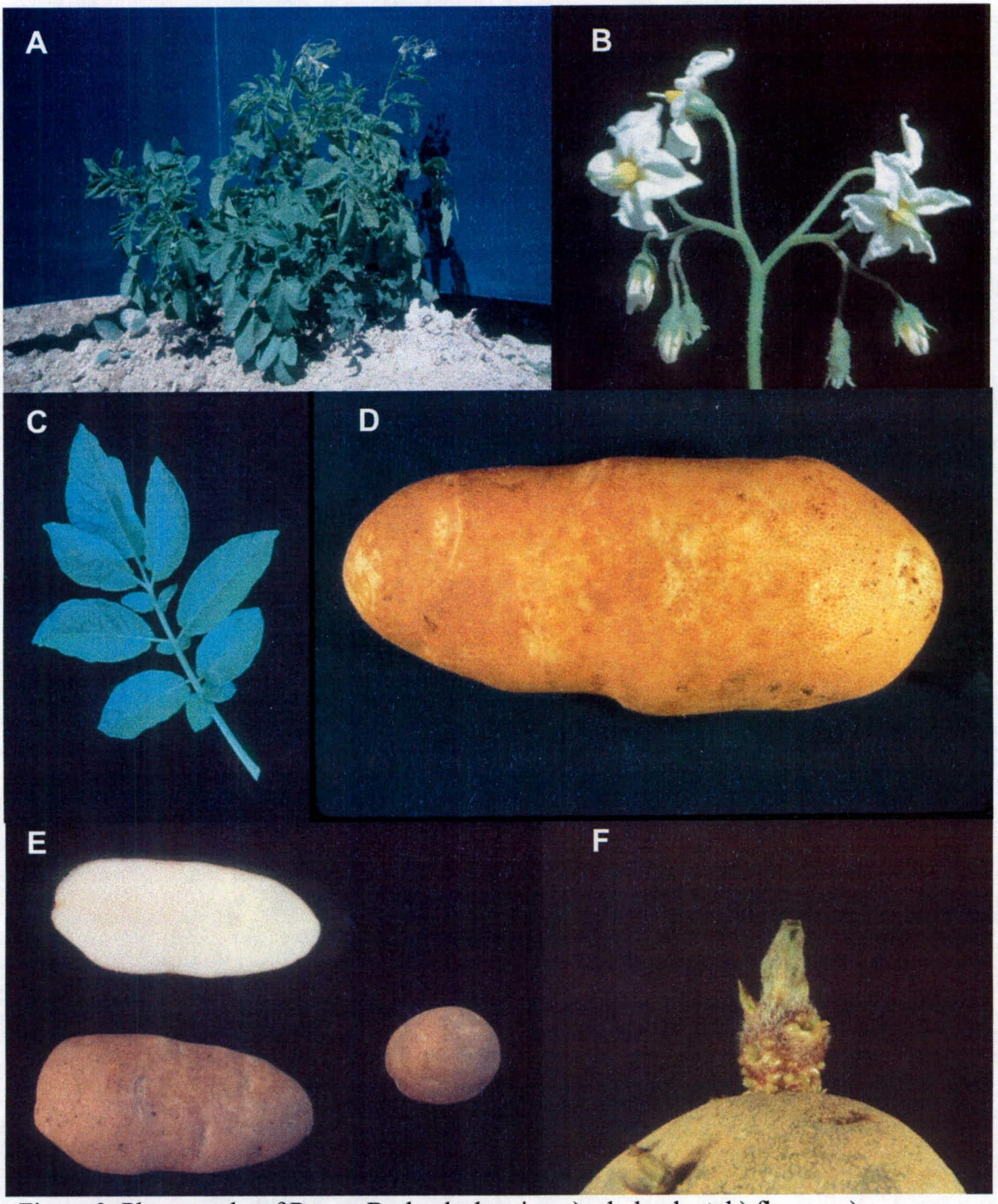

Figure 3. Photographs of Russet Burbank showing a) whole plant, b) flower, c) compound leaf, d) field tuber, e) external tuber appearance and tuber flesh color, and f) light sprout.

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

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY
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 Society (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	Yukon Gold
Round-white table-stock	Superior
Chip-processing	Atlantic, Snowden, Norchip
Frozen-processing	Russet Burbank
Russet table-stock	Russet Burbank, Russet Norkotah, Goldrush
Red table-stock	Red Pontiac, Red Norland, Red Lasoda

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).

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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 leaflet shape of tip and base, respectively. To measure the total number of 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.

2009 SEP 28 PM 4:53

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
The Idaho Research Foundation, Inc. representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and the United States of America, as represented by the Secretary of Agriculture	A9014-2	GemStar Russet

ADDRESS *(Street and No. or RD No., City, State, Zip Code, and Country)*
Office of Technology Transfer
Morrill Hall 414
PO Box 443003
Moscow ID 83844-3003

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#200400139

REFERENCE 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 Variety 4 (R4)
GemStar Russet	Russet Burbank			

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

1. MARKET CHARACTERISTICS:

***MARKET CLASS**:
1 = Yellow-flesh Tablestock 2 = Round-white Tablestock 3 = Chip-processing 4 = Frozen-processing
5 = Russet Tablestock 6 = Other _____

V	R1	R2	R3	R4
4-5	4-5			

2. LIGHT SPROUT CHARACTERISTICS: (See Figure 1)

***LIGHT SPROUT: GENERAL SHAPE**
1 = Spherical 2 = Ovoid 3 = Conica 4 = Broad cylindrica 5 = Narrow cylindrical 6 = Other _____

V	R1	R2	R3	R4
2	2			

***LIGHT SPROUT BASE: PUBESCENCE OF BASE**
1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	R1	R2	R3	R4
2	2			

***LIGHT SPROUT BASE: ANTHOCYANIN COLORATION**
1 = Green 2 = Red-violet 3 = Blue-violet 4 = Other(describe) _____

V	R1	R2	R3	R4
2	2			

***LIGHT SPROUT BASE: INTENSITY OF ANTHOCYANIN COLORATION (IF PRESENT)**
1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	R1	R2	R3	R4
3	3			

* **LIGHT SPROUT TIP: HABIT**
1 = Closed 2 = Intermediate 3 = Open

V	R1	R2	R3	R4
3	2			

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2. LIGHT SPROUT CHARACTERISTICS: (continued)

LIGHT SPROUT TIP: PUBESCENCE
1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	3	R1	4	R2		R3		R4	

LIGHT SPROUT TIP ANTHOCYANIN COLORATION
1 = Green 2 = Red-violet 3 = Blue-violet 4 = Other(describe) _____

V	1	R1	2	R2		R3		R4	

LIGHT SPROUT TIP: INTENSITY OF ANTHOCANIN COLORATION (IF PRESENT)
1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	1	R1	3	R2		R3		R4	

LIGHT SPROUT ROOT INITIALS: FREQUENCY
1 = Absent 2 = Some 3 = Abundant

V	2	R1	2	R2		R3		R4	

3. PLANT CHARACTERISTICS:

GROWTH HABIT: (See Figure 2)
3 = Erect (>45° with ground) 5 = Semi-erect (30-45° with ground) 7 = Spreading

V	5	R1	5	R2		R3		R4	

TYPE:
1 = Stem (foliage open, stems clearly visible) 2 = Intermediate 3 = Leaf (Foliage closed, stems hardly visible)

V	3	R1	1	R2		R3		R4	

MATURITY: Days after planting (DAP) at vine senescence

V	125	R1	125	R2		R3		R4	

PLANTING DATE:

V	4-21-2000, 5-2-2001	R1	4-21-2000, 5-2-2001	R2		R3		R4	

***REGIONAL AREA**:
1 = Pacific North West (WA, OR, ID, CO, CA) 2 = North Central (ND, WI, MI, MN, OH) 3 = North East (ME, NY, PA, NJ, MD, MA, RI,)
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 _____

V	1 Aberdeen, ID	R1	1 Aberdeen, ID	R2		R3		R4	

MATURITY CLASS:
1 = Very Early (<100 DAP) 2 = Early (100-110 DAP) 3 = Mid-season (111-120 DAP) 4 = Late (121-130 DAP) 5 = Very Late (>130 DAP).

V	4	R1	4	R2		R3		R4	

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4. STEM CHARACTERISTICS: Measure at early first bloom

*** STEM ANTHOCYANIN COLORATION**:
1 = Absent 3= Weak 5 = Medium 7 = Strong 9 = Very Strong

V	1	R1	3	R2		R3		R4	

STEM WINGS: (See Figure 3)
1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very Strong

V	3	R1	3	R2		R3		R4	

5. LEAF CHARACTERISTICS:

LEAF COLOR: (*Observe fully developed leaves located on middle 1/3 of plant)*
1 = Yellowing-green 2 = Olive-green 3 = Medium Green 4 = Dark Green 5 = Grey-green 6 = Other _____

V	3	R1	3	R2		R3		R4	

LEAF COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart
(*Observe fully developed leaves located on middle 1/3 of plant and circle the appropriate color chart)*

V	144 A	R1	146 A	R2		R3		R4	

LEAF PUBESCENCE DENSITY:
1 = Absent 2 = Sparse 3 = Medium 4 = Thick 5 = Heavy

V	3	R1	3	R2		R3		R4	

LEAF PUBESCENCE LENGTH:
1 = None 2 = Short 3 = Medium 4 = Long 5 = Very Long

V	3	R1	2	R2		R3		R4	

(*Note Descriptor #15 can be used to describe the type and length of the glandular trichomes observed.)*

*** LEAF SILHOUETTE**: (See Figure 4)
1 = Closed 3 = Medium 5 = Open

V	1	R1	5	R2		R3		R4	

PETIOLES ANTHOCYANIN COLORATION:
1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very Strong

V	1	R1	3	R2		R3		R4	

LEAF STIPULES SIZE: (Se Figure 5)
1 = Absent 3 = Small 5 = Medium 7 = Large

V	5	R1	7	R2		R3		R4	

TERMINAL LEAFLET SHAPE (See Figures 6 and 7)
1 = Narrowly ovate 2 = Medium Ovate 3 = Broadly Ovate 4 = Lanceolate 5 = Elliptical 6 = Obovate 7 = Oblong 8 = Other _____

V	3	R1	1	R2		R3		R4	

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5. LEAF CHARACTERISTICS: (continued)

TERMINAL LEAFLET TIP SHAPE: (See Figures 6 and 8)
1 = Acute 2 = Cuspidate 3 = Acuminate 4 = Obtuse 5 = Other _____

V	3	R1	3	R2		R3		R4	

* **TERMINAL LEAFLET BASE SHAPE**: (See Figure 9)
1 = Cuneate 2 = Acute 3 = Obtuse 4 = Cordate 5 = Truncate 6 = Lobed 7 = Other _____

V	3	R1	3	R2		R3		R4	

TERMINAL LEAFLET MARGIN WAVINESS:
1 = Absent 2 = Slight 3 = Weak 4 = Medium 5 = Strong

V	2	R1	2	R2		R3		R4	

NUMBER OF PRIMARY LEAFLET PAIRS: (See Figure 6)

AVERAGE:

V	3.6	R1	3.3	R2		R3		R4	

RANGE:

V	2 to 5	R1	1 to 5	R2	to	R3	to	R4	to

PRIMARY LEAFLET TIP SHAPE: (See Figures 6 and 8)
1 = Acute 2 = Cuspidate 3 = Acuminate 4 = Obtuse 5 = Other _____

V	3	R1	3	R2		R3		R4	

PRIMARY LEAFLET SIZE:
1 = Very Small 2 = Small 3 = Medium 4 = Large 5 = Very Large

V	2	R1	3	R2		R3		R4	

PRIMARY LEAFLET SHAPE: (See Figures 6 and 7)
1 = Narrowly ovate 2 = Medium ovate 3 = Broadly ovate 4 = Lanceolate 5 = Elliptical 6 = Ovate 7 = Oblong 8 = Other _____

V	2	R1	1	R2		R3		R4	

PRIMARY LEAFLET BASE SHAPE: (See Figures 6 and 9)
1 = Cuneate 2 = Acute 3 = Obtuse 4 = Cordate 5 = Truncate 6 = Lobed 7 = Other _____

V	3	R1	3	R2		R3		R4	

NUMBER OF SECONDARY AND TERTIARY LEAFLET PAIRS: (See Figure 6)

AVERAGE:

V	4.8	R1	6.5	R2		R3		R4	

RANGE:

V	1 to 8	R1	2 to 11	R2	to	R3	to	R4	to

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5. LEAF CHARACTERISTICS: (continued)

NUMBER OF INFLORESCENCE/PLANT:

AVERAGE:

V	2.9	R1	3.3	R2		R3		R4	

RANGE:

V	1 to 7	R1	1 to 9	R2	to	R3	to	R4	to

NUMBER OF FLORETS/INFLORESCENCE:

AVERAGE:

V	9.3	R1	12.9	R2		R3		R4	

RANGE:

V	2 to 16	R1	5 to 22	R2	to	R3	to	R4	to

*** COROLLA INNER SURFACE COLOR CHART VALUE**: Royal Horticulture Society Color Chart or Munsell Color Chart (Measure predominant color of newly open flower and circle the appropriate color chart)

V	155 B	R1	157 D	R2		R3		R4	

*** COROLLA OUTER SURFACE COLOR CHART VALUE**: Royal Horticulture Society Color Chart or Munsell Color Chart (Measure predominant color of newly open flower and circle the appropriate color chart)

V	155 B	R1	157 D	R2		R3		R4	

*** COROLLA INNER SURFACE COLOR**: (Measure predominant color of newly open flower, if flowers are bi-color please use the ratio codes)
1 = White 2 = Red-violet 3 = Blue-violet 4 = Cream 5 = Red-purple 6 = Blue 7 = Pink 8 = Pink-white 9 = Purple 10 = Violet 11 = Purple-violet 13 = Violet-White 1:1 14 = Violet-White 1:3 15 = Violet-White 3:1 16 = Violet-White Halo 17 = Pink-White 1:1 18 = Pink-White 1:3 19 = Pink-White 3:1 20 = Pink-White Halo 21 = RedViolet-White 1:1 22 = RedViolet-White 1:3 23 = RedViolet-White 3:1 24 = RedViolet-White Halo 25 = BlueViolet-White 1:1 26 = BlueViolet-White 1:3 27 = BlueViolet-White 3:1 28 = BlueViolet-White Halo
12 = Other _____

V	1	R1	1	R2		R3		R4	

COROLLA SHAPE: (See Figure 10)
1 = Very rotate 2 = Rotate 3 = Pentagonal 4 = Semi-stellate 5 = Stellate

V	3	R1	4	R2		R3		R4	

6. INFLORESCENCE CHARACTERISTICS:

CALYX ANTHOCYANIN COLORATION:
1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very strong

V	1	R1	3	R2		R3		R4	

ANTHER COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsel Color Chart (Measure when newly opened flower is fully expanded and circle the appropriate color chart)

V	17 A	R1	17 A	R2		R3		R4	

ANTHER SHAPE: (See Figure 11)
1 = Broad cone 2 = Narrow cone 3 = Pear-shaped cone 4 = Loose 5 = Other

V	1	R1	3	R2		R3		R4	

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6. **INFLORESCENCE CHARACTERISTICS**: (continued)

POLLEN PRODUCTION:
1 = None 3 = Some 5 = Abundant

V	3	R1	1	R2		R3		R4	

STIGMA SHAPE: (See Figure 12)
1 = Capitate 2 = Clavate 3 Bi-lobed

V	1	R1	1	R2		R3		R4	

STIGMA COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsel Color Chart (Circle the appropriate color chart)

V	146 A	R1	146 B	R2		R3		R4	

BERRY PRODUCTION: (Under field conditions)
1 = Absent 3 = Low 5 = Moderate 7 = Heavy 9 = Very Heavy

V	3	R1	1	R2		R3		R4	

7. **TUBER CHARACTERISTICS**:

* **PREDOMINANT SKIN COLOR**:
1 = White 2 = Light Yellow 3 = Yellow 4 = Buff 5 = Tan 6 = Brown 7 = Pink 8 = Red 9 = Purplish-red
10 = Purple 11 = Dark purple-black 12 = Other _____

V	6	R1	5	R2		R3		R4	

PREDOMINANT SKIN COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V	165 B	R1	161 B	R2		R3		R4	

SECONDARY SKIN COLOR:
1 = Absent 2 = Present (please describe)

V	1	R1	1	R2		R3		R4	

SECONDARY SKIN COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color)

V		R1		R2		R3		R4	

SECONDARY SKIN COLOR DISTRIBUTION: (See Figure 13)
1 = Eyes 2 = Eyebrows 3 = Splashed 4 = Scattered 5 = Spectacled 6 = Stippled 7 = Other _____

V		R1		R2		R3		R4	

SKIN TEXTURE:
1 = Smooth 2 = Rough (flaky) 3 = Netled 4 = Russetted 5 = Heavily russetted 6 = Other _____

V	5	R1	4	R2		R3		R4	

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7. **TUBER CHARACTERISTICS**: (continued)

* **TUBER SHAPE**: (See Figure 14)
1 = Compressed 2 = Round 3 = Oval 4 = Oblong 5 = Long 6 = Other _____

V	4	R1	5	R2		R3		R4	

TUBER THICKNESS:
1 = Round 2 = Medium thick 3 = Slightly flattened 4 = Flattened 5 = Other _____

V	2	R1	3	R2		R3		R4	

TUBER LENGTH (mm):

AVERAGE:

V	117	R1	135	R2		R3		R4	

RANGE:

V	80 to 152	R1	92 to 178	R2	to	R3	to	R4	to

STANDARD DEVIATION:

V	11.2	R1	16.0	R2		R3		R4	

AVERAGE WEIGHT OF SAMPLE TAKEN:

V	265 g	R1	242 g	R2		R3		R4	

TUBER WIDTH (mm)

AVERAGE:

V	66	R1	64	R2		R3		R4	

RANGE:

V	50 87 to	R1	53 to 78	R2	to	R3	to	R4	to

STANDARD DEVIATION:

V	5.8	R1	5.8	R2		R3		R4	

AVERAGE WEIGHT OF SAMPLE TAKEN (g):

V	265 g	R1	242 g	R2		R3		R4	

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7. **TUBER CHARACTERISTICS**: (continued)

TUBER THICKNESS (mm):

AVERAGE:

V	57	R1	54	R2		R3		R4	

RANGE:

V	44 to 88	R1	41 to 70	R2	to	R3	to	R4	to

STANDARD DEVIATION:

V	5.6	R1	5.6	R2		R3		R4	

AVERAGE WEIGHT OF SAMPLE TAKEN (g):

V	265 g	R1	242 g	R2		R3		R4	

TUBER EYE DEPTH:

1 = Protruding 3 = Shallow 5 = Intermediate 7 = Deep 9 = Very deep

V	2	R1	3	R2		R3		R4	

TUBER LATERAL EYES:

1 = Protruding 3 = Shallow 5 = Intermediate 7 = Deep 9 = Very deep

V	2	R1	3	R2		R3		R4	

NUMBER EYE/TUBER:

AVERAGE:

V	16.6	R1	23.1	R2		R3		R4	

RANGE:

V	8 to 27	R1	12 to 36	R2	to	R3	to	R4	to

DISTRIBUTION OF TUBER EYES:

1 = Predominantly apical 2 = Evenly distributed

V	1	R1	2	R2		R3		R4	

PROMINENCE OF TUBER EYEBROWS:

1= Absent 2 = Slight prominence 3 = Medium prominence 4 = Very prominent 5 = Other _____

V	2	R1	1	R2		R3		R4	

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7. **TUBER CHARACTERISTICS**: (continued)

PREDOMINANT TUBER FLESH COLOR
1 = White 2 = Light Yellow 3 = Yellow 4 = Buff 5 = Tan 6 = Brown 7 = Pink 8 = Red 9 = Purplish-red
10 = Purple 11 = Dark purple-black 12 = Other _____

V	1 = White	R1	1 = white	R2		R3		R4	

PRIMARY TUBER FLESH COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V	155 A	R1	158 B	R2		R3		R4	

SECONDARY TUBER FLESH COLOR:

1 = Absent 2 = Present, please describe: _____

V	1	R1	1	R2		R3		R4	

SECONDARY TUBER FLESH COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V		R1		R2		R3		R4	

NUMBER OF TUBERS/PLANT:
1 = Low (<8) 2 = Medium (8-15) 3 = High (>15)

V	1	R1	1	R2		R3		R4	

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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)

V	R1	R2	R3	R4
7	7			

EARLY BLIGHT: (Alternaria)

V	R1	R2	R3	R4
0	0			

SOFT ROT (Erwinia)

V	R1	R2	R3	R4
0	0			

COMMON SCAB (Streptomyces)

V	R1	R2	R3	R4
0	0			

POWDERY SCAB (Spongospora)

V	R1	R2	R3	R4
0	0			

DRY ROT (Fusarium)

V	R1	R2	R3	R4
0	0			

POTATO LEAF ROLL VIRUS (PLRV)

V	R1	R2	R3	R4
8	6			

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8. DISEASES CHARACTERISTICS: (continued)

POTATO VIRUS X (PVX)

V	1	R1	7	R2		R3		R4	

POTATO VIRUS Y (PVY)

V	8	R1	7	R2		R3		R4	

POTATO VIRUS M (PVM)

V	0	R1	0	R2		R3		R4	

POTATO VIRUS A (PVA)

V	0	R1	0	R2		R3		R4	

GOLDEN NEMATODE (Globodera)

V	0	R1	7	R2		R3		R4	

ROOT – KNOT NEMATODE (Meloidogyne)

V	3	R1	8	R2		R3		R4	

OTHER DISEASE Verticillium Wilt

V	4	R1	7	R2		R3		R4	

PHYSIOLOGICAL DISORDER

1 = Malformed shape 2 = Tuber cracking 3 = Feathering 4 = Hollow heart 5 = Internal necrosis
6 = Blackheart 7 = Internal sprouting 8 = Other _____

V		R1		R2		R3		R4	

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*)

V	0	R1		R2		R3		R4	

GREEN PEACH APHID *(Myzus)*

V	0	R1		R2		R3		R4	

OTHER:

V		R1		R2		R3		R4	

OTHER:

V		R1		R2		R3		R4	

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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)
1 = <1.060 2 = 1.060-1.069 3 = 1.070-1.079 4 = 1.080-1.089 5 = >1.090

V	4	R1	4	R2		R3		R4	

TOTAL GLYCOALKALOID CONTENT (mg./100 g. fresh tuber)

V	1.5	R1	5.7	R2		R3		R4	

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.

Fry Color (40 F storage): V=1.7, R1=3.5 (0-4 where 4=dark)

See attached statistical analysis and prptocols

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.

Vitamin C content (mg/100G): V=31.7, R1=20.7

See attached statistical analysis and prptocols

13. FINGER PRINTING MARKERS:

ISOZYMES 1 = YES 2 = NO ☑

IF YES, attach information

14. DNA PROFILE: 1 = YES 2 = NO ☑

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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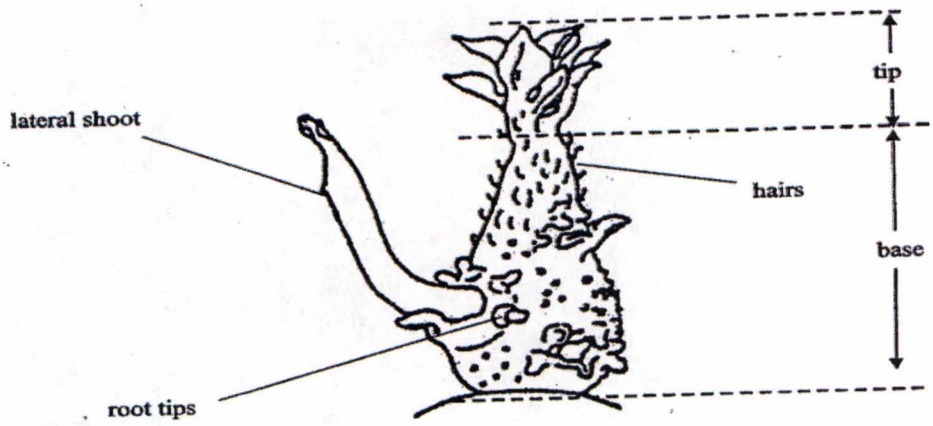
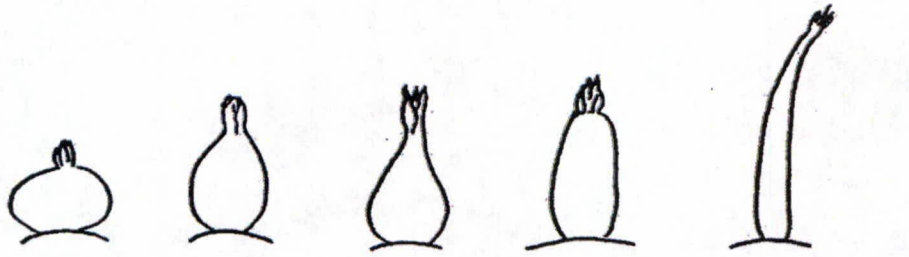
Figure 1: Light sprout

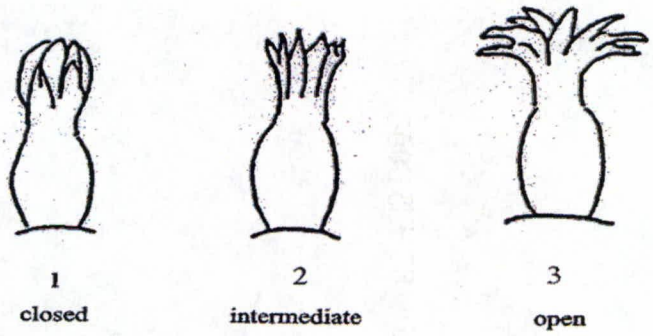
Light sprout dissection



Light sprout shape



Light sprout tip habit



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

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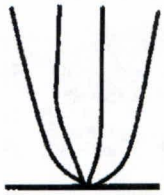
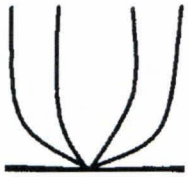
Figure 2: Growth Habit

Erect



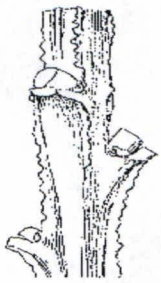
Semi Erect



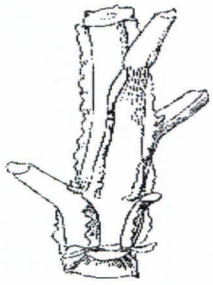
Spreading

Figure 3: Stem Wings

Weak



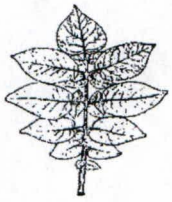
Medium



Strong

Figure 4: Leaf Sillhouette

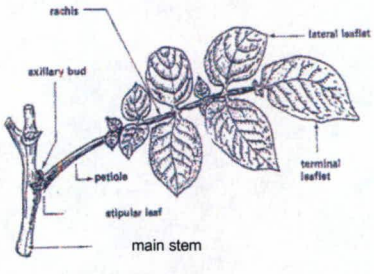
Closed



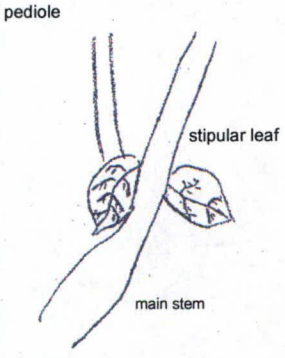
Medium

Open

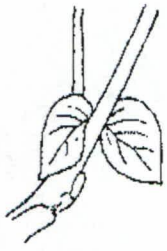
Figure 5: Leaf Stipules



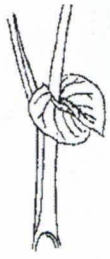
General structures



Small stipular leaf



Medium stipular leaf



Large stipular leaf

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Figure 6: Leaf Dissection

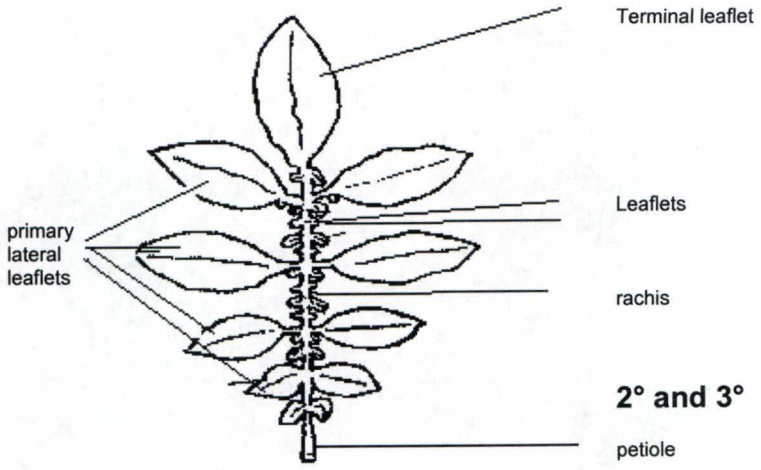
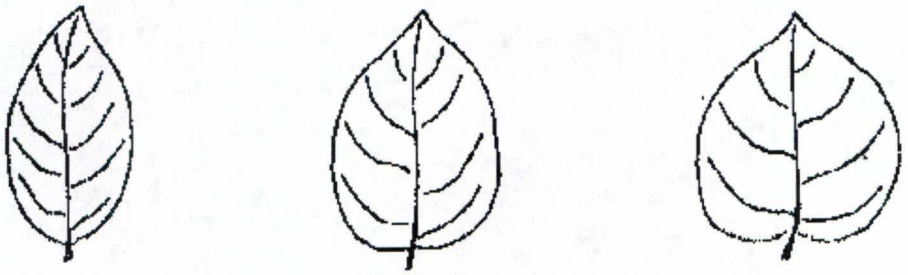
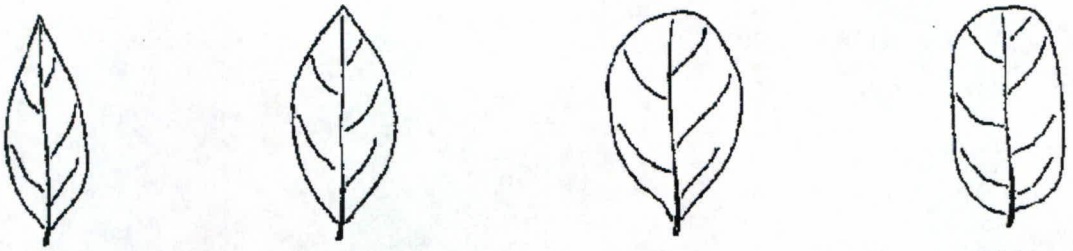


Figure 7: Terminal Leaflet Shape/Primary Leaflet Shape



Narrowly Ovate **Medium Ovate** **Broadly Ovate**



Lanceolate **Elliptical** **Obovate** **Oblong**

Figure 8: Terminal Leaflet Shape of Tip/Primary Leaflet Shape of Tip

Acute **Cuspidate** **Acuminate** **Obtuse**

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

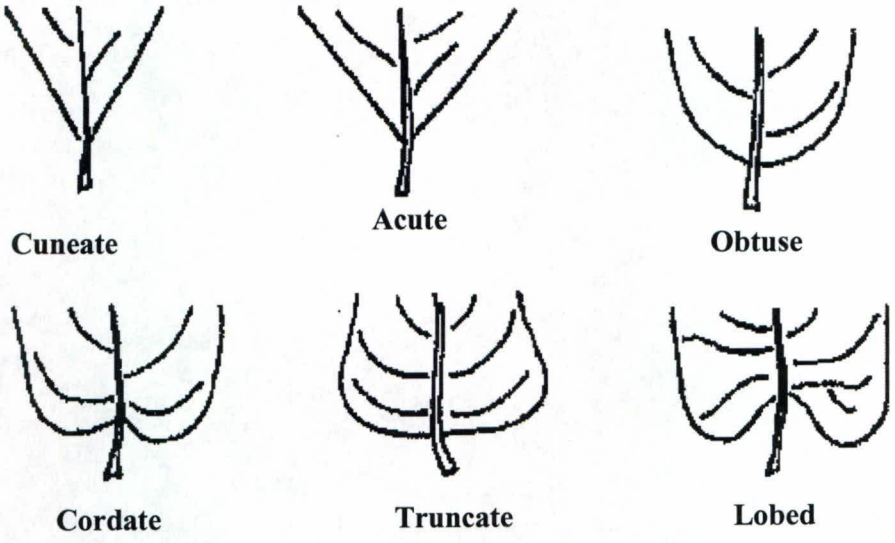

Figure 10: Corolla Shape

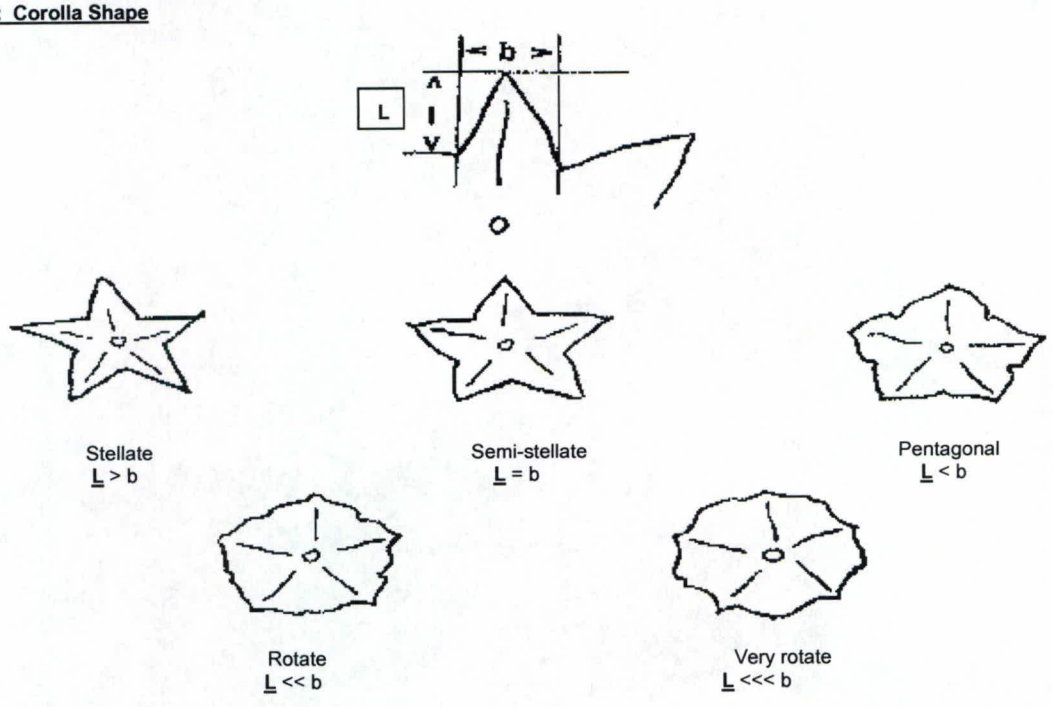

Figure 11: Anther Shape

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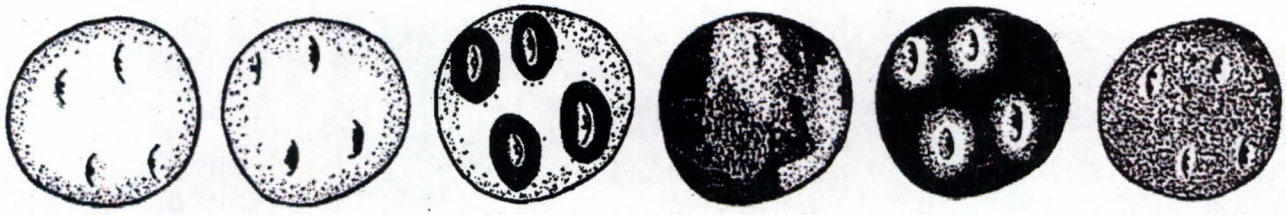
Figure 12: Stigma Shape

Capitate Clavate Bi-lobed

Figure 13: Distribution of Secondary Skin Tuber Color



Eyes Eyebrows Splashed Scattered Spectacled Stippled

Figure 14: Tuber Shape

Compressed Round Oval Oblong Long

References:
Huaman, Z. 1986. Systematic botany and morphology of the potato. Technical information Bulletin 6. International Potato Center, Lima, Peru.

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.

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200400139

Application for Plant Variety Protection Certificate

Exhibit D: Additional Description Information
Variety: A9014-2 (~~Unnamed~~) GemStar Russet
Owner: Idaho Agricultural Experiment Station

A9014-2 provides some distinct quality advantages over Russet Burbank. These include greater resistance to cold temperature sweetening, which results in better fry color following cold (40°F) storage, and higher content of vitamin C. Evidence for these differences and the procedures used to quantify them are attached.

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Standard Operating Procedure

Title: Determination of Vitamin C Content of Freeze-dried Tuber Powder – Total Ascorbic Acid Microfluorometric Method

Reagents:

1. Extracting solution: Dissolve with shaking 15 g metaphosphoric acid in 40 ml glacial acetic and 200 ml H_2O; dilute to 500 ml and filter rapidly through fluted paper into glass stoppered bottle; store in refrigerator – good for 1 week.

2. O-Phenylenediamine solution: for each 100 ml solution required, weight 20 mg O-Phenylenediamine • 2 HCL; dilute to volume with double distilled water (DD H_2O) immediately before use.

3. Sodium Acetate Solution: Dissolve 500 g (sodium acetate – 3 H_2O) in DD H_2O and dilute to 1 liter.

4. Boric Acid – Sodium Acetate Solution: Dissolve 3 g boric acid in 100 ml sodium acetate solution; prepare fresh for each assay.

5. Activated Charcoal (VWR)

Procedure:

1. Preparation of standard curve: Dissolve 10 mg L-ascorbic acid in 100 ml extracting solution; dilute 10 ml, 20 ml, and 30 ml aliquots to 100 ml with extracting solution. Proceed with these standard solutions in the ascorbic acid determination. Final concentrations of standard solutions are 10 µg/ml, 20 µg/ml, and 30 µg/ml.

2. Sample preparation: Use 1.5 g freeze dried material per 50 ml extracting solution (25 g fresh tuber tissue per 150 ml). Place in 125 ml flask; allow to sit at least 5 min; filter through a Whatman #4 filter paper. Proceed with ascorbic acid determination.

3. Add 2 g acid-washed Norit to 100 ml sample extract or standard solution (with above sample extract use 25 ml extract and 0.5 g norit in a 125 ml erlenmeyer). Shake vigorously and filter through a Whatman #4 filter paper discarding first few ml.

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4. Transfer 5 ml of this filtrate to a 100 ml volumetric flask containing 5 ml boric acid – sodium acetate solution. Let stand 15 min swirling occasionally. This is the blank determination since the H_3BO_3 – dehydroascorbate complex will not produce a fluorophor with phenylenediamine. After 15 min dilute to volume with H_2O.

5. During the 15 min period during which the blank is sitting, transfer a second 5 ml of filtrate to a 100 ml volumetric containing 5 ml sodium acetate solution and 75 ml of H_2O; dilute to volume with H_2O.

6. Transfer 2 ml of each solution to a test tube. Add 5 ml O-Phenylenediamine solution to each tube; mix well; let stand 35 min at room temp protected from light (i.e. in closed cabinet).

7. Measure fluorescence of each tube at 1 X setting in a Turner fluorometer primary filter 7-60 secondary filter 2A. Net fluorescence is the difference between the borate treated and non-treated extract. Unknown samples are determined by comparison with known readings as defined by the standard curve.

Reference:

AOAC Handbook 12th Edition 43.056

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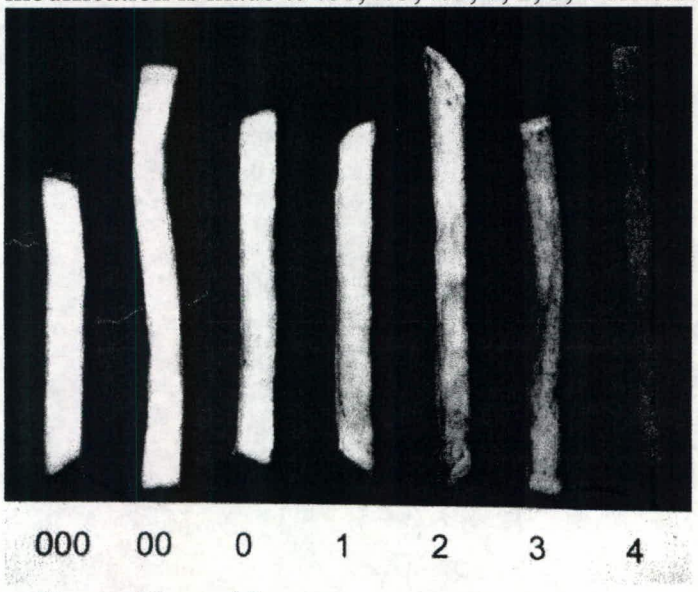
Protocol for frying russet variety potatoes at the University of Idaho

After harvest, potatoes are graded sized and weighed. A three-tuber sample is used for two temperature regimes. Tubers are gradually cooled to approximately 45-50° F during a 4-6 week period. The samples are then moved to 40 and 45° storage units, where they remain for 6-10 weeks.

Tubers are cut stem to bud end using a Shaver Specialty Co Cutter (20608 Earl Street Torrance, CA 90503. Phone (310) 370-6941). Four or nine 3/8" fry strips are cut from the center of each of the three tubers. Oil temperature is 375° F and fry time is 3.5 minutes. A creamy liquid frying shortening "Pocahontas" made from soybean oil. (Purchased from the local grocery/bakery). Frying is done in a Hobart commercial fryer.

Color is rated visually using the USDA fry color chart with a scale of 000-4. A scale modification is made to .01, .03, .05, 1, 2, 3, 4 for calculating averages.



This is not an official USDA chart. The USDA chart is copyrighted.

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'04 MAR 11 P1:03

#200400139

The GLM Procedure

Class Level Information

Class	Levels	Values
CLONE	2	GemStar RBurbank
REP	4	1 2 3 4

Number of Observations Read	8
Number of Observations Used	8

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The GLM Procedure

Dependent Variable: VitC

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	164.9807500	41.2451875	12.36	0.0330
Error	3	10.0077375	3.3359125		
Corrected Total	7	174.9884875			

R-Square	Coeff Var	Root MSE	VitC Mean
0.942809	6.707177	1.826448	27.23125

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	3	1.0852375	0.3617458	0.11	0.9496
CLONE	1	163.8955125	163.8955125	49.13	0.0060

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	3	1.0852375	0.3617458	0.11	0.9496
CLONE	1	163.8955125	163.8955125	49.13	0.0060

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#200400139

The GLM Procedure

Dependent Variable: Fry40

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	9.84390000	2.46097500	8.69	0.0533
Error	3	0.84945000	0.28315000		
Corrected Total	7	10.69335000			

R-Square	Coeff Var	Root MSE	Fry40 Mean
0.920563	20.92894	0.532118	2.542500

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	3	2.50945000	0.83648333	2.95	0.1987
CLONE	1	7.33445000	7.33445000	25.90	0.0147

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	3	2.50945000	0.83648333	2.95	0.1987
CLONE	1	7.33445000	7.33445000	25.90	0.0147

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#200400139

The GLM Procedure

t Tests (LSD) for VitC

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	3
Error Mean Square	3.335913
Critical Value of t	3.18245
Least Significant Difference	4.1101

Means with the same letter are not significantly different.

t Grouping	Mean	N	CLONE
A	31.758	4	GemStar
B	22.705	4	RBurbank

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#200400139

The GLM Procedure

t Tests (LSD) for Fry40

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	3
Error Mean Square	0.28315
Critical Value of t	3.18245
Least Significant Difference	1.1974

Means with the same letter are not significantly different.

t Grouping	Mean	N	CLONE
A	3.5000	4	RBurbank
B	1.5850	4	GemStar

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#200400139

CLONE=GemStar

The UNIVARIATE Procedure
Variable: VitC

Moments

N	4	Sum Weights	4
Mean	31.7575	Sum Observations	127.03
Std Deviation	1.07354165	Variance	1.15249167
Skewness	-0.0962178	Kurtosis	-1.5916536
Uncorrected SS	4037.6127	Corrected SS	3.457475
Coeff Variation	3.380435	Std Error Mean	0.53677082

Basic Statistical Measures

Location		Variability	
Mean	31.75750	Std Deviation	1.07354
Median	31.78000	Variance	1.15249
Mode	.	Range	2.47000
		Interquartile Range	1.68500

Tests for Location: Mu0=0

Test	-Statistic-		-----p Value------	
Student's t	t	59.16398	Pr > |t|	<.0001
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test	--Statistic---		-----p Value------	
Shapiro-Wilk	W	0.986939	Pr < W	0.9413
Kolmogorov-Smirnov	D	0.170079	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.023789	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.166543	Pr > A-Sq	>0.2500

Quantiles (Definition 5)

Quantile	Estimate
100% Max	32.970
99%	32.970
95%	32.970

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---------- CLONE=GemStar ----------

The UNIVARIATE Procedure
Variable: VitC

Quantiles (Definition 5)

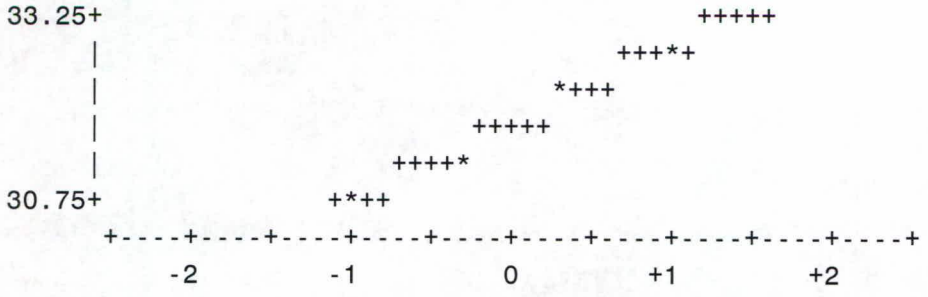
Quantile	Estimate
90%	32.970
75% Q3	32.600
50% Median	31.780
25% Q1	30.915
10%	30.500
5%	30.500
1%	30.500
0% Min	30.500

Extreme Observations

-----Lowest----		----Highest----	
Value	Obs	Value	Obs
30.50	3	30.50	3
31.33	1	31.33	1
32.23	2	32.23	2
32.97	4	32.97	4

```
Stem Leaf                     #             Boxplot
  33 0                        1                |
  32                                         +-----+
  32 2                        1              |     |
  31                                         *--+--*
  31 3                        1              |     |
  30 5                        1              +-----+
     ----+----+----+----+
```

Normal Probability Plot



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CLONE=GemStar

The UNIVARIATE Procedure
Variable: Fry40

Moments

N	4	Sum Weights	4
Mean	1.585	Sum Observations	6.34
Std Deviation	0.34588052	Variance	0.11963333
Skewness	0	Kurtosis	0.3407733
Uncorrected SS	10.4078	Corrected SS	0.3589
Coeff Variation	21.8221148	Std Error Mean	0.17294026

Basic Statistical Measures

Location		Variability	
Mean	1.585000	Std Deviation	0.34588
Median	1.585000	Variance	0.11963
Mode	.	Range	0.83000
		Interquartile Range	0.50000

Tests for Location: Mu0=0

Test		-Statistic-	-----p Value------	
Student's t	t	9.165015	Pr > |t|	0.0027
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test		--Statistic---	-----p Value------	
Shapiro-Wilk	W	0.998745	Pr < W	0.9963
Kolmogorov-Smirnov	D	0.152938	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.02259	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.161753	Pr > A-Sq	>0.2500

Quantiles (Definition 5)

Quantile	Estimate
100% Max	2.000
99%	2.000
95%	2.000

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---------- CLONE=GemStar ----------

The UNIVARIATE Procedure
Variable: Fry40

Quantiles (Definition 5)

Quantile	Estimate
90%	2.000
75% Q3	1.835
50% Median	1.585
25% Q1	1.335
10%	1.170
5%	1.170
1%	1.170
0% Min	1.170

Extreme Observations

----Lowest----		----Highest---	
Value	Obs	Value	Obs
1.17	3	1.17	3
1.50	1	1.50	1
1.67	2	1.67	2
2.00	4	2.00	4

Stem	Leaf	#	Boxplot
20	0	1	
19			
18			+-----+
17			| |
16	7	1	| |
15	0	1	*--+--*
14			| |
13			+-----+
12			
11	7	1	

----+----+----+----+

Multiply Stem.Leaf by 10**-1

40

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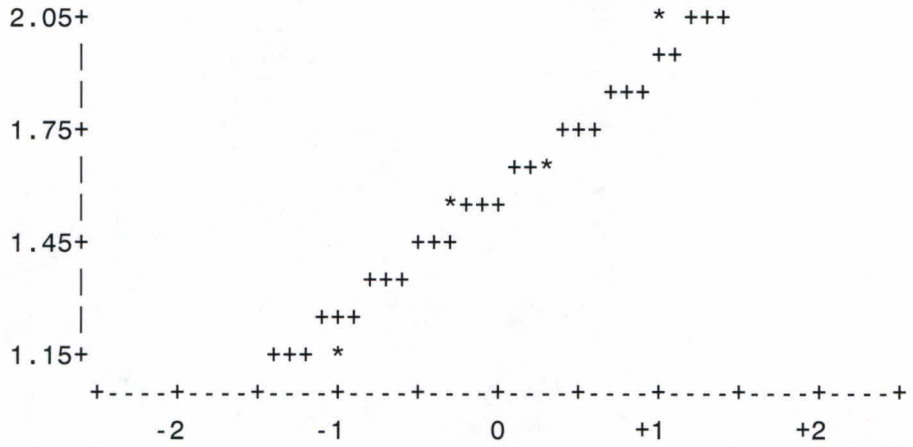
---------- CLONE=GemStar ----------

The UNIVARIATE Procedure
Variable: Fry40

Normal Probability Plot



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---------- CLONE=RBurbank ---------- #200400139

The UNIVARIATE Procedure
Variable: VitC

Moments

N	4	Sum Weights	4
Mean	22.705	Sum Observations	90.82
Std Deviation	1.59535785	Variance	2.54516667
Skewness	0.04835669	Kurtosis	-5.7152682
Uncorrected SS	2069.7036	Corrected SS	7.6355
Coeff Variation	7.02646047	Std Error Mean	0.79767892

Basic Statistical Measures

Location		Variability	
Mean	22.70500	Std Deviation	1.59536
Median	22.62000	Variance	2.54517
Mode	.	Range	2.96000
		Interquartile Range	2.75000

Tests for Location: Mu0=0

Test	-Statistic-		-----p Value------	
Student's t	t	28.46383	Pr > |t|	<.0001
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test	--Statistic---		-----p Value------	
Shapiro-Wilk	W	0.790498	Pr < W	0.0862
Kolmogorov-Smirnov	D	0.302154	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.079405	Pr > W-Sq	0.1598
Anderson-Darling	A-Sq	0.471494	Pr > A-Sq	0.1034

Quantiles (Definition 5)

Quantile	Estimate
100% Max	24.27
99%	24.27
95%	24.27

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CLONE=RBurbank

The UNIVARIATE Procedure
Variable: VitC

Quantiles (Definition 5)

Quantile	Estimate
90%	24.27
75% Q3	24.08
50% Median	22.62
25% Q1	21.33
10%	21.31
5%	21.31
1%	21.31
0% Min	21.31

Extreme Observations

-----Lowest----		----Highest----	
Value	Obs	Value	Obs
21.31	6	21.31	6
21.35	8	21.35	8
23.89	7	23.89	7
24.27	5	24.27	5

```
Stem Leaf                     #             Boxplot
  24 3                        1             +-----+
  23 9                        1             |     |
  23                                        |     |
  22                                        *--+--*
  22                                        |     |
  21                                        |     |
  21 34                       2             +-----+
     ----+----+----+----+
```

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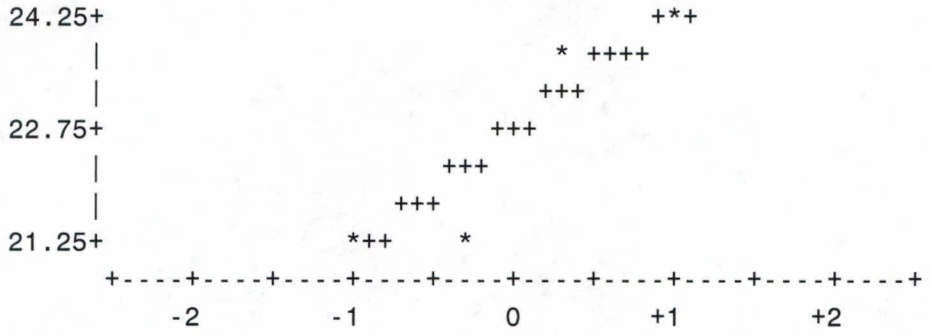
---------- CLONE=RBurbank ----------

The UNIVARIATE Procedure
Variable: VitC

Normal Probability Plot



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#200400139

---------- CLONE=RBurbank ----------

The UNIVARIATE Procedure
Variable: Fry40

Moments

N	4	Sum Weights	4
Mean	3.5	Sum Observations	14
Std Deviation	1	Variance	1
Skewness	-2	Kurtosis	4
Uncorrected SS	52	Corrected SS	3
Coeff Variation	28.5714286	Std Error Mean	0.5

Basic Statistical Measures

Location		Variability	
Mean	3.500000	Std Deviation	1.00000
Median	4.000000	Variance	1.00000
Mode	4.000000	Range	2.00000
		Interquartile Range	1.00000

Tests for Location: Mu0=0

Test	-Statistic-		-----p Value------	
Student's t	t	7	Pr > |t|	0.0060
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test	--Statistic---		-----p Value------	
Shapiro-Wilk	W	0.629776	Pr < W	0.0012
Kolmogorov-Smirnov	D	0.441462	Pr > D	<0.0100
Cramer-von Mises	W-Sq	0.162472	Pr > W-Sq	0.0090
Anderson-Darling	A-Sq	0.826838	Pr > A-Sq	0.0075

Quantiles (Definition 5)

Quantile	Estimate
100% Max	4
99%	4
95%	4

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#200400139

---------- CLONE=RBurbank ----------

The UNIVARIATE Procedure
Variable: Fry40

Quantiles (Definition 5)

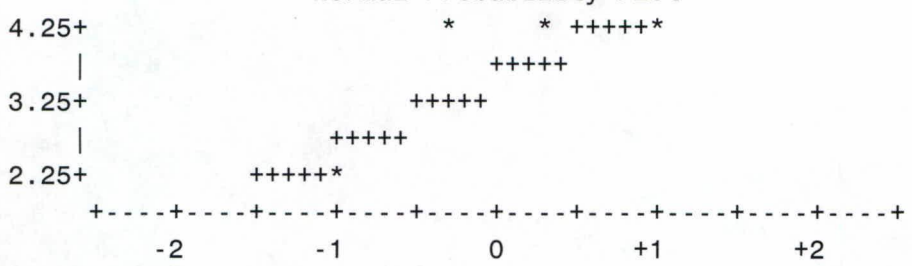
Quantile	Estimate
90%	4
75% Q3	4
50% Median	4
25% Q1	3
10%	2
5%	2
1%	2
0% Min	2

Extreme Observations

----Lowest----		----Highest---	
Value	Obs	Value	Obs
2	7	2	7
4	8	4	5
4	6	4	6
4	5	4	8

```
Stem Leaf                     #             Boxplot
   4 000                      3             +-----+
   3                                        |  +  |
   3                                        +-----+
   2                                           |
   2 0                        1                |
     ----+----+----+----+
```

Normal Probability Plot



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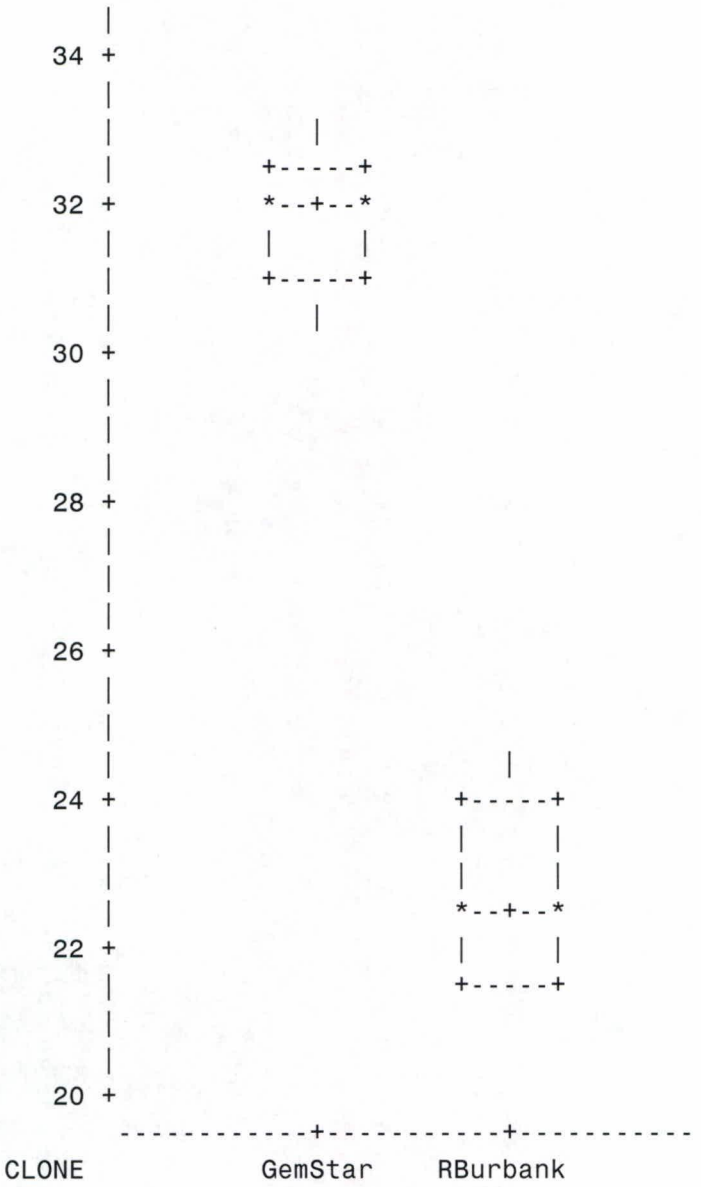
#200400139

The UNIVARIATE Procedure
Variable: VitC

Schematic Plots



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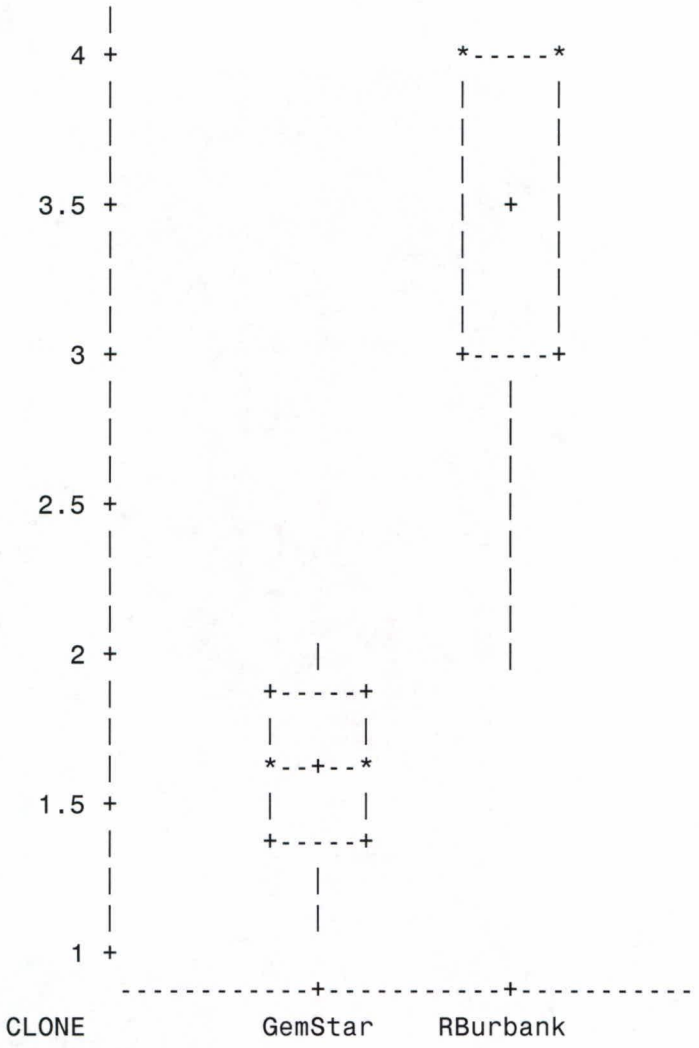
The UNIVARIATE Procedure
Variable: Fry40

#200400139

Schematic Plots



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#200400139

The GLM Procedure

Class Level Information

Class	Levels	Values
CLONE	2	GemStar RBurbank
REP	4	1 2 3 4

Number of Observations Read	8
Number of Observations Used	8

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The GLM Procedure

#200400139

Dependent Variable: VitC

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	365.0251000	91.2562750	7.28	0.0673
Error	3	37.5816500	12.5272167		
Corrected Total	7	402.6067500			

R-Square	Coeff Var	Root MSE	VitC Mean
0.906654	14.08008	3.539381	25.13750

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	3	20.4938500	6.8312833	0.55	0.6846
CLONE	1	344.5312500	344.5312500	27.50	0.0135

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	3	20.4938500	6.8312833	0.55	0.6846
CLONE	1	344.5312500	344.5312500	27.50	0.0135

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#200400139

The GLM Procedure

Dependent Variable: Fry40

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	8.00725000	2.00181250	30.97	0.0090
Error	3	0.19390000	0.06463333		
Corrected Total	7	8.20115000			

R-Square	Coeff Var	Root MSE	Fry40 Mean
0.976357	10.89950	0.254231	2.332500

Source	DF	Type I SS	Mean Square	F Value	Pr > F
REP	3	1.30945000	0.43648333	6.75	0.0755
CLONE	1	6.69780000	6.69780000	103.63	0.0020

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	3	1.30945000	0.43648333	6.75	0.0755
CLONE	1	6.69780000	6.69780000	103.63	0.0020

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#200400139

The GLM Procedure

t Tests (LSD) for VitC

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	3
Error Mean Square	12.52722
Critical Value of t	3.18245
Least Significant Difference	7.9648

Means with the same letter are not significantly different.

t Grouping	Mean	N	CLONE
A	31.700	4	GemStar
B	18.575	4	RBurbank

S2

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#200400139

The GLM Procedure

t Tests (LSD) for Fry40

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	3
Error Mean Square	0.064633
Critical Value of t	3.18245
Least Significant Difference	0.5721

Means with the same letter are not significantly different.

t Grouping	Mean	N	CLONE
A	3.2475	4	RBurbank
B	1.4175	4	GemStar

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#200400139

CLONE=GemStar

The UNIVARIATE Procedure
Variable: VitC

Moments

N	4	Sum Weights	4
Mean	31.7	Sum Observations	126.8
Std Deviation	4.24776804	Variance	18.0435333
Skewness	1.5632239	Kurtosis	2.20657022
Uncorrected SS	4073.6906	Corrected SS	54.1306
Coeff Variation	13.3998992	Std Error Mean	2.12388402

Basic Statistical Measures

Location		Variability	
Mean	31.70000	Std Deviation	4.24777
Median	30.15500	Variance	18.04353
Mode	.	Range	9.13000
		Interquartile Range	5.77000

Tests for Location: Mu0=0

Test	-Statistic-		-----p Value------	
Student's t	t	14.92549	Pr > |t|	0.0007
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test	--Statistic---		-----p Value------	
Shapiro-Wilk	W	0.82326	Pr < W	0.1509
Kolmogorov-Smirnov	D	0.281898	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.074358	Pr > W-Sq	0.1932
Anderson-Darling	A-Sq	0.429579	Pr > A-Sq	0.1432

Quantiles (Definition 5)

Quantile	Estimate
100% Max	37.810
99%	37.810
95%	37.810

S4

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#200400139

---------- CLONE=GemStar ----------

The UNIVARIATE Procedure
Variable: VitC

Quantiles (Definition 5)

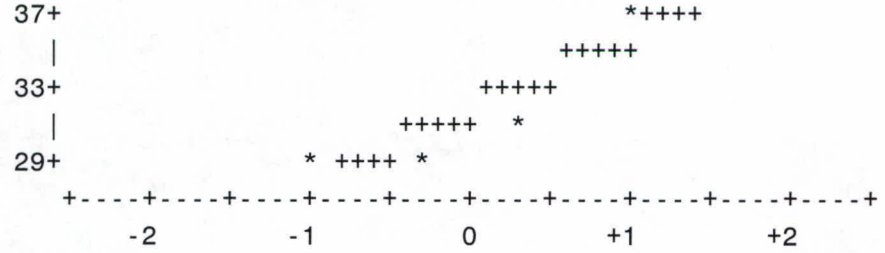
Quantile	Estimate
90%	37.810
75% Q3	34.585
50% Median	30.155
25% Q1	28.815
10%	28.680
5%	28.680
1%	28.680
0% Min	28.680

Extreme Observations

-----Lowest----		----Highest----	
Value	Obs	Value	Obs
28.68	2	28.68	2
28.95	4	28.95	4
31.36	1	31.36	1
37.81	3	37.81	3

```
Stem Leaf                     #             Boxplot
  36 8                        1                |
  34                                           +-----+
  32                                           |     |
  30 4                        1                *--+--*
  28 70                       2                +-----+
     ----+----+----+----+
```

Normal Probability Plot



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#200400139

CLONE=GemStar

The UNIVARIATE Procedure
Variable: Fry40

Moments

N	4	Sum Weights	4
Mean	1.4175	Sum Observations	5.67
Std Deviation	0.44033131	Variance	0.19389167
Skewness	0.86107638	Kurtosis	-0.261173
Uncorrected SS	8.6189	Corrected SS	0.581675
Coeff Variation	31.0639375	Std Error Mean	0.22016566

Basic Statistical Measures

Location		Variability	
Mean	1.417500	Std Deviation	0.44033
Median	1.335000	Variance	0.19389
Mode	.	Range	1.00000
		Interquartile Range	0.66500

Tests for Location: Mu0=0

Test		-Statistic-	-----p Value------	
Student's t	t	6.438334	Pr > |t|	0.0076
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test	--Statistic---		-----p Value------	
Shapiro-Wilk	W	0.946911	Pr < W	0.6969
Kolmogorov-Smirnov	D	0.212968	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.034334	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.227495	Pr > A-Sq	>0.2500

Quantiles (Definition 5)

Quantile	Estimate
100% Max	2.000
99%	2.000
95%	2.000

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#200400139

---------- CLONE=GemStar ----------

The UNIVARIATE Procedure
Variable: Fry40

Quantiles (Definition 5)

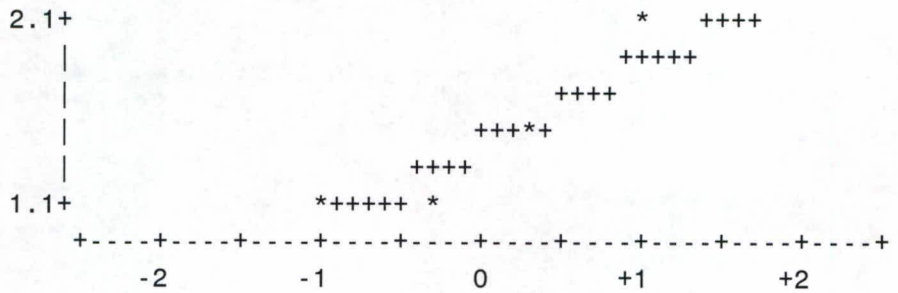
Quantile	Estimate
90%	2.000
75% Q3	1.750
50% Median	1.335
25% Q1	1.085
10%	1.000
5%	1.000
1%	1.000
0% Min	1.000

Extreme Observations

----Lowest----		----Highest---	
Value	Obs	Value	Obs
1.00	1	1.00	1
1.17	2	1.17	2
1.50	4	1.50	4
2.00	3	2.00	3

```
Stem Leaf                     #             Boxplot
  20 0                        1                |
  18                                           |
  16                                          +-----+
  14 0                        1               |  +  |
  12                                          *-----*
  10 07                       2               +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-1
```

Normal Probability Plot



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#200400139

CLONE=RBurbank

The UNIVARIATE Procedure
Variable: VitC

Moments

N	4	Sum Weights	4
Mean	18.575	Sum Observations	74.3
Std Deviation	1.14671996	Variance	1.31496667
Skewness	-0.1655284	Kurtosis	-4.9482771
Uncorrected SS	1384.0674	Corrected SS	3.9449
Coeff Variation	6.17345873	Std Error Mean	0.57335998

Basic Statistical Measures

Location		Variability	
Mean	18.57500	Std Deviation	1.14672
Median	18.67500	Variance	1.31497
Mode	.	Range	2.27000
		Interquartile Range	1.95000

Tests for Location: Mu0=0

Test		-Statistic-	-----p Value------	
Student's t	t	32.39675	Pr > |t|	<.0001
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test		--Statistic---	-----p Value------	
Shapiro-Wilk	W	0.85005	Pr < W	0.2263
Kolmogorov-Smirnov	D	0.287544	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.062688	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.373757	Pr > A-Sq	0.2210

Quantiles (Definition 5)

Quantile	Estimate
100% Max	19.610
99%	19.610
95%	19.610

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#200400139

---------- CLONE=RBurbank ----------

The UNIVARIATE Procedure
Variable: VitC

Quantiles (Definition 5)

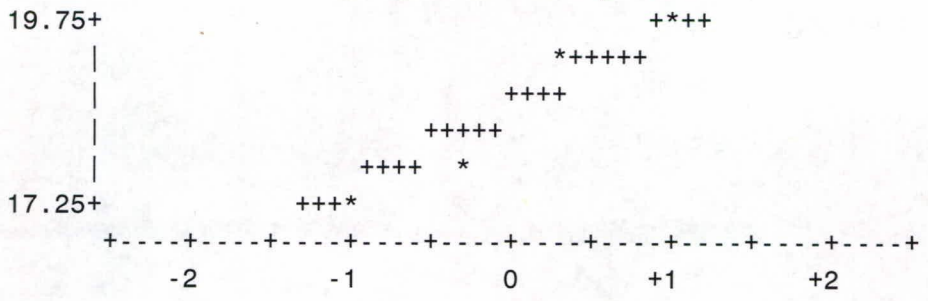
Quantile	Estimate
90%	19.610
75% Q3	19.550
50% Median	18.675
25% Q1	17.600
10%	17.340
5%	17.340
1%	17.340
0% Min	17.340

Extreme Observations

-----Lowest----		----Highest----	
Value	Obs	Value	Obs
17.34	7	17.34	7
17.86	6	17.86	6
19.49	5	19.49	5
19.61	8	19.61	8

```
Stem Leaf                     #             Boxplot
  19 56                       2             +-----+
  19                                        |     |
  18                                        *--+--*
  18                                        |     |
  17 9                        1             +-----+
  17 3                        1                |
     ----+----+----+----+
```

Normal Probability Plot



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#200400139

CLONE=RBurbank

The UNIVARIATE Procedure
Variable: Fry40

Moments

N	4	Sum Weights	4
Mean	3.2475	Sum Observations	12.99
Std Deviation	0.55427881	Variance	0.307225
Skewness	1.10057909	Kurtosis	-0.0286183
Uncorrected SS	43.1067	Corrected SS	0.921675
Coeff Variation	17.0678618	Std Error Mean	0.27713941

Basic Statistical Measures

Location		Variability	
Mean	3.247500	Std Deviation	0.55428
Median	3.080000	Variance	0.30723
Mode	2.830000	Range	1.17000
		Interquartile Range	0.83500

Tests for Location: Mu0=0

Test		-Statistic-	-----p Value------	
Student's t	t	11.71793	Pr > |t|	0.0013
Sign	M	2	Pr >= |M|	0.1250
Signed Rank	S	5	Pr >= |S|	0.1250

Tests for Normality

Test		--Statistic---	-----p Value------	
Shapiro-Wilk	W	0.854144	Pr < W	0.2399
Kolmogorov-Smirnov	D	0.274344	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.059025	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.366383	Pr > A-Sq	0.2318

Quantiles (Definition 5)

Quantile	Estimate
100% Max	4.000
99%	4.000
95%	4.000

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#200400139

CLONE=RBurbank

The UNIVARIATE Procedure
Variable: Fry40

Quantiles (Definition 5)

Quantile	Estimate
90%	4.000
75% Q3	3.665
50% Median	3.080
25% Q1	2.830
10%	2.830
5%	2.830
1%	2.830
0% Min	2.830

Extreme Observations

----Lowest----		----Highest---	
Value	Obs	Value	Obs
2.83	8	2.83	5
2.83	5	2.83	8
3.33	6	3.33	6
4.00	7	4.00	7

```
Stem Leaf                     #             Boxplot
  40 0                        1                |
  38                                           |
  36                                          +-----+
  34                                          |     |
  32 3                        1               |  +  |
  30                                          *-----*
  28 33                       2               +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-1
```

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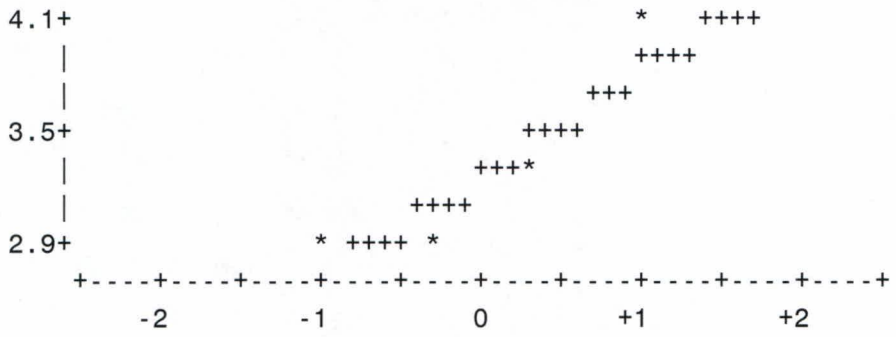
#20040039

---------- CLONE=RBurbank ----------

The UNIVARIATE Procedure
Variable: Fry40

Normal Probability Plot



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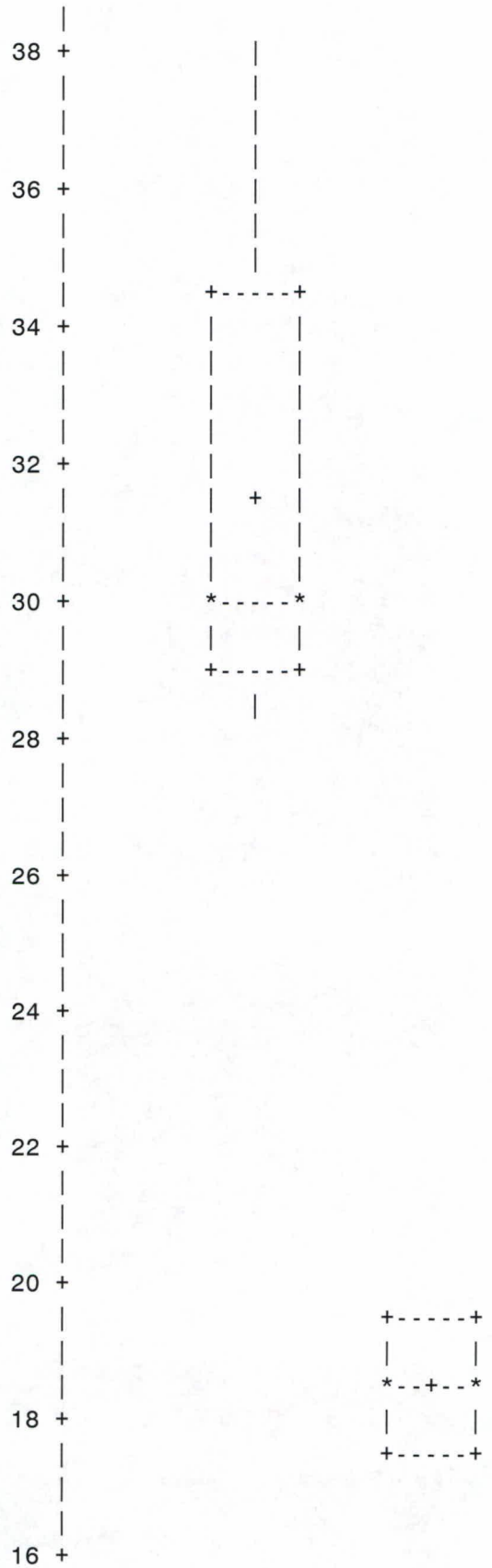
#200400139

The UNIVARIATE Procedure
Variable: VitC

Schematic Plots



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#200400139

The UNIVARIATE Procedure
Variable: VitC

Schematic Plots

```
------------+-----------+-----------
CLONE           GemStar     RBurbank
```

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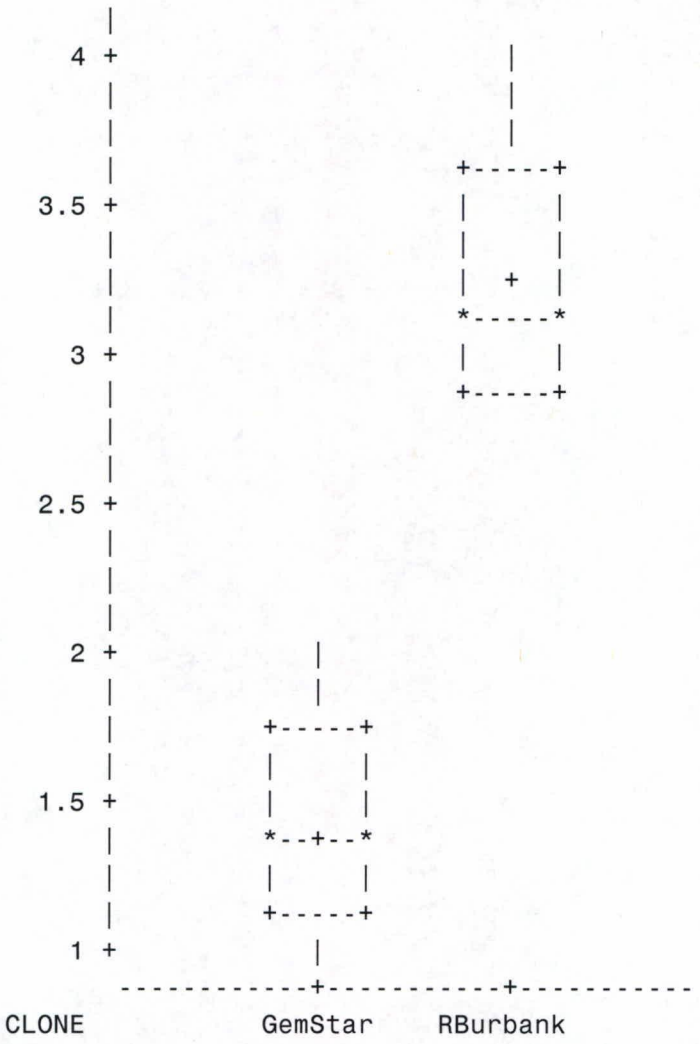
#2004001139

The UNIVARIATE Procedure
Variable: Fry40

Schematic Plots



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GemStar Russet and Gem Russet Tubers

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GemStar Russet and Gem Russet Leaf

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#20040001139

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There is a 17 page ADDENDUM to PV# 200400139 'GemStar Russet' to be provided upon request.

Replaced DPA.

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

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

1. NAME OF APPLICANT(S)

The Idaho Research Foundation, Inc. representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and the United States of America, as represented by the Secretary of Agriculture

PO Box 442337
University of Idaho
Moscow, ID 83844-2337
USA

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
A9014-2	GemStar Russet
5. TELEPHONE *(Include area code)*	**6. FAX** *(Include area code)*
208-885-7173	208-885-6654

7. PVPO NUMBER #200400139

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)*:

The Idaho Research Foundation, Inc., (representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and United States Department of Agriculture/Agricultural Research Service.

The Idaho Research Foundation, Inc., is a partner in the Northwest (Tri-State) Potato Variety Development Program and a signatory of the General Agreement on Policy and Procedure for Release of New Publicly Developed Plant Varieties in Idaho, Oregon and Washington, between Washington State University, Oregon State University, University of Idaho and U.S. Department of Agriculture, Agricultural Research Service. In accordance with provision 2. of this Agreement, Idaho Research Foundation is applying for this PVPC.

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.

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 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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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 call (800) 795-3272 (voice) or (202) 720-6382 (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

RAD 9/23/09

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
The Idaho Research Foundation, Inc. representing the interests of the Washington State University Research Foundation, State of Oregon, Acting by and Through the State Board of Higher Education on behalf of Oregon State University, and the United States of America, as represented by the Secretary of Agriculture		A9014-2
		VARIETY NAME: GemStar Russet
NAME OF OWNER REPRESENTATIVE (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	FOR OFFICIAL USE ONLY
Stephen Love	Aberdeen R&E Center 1693 S 2700 W Aberdeen, ID 83210	PVPO NUMBER: 200400139

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

Signature

15 Apr 09
Date

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