No.. 200100090

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Progeny Advanced Genetics, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PERMITTED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

LETTUCE

'Alpine'

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 twelfth day of December, in the year two thousand and five.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

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

Form Approved - OMB No. 0581-

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: PROGENY ADVANCED GENETICS, INC.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME: PX 223

3. VARIETY NAME: ALPINE

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*: 1536 B MOFFETT STREET, SALINAS, CA 93905-3342

5. TELEPHONE *(include area code)*: 831-751-6030

6. FAX *(include area code)*: 831-751-6032

FOR OFFICIAL USE ONLY

PVPO NUMBER: 200100090

FILING DATE: January 24, 2001

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

8. IF INCORPORATED, GIVE STATE OF INCORPORATION: CALIFORNIA

9. DATE OF INCORPORATION: 12-26-94

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

Darryn Gibson
Product Development Manager
Progeny Advanced Genetics, Inc.
1536 B Moffett Street
Salinas, CA 93905

FEES RECEIVED

FILING AND EXAMINATION FEES: $2705— DATE Jan 24, 01

CERTIFICATION FEE: $682— DATE Nov 29, 05

11. TELEPHONE *(include area code)*: 831-751-6030

12. FAX *(include area code)*: 831-751-6032

13. E_MAIL: dgibson@redshift.com

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

15. GENUS AND SPECIES NAME OF CROP: LACTUCA SATIVA

16. FAMILY NAME *(Botanical)*: COMPOSITAE

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

18. 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 ($2,450), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)

19. 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 20 and 21 below)* ☒ NO *(If "no," go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☒ NO

21. IF "YES" TO ITEM 20, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

22. 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.)*

23. 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.)*

24. The owners declare that a viable sample of basic seed of the variety will be 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: Darryn G

NAME *(Please print or type)*: Darryn Gibson

CAPACITY OR TITLE: Product Development Manager

DATE: 1/12/01

SIGNATURE OF OWNER:

NAME *(Please print or type)*:

CAPACITY OR TITLE:

DATE: /

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

Form Approved - OMB No. 0581-0055

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

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2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME: PX 223

3. VARIETY NAME: ALPINE

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
1536 B MOFFETT STREET
SALINAS CALIFORNIA 93905-3342

5. TELEPHONE *(include area code)*: 831-751-6030

6. FAX *(include area code)*: 831-751-6032

FOR OFFICIAL USE ONLY

PVPO NUMBER: 0 1 0 0 0 9 0

FILING DATE

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8. IF INCORPORATED, GIVE STATE OF INCORPORATION: CALIFORNIA

9. DATE OF INCORPORATION: 12/26/94

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
DARRYN GIBSON
PRODUCT DEVELOPMENT MANAGER
PROGENY ADVANCED GENETICS, INC
1536 B MOFFETT STREET
SALINAS CALIFORNIA 93905

FEES RECEIVED

FILING AND EXAMINATION FEES: $

DATE

CERTIFICATION FEE: $

DATE

11. TELEPHONE *(Include area code)*: 831-751-6030

12. FAX *(Include area code)*: 831-751-6032

13. E-MAIL: dgibson@redshift.com

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

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

a. [X] Exhibit A. Origin and Breeding History of the Variety
b. [X] Exhibit B. Statement of Distinctness
c. [X] Exhibit C. Objective Description of Variety
d. [X] Exhibit D. Additional Description of the Variety *(Optional)*
e. [X] Exhibit E. Statement of the Basis of the Owner's Ownership
f. [X] 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. [X] Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. 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 20 and 21 below)* [X] NO *(If "no," go to item 22)*

20. 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

21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? [ ] YES [ ] NO
IF YES, SPECIFY THE NUMBER 1, 2, 3, *etc.* [ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

(If additional explanation is necessary, please use the space indicated on the reverse.)

22. 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 [X] 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.)*

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

24. The owners declare that a viable sample of basic seed of the variety will be 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	
NAME *(Please print or type)* DARRYN GIBSON		NAME *(Please print or type)*	
CAPACITY OR TITLE 2 PRODUCT DEVELOPMENT MANAGER	DATE	CAPACITY OR TITLE	DATE

INSTRUCTIONS

200100090

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 $2,705 ($320 filing fee and $2,385 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 Variet Protection Office, AMS, USDA, Room 500, 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 amoun of $320 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/pvp.htm

ITEM

18a. 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

18b. 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.

18c. 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.

18d. 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.*

18e. 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.

19. 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).*

21. *See Section 83 of the Act for the Contents and Term of Plant Variety Protection.*

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

23. *See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.*

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

22. 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.)*

23. 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. There is no charge for filing a change of address. The fee for filing a change of 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.)*

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089.

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 collection of information 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, political beliefs, sexual orientation, and marital or family status. (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 the 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.

Exhibit A Revised

Details of the Development of the Variety Alpine

Alpine is an iceberg lettuce variety developed from a hand pollinated cross of Atlas and Genecorp Green made in 1994 in the San Joaquin Valley. The F1 seed harvested was designated as Gamma # 010. The two parental varieties were selected for there color size and heat tolerance. Atlas was selected for its extreme dark color and improved texture. Genecorp Green was selected for its frilled margin, large size and heat tolerance. The cross was made and through the pedigree selection breeding method, we developed a dark green, large, slow bolting green leaf lettuce with a frilled leaf margin for plantings in Yuma Arizona, and the Salinas Valley of California.

Approximately 40 plants of the F1 seed were planted in a San Joaquin Valley production field for seed increase in 1995. The block was rogued, eliminating the self pollinating plants. The F2 seed was harvested in August 1995.

The F2 seed was designated as PSR95400-41 and was evaluated in research and development plot trials in late 1995 and 1996. The seed was then increased in 1996 in a San Joaquin Valley research production block. The block was intensely rogued at the market stage, and individual plants were selected for improved size, dark green color and late maturity. Selected plants were harvested individually and the remainder of the plants were harvested in bulk for trial purposes to produce the F3 seed.

The F3 seed was extensively trialed throughout the 1996 and 1997 growing seasons in Yuma, Arizona and the Salinas Valley of California. Seed from the individual plant selections were then increased in 1997, in the San Joaquin Valley research production. Selections for large size, dark green color and heat resistance were made. Further rogueing for size, color, type and maturity was done until harvest of the F4 seed. Individual plants were harvested separately and the remainder of the block was bulk harvested for trial evaluation.

The F4 seed was evaluated in research and development plot trials during 1997 and 1998 growing seasons in the winter plantings of Yuma, Arizona and the Salinas Valley of California, where it exhibited good uniformity. Individual plants were selected from the trials for color, size, type and maturity and grown to seed in our San Martin green house facility, producing F5 seed.

During the 1999 growing seasons, we continued to extensively trial the F4 seed in Yuma Arizona and the Salinas Valley of California. This variety was noted to exhibit the desired phenotypic traits, with improved size, weight and color, while being uniform and stable. The F5 seed was planted in 2000 in our San Joaquin Valley commercial production field, where it was selectively rogued for uniformity in size and maturity. The F6 seed was harvested in fall 2000, and was trialed through the winter of 2000 and throughout the 2001 growing seasons in Yuma and Salinas.

Alpine, as evaluated in commercial trails and production, has been uniform, stable and without variants for two generations. No seed or harvested material from the variety was sold or offered for sale prior to the initial filing of this application.

PROGENY
advanced genetics®

Exhibit B Revised

Statement of Distinctness

Alpine is a slow bolting green leaf lettuce that most closely resembles its parent variety Genecorp Green. Alpine is distinct from Genecorp Green as it is slower bolting, it has a darker green color, a larger frame diameter and longer head length. Alpine is characterized as having a moderate incision depth on the mature leaf, where as the incision depth is absent for Genecorp Green. The mature leaf indentation of Alpine is shallowly dentate, where as the mature leaf indentation of Genecorp green is entire.

Alpine is distinguished from its parent variety Atlas as it has a much more frilled leaf margin, it is a larger plant in height and diameter, and is later maturing. Alpine is also lighter in color than the variety Atlas. Additionally Alpine differs from Atlas by the following attributes as described in their respective Exhibit C claims:

Attribute	**Alpine**	**Atlas**
Cotyledon apical margin	Finely dentate	Entire
Cotyledon leaf cupping	Uncupped	Slight
Mature leaf incision depth	Moderate	Absent
Mature leaf indentation	Shallowly dentate	Entire
Leaf margin undulation	Strong	Moderate
Leaf thickness	intermediate	Thick
Butt shape	Rounded	Flat
Leaf margin	Dentate	Entire

Alpine is unique and distinct from the variety Waldmanns Green by the following attributes as based on their respective Exhibit C and otherwise published claims:

Attribute	**Alpine**	**Waldmanns Green**
Mature leaf margin	Moderately frilled	Frilled, finely fringed
RHS Value	137B	138B
Mature leaf blistering	Moderately blistered	Blistered
Head size	Large	Medium
Butt shape	Round	Flat
Days to maturity summer	53	45

Differences in leaf color:

Alpine	**Genecorp Green**	**Atlas**	**Waldmanns Green**
137 B	138 A	137 A	138 B

1536 B. Moffett St. • Salinas, CA 93905 • Office 831.751.6030 • Fax 831.751.6032

U. S. Department of Agriculture
Agricultural Marketing Service
Science and Technology Program

Exhibit C

OBJECTIVE DESCRIPTION OF VARIETY
LETTUCE *Lactuca sativa*

NAME OF APPLICANT (S)
PROGENY ADVANCED GENETICS, INC.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)
1536 B MOFFETT STREET
SALINAS CALIFORNIA 93905

FOR OFFICIAL USE ONLY
PVPO NUMBER 200100090
VARIETY NAME
EXPERIMENTAL DESIGNATION

Place numbers in the boxes for the characters which best describe this variety. Measured data should be the mean of an appropriate number (at least 10) of v spaced plants. Royal Horticultural Society or any recognized color standard may be used to determine plant colors.

The location of the test area is: **SALINAS VALLEY CA**

Color System Used: **THE ROYAL HORTICULTURAL SOCIETY**

1. PLANT TYPE: *(See list of suggested check varieties page 4.)*

[0 1]

01=Cutting/Leaf
02=Butterhead
03=Bibb
04=Cos or Romaine
05=Great Lakes Group
06=Vanguard Group
07=Imperial Group
08=Eastern (Ithaca) Group
09=Stem
10=Latin
11=OTHER

2. SEED:

[2] COLOR: 1=White (Silver Gray) 2=Black (Gray Brown) 3=Brown (Amber)

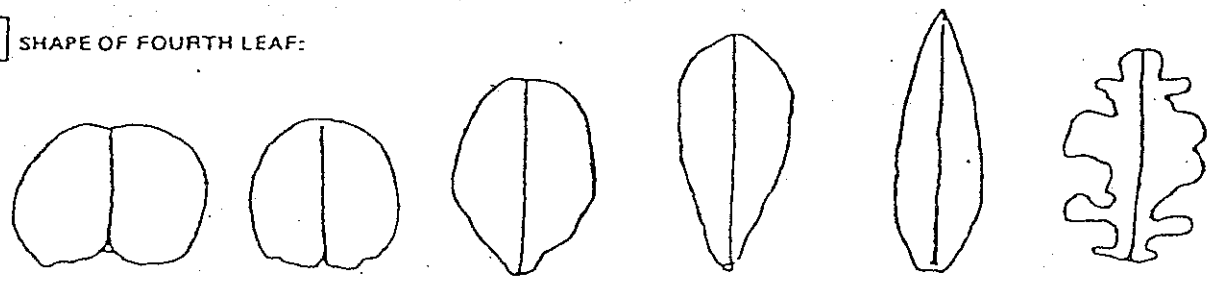
[1] LIGHT DORMANCY: 1=Light Required 2=Light Not Required

[1] HEAT DORMANCY: 1=Susceptible 2=Not Susceptible

3. COTYLEDON TO FOURTH LEAF STAGE: NOTE: Provide a color photograph or photocopy of the fourth leaf from 20 day old seedling grown under optimal conditions.

[1] SHAPE OF COTYLEDONS: 1=Broad 2=Intermediate 3=Spatulate

[3] SHAPE OF FOURTH LEAF:



1 2 3 4 5 6

[1 7] LENGTH/WIDTH INDEX OF FOURTH LEAF: L/W x 10

[3] APICAL MARGIN: / [4] BASAL MARGIN:
1=Entire
2=Crenate/Gnawed
3=Finely Dentate
4=Moderately Dentate
5=Coarsely Dentate
6=Incised
7=Lobed
8=OTHER *(specify)*

[2] UNDULATION: 1=Flat 2=Slight 3=Medium 4=Marked

[4] GREEN COLOR: 1=Yellow Green 2=Light Green 3=Medium Green 4=Dark Green 5=Blue Green 6=Silver Green 7=Gray Green

ANTHOCYANIN:

[1] DISTRIBUTION: 1=Absent 2=Margin Only 3=Spotted 4=Throughout 5=OTHER *(specify)*

[-] CONCENTRATION: 1=Light 2=Moderate 3=Intense

[1] ROLLING: 1=Absent 2=Present

[1] CUPPING: 1=Uncupped 2=Slight 3=Markedly

[3] REFLEXING: 1=None 2=Apical Margin 3=Lateral Margins

4. MATURE LEAVES *(observe harvest-mature outer leaves)*:

NOTE: Provide color photo of harvest-mature leaves which accurately shows color and margin characteristics.

MARGIN:

2	INCISION DEPTH: *(deepest penetration of the margin)*	1=Absent/Shallow (Dark Green Boston)	2=Moderate (Vanguard)	3=Deep (Great Lakes 659)
2	INDENTATION: *(finest divisions of the margin)*	1=Entire (Dark Green Boston) 2=Shallowly Dentate (Great Lakes 65)	3=Deeply Dentate (Great Lakes 659) 4=Crenate (Vanguard)	5=OTHER *(specify)*
3	UNDULATION OF THE APICAL MARGIN:	1=Absent/Slight (Dark Green Boston)	2=Moderate (Vanguard)	3=Strong (Great Lakes 659
4	GREEN COLOR:	1=Very Light Green (Bibb) 2=Light Green (Minetto)	3=Medium Green (Great Lakes) 4=Dark Green (Vanguard)	5=Very Dark Green 6=OTHER

ANTHOCYANIN *(grown at or below 10 C)*:

1	DISTRIBUTION:	1=Absent 2=Margin Only (Big Boston)	3=Spotted (Calif. Cream Butter) 4=Throughout (Prize Head)	5=OTHER *(specify)*
–	CONCENTRATION:	1=Light (Iceberg)	2=Moderate (Prize Head)	3=Intense (Ruby)
3	SIZE:	1=Small	2=Medium	3=Large
2	GLOSSINESS:	1=Dull (Vanguard)	2=Moderate (Salinas)	3=Glossy (Great Lakes)
2	BLISTERING:	1=Absent/Slight (Salinas)	2=Moderate (Vanguard)	3=Strong (Prize Head)
2	LEAF THICKNESS:	1=Thin	2=Intermediate	3=Thick
1	TRICHOMES:	1=Absent (smooth)	2=Present (spiny)	

5. PLANT *(at market stage. Choose a comparison variety appropriate for this type.)*:

39 SPREAD OF FRAME LEAVES: cm This Variety 37 cm GENECORP GREEN *(specify comparison variety)*

39 HEAD DIAMETER *(market trimmed with single cap leaf)*: cm This Variety 37 cm GENECORP GREEN *(specify comparison variety)*

5	HEAD SHAPE:	1=Flattened 2=Slightly Flattened	3=Spherical 4=Elongate	5=Non-Heading 6=OTHER
3	HEAD SIZE CLASS:	1=Small	2=Medium	3=Large

24 HEAD COUNT PER CARTON

414 HEAD WEIGHT: g This Variety 341 g GENECORP GREEN *(specify comparison variety)*

1	HEAD FIRMNESS:	1=Loose 2=Moderate	3=Firm 4=Very Firm

6. BUTT *(bottom of market-trimmed head)*:

3	SHAPE:	1=Slightly Concave	2=Flat	3=Rounded
2	MIDRIB:	1=Flattened (Salinas)	2=Moderately Raised	3=Prominently Raised (Great Lakes 659)

7. CORE *(stem of market-trimmed head)*:

33 mm Diameter at base of head

11.8 Ratio of head diameter/core diameter

43 Core height from base of head to apex: mm This Variety 41 mm GENECORP GREEN *(specify comparison variety)*

8. BOLTING *(Give First Water Date* MAY 11, 2000 NOTE: First Water Date is the date seed first receives adequate moisture to germinate. This can and often does equal the planting date.

46 Number of days from First Water Date to seed stalk emergence *(summer conditions)*: This Variety 41 GENECORP GREEN *(specify comparison variety)*

2	BOLTING CLASS:	1=Very Slow 2=Slow	3=Medium 4=Rapid	5=Very Rapid

8 92 Height of mature seed stalk: cm This Variety 78 cm GENECORP GREEN *(specify comparison variety)*

Spread of Bolter Plant *(at widest point)*:

[3 5] cm This Variety [4 1] cm GENECORP GREEN *(specify comparison variety)*

[2] BOLTER LEAVES: 1=Straight 2=Curved

[2] MARGIN: 1=Entire 2=Dentate

[3] COLOR: 1=Light Green 2=Medium Green 3=Dark Green

BOLTER HABIT:

[1] TERMINAL INFLORESCENCE: 1=Absent 2=Present

[2] LATERAL SHOOTS: *(above head)* 1=Absent 2=Present

[1] BASAL SIDE SHOOTS: 1=Absent 2=Present

9. MATURITY *(earliness of harvest-mature head formation)*:

NOTE: Complete this section for at least one season.

SEASON	Applic. 1/ # of days	Check 1/ # of days	CHECK VARIETY 2/
Spring	48	50	GENECORP GREEN
Summer	53	54	GENECORP GREEN
Fall			
Winter	84	85	GENECORP GREEN

Give planting date(s), and location(s):

Spring APRIL 2, SALINAS VALLEY CA

Summer JUNE 22, SALINAS VALLEY CA

Fall SEPTEMBER 20, YUMA ARIZONA

Winter FEBRUARY 20, SALINAS VALLEY CA. JANUARY 1, YUMA ARIZONA.

1/ First water date to harvest. 2/ Fill in check variety name on the appropriate line.

10. ADAPTATION:

PRIMARY REGIONS OF ADAPTION *(tested and proven adapted)*: (0=Not tested 1=Not Adapted 2=Adapted)

[2] Southwest *(Calif., Ariz. desert)* [2] West Coast [0] Northeast

[0] Northcentral [0] Southeast [ ] OTHER

SEASON:

[2] Spring (area SALINAS VALLEY, CA) [2] Fall (area YUMA, AZ)

[2] Summer (area SALINAS VALLEY, CA) [2] Winter (area SALINAS VALLEY, YUMA ARIZONA

[0] GREENHOUSE: 0=Not tested 1=Not Adapted 2=Adapted

[3] SOIL TYPE: 1=Mineral 2=Organic 3=Both

200100090

11. DISEASES AND STRESS REACTIONS (0=Not tested; 1=Susceptible; 2=Intermediate; 3=Resistant; 4=Highly resistant; 5=Tolerant):

VIRUS

- [2] Big Vein
- [1] Lettuce Mosaic
- [0] Cucumber Mosaic
- [0] Broad Bean Wilt
- [0] Turnip Mosaic
- [0] Beet Western Yellows
- [0] Lett. Infectious Yellows
- [ ] Other Virus _____

FUNGAL/BACTERIAL

- [1] Corky Root Rot (Pythium Root Rot)
- [1] Downy Mildew (Races _____)
- [1] Powdery Mildew
- [1] Sclerotinia Rot
- [0] Bacterial Soft Rot (Pseudomonas spp. & others)
- [0] Botrytis (Gray Mold)
- [0] OTHER _____

INSECTS

- [0] Cabbage Loopers
- [1] Root Aphids
- [0] Green Peach Aphid
- [ ] Other Insect _____

PHYSIOLOGICAL/STRESS

- [5] Tipburn
- [5] Heat
- [0] Drought
- [2] Cold
- [0] Salt
- [0] Brown Rib (Rib Discoloration, Rib Blight)
- [ ] OTHER _____

POST HARVEST

- [2] Pink Rib
- [0] Russet Spotting
- [0] Rusty Brown Discoloration
- [5] Internal Rib Necrosis (Blackheart, Gray Rib, Gray Streak)
- [0] Brown Stain

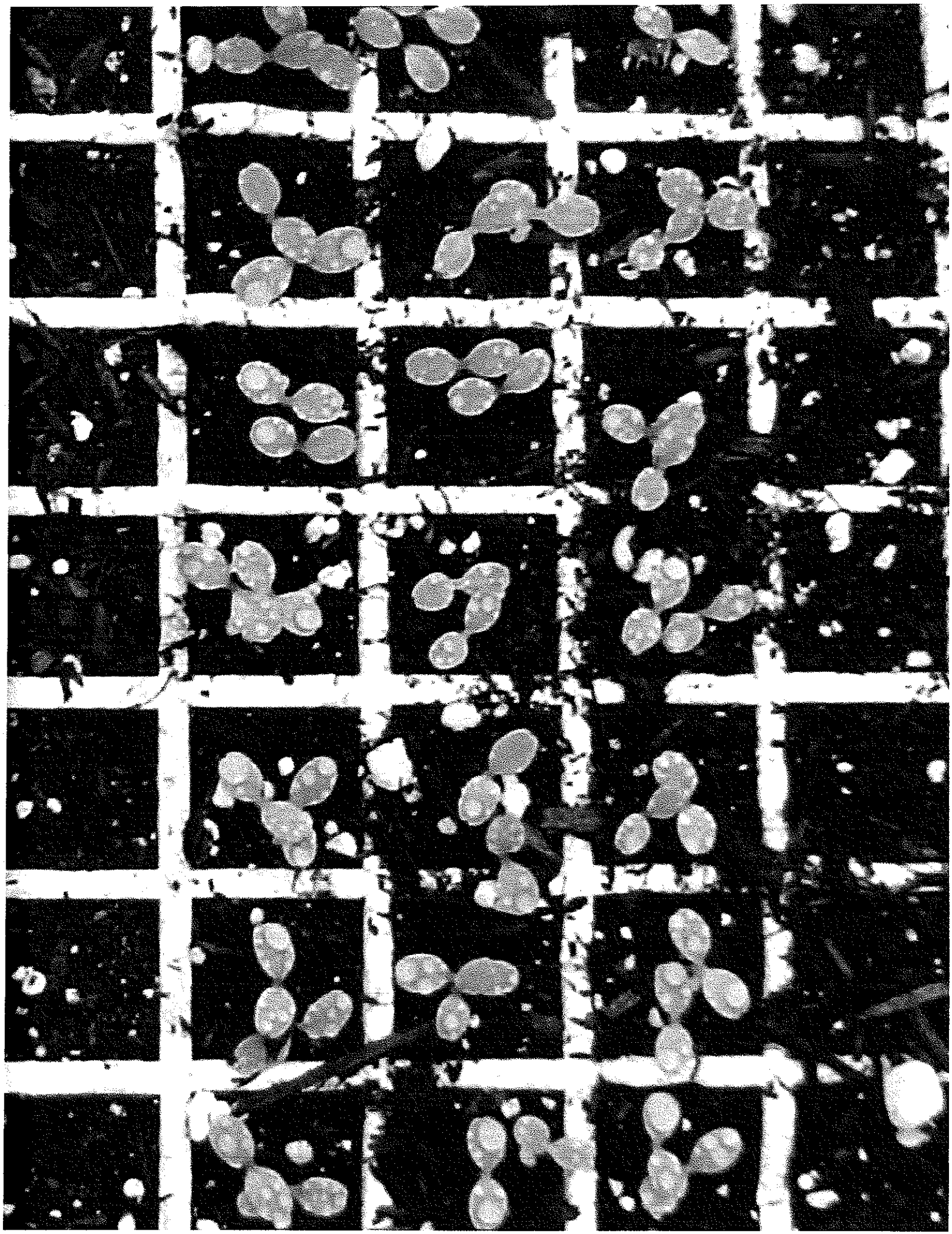
12. BIOCHEMICAL OR ELECTROPHORETIC MARKERS:

13. COMMENTS:

SUGGESTED CHECK VARIETIES

TYPE	CHECK VARIETY
1) CUTTING/LEAF	SALAD BOWL
2) BUTTERHEAD	DARK GREEN BOSTON
3) BIBB	BIBB
4) COS, OR ROMAINE	PARRIS ISLAND
5) GREAT LAKES GROUP	GREAT LAKES 659-700
6) VANGUARD GROUP	VANGUARD
7) IMPERIAL GROUP	VIVA
8) EASTERN GROUP	ITHACA

10



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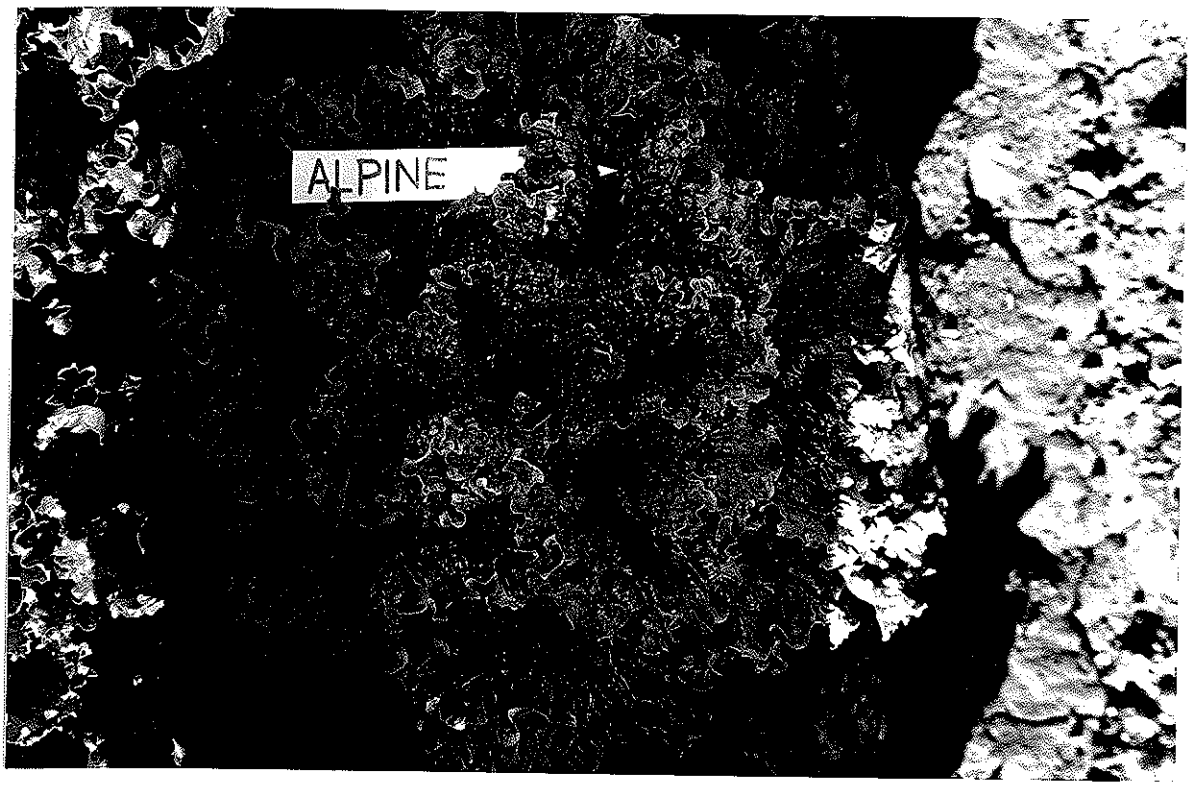

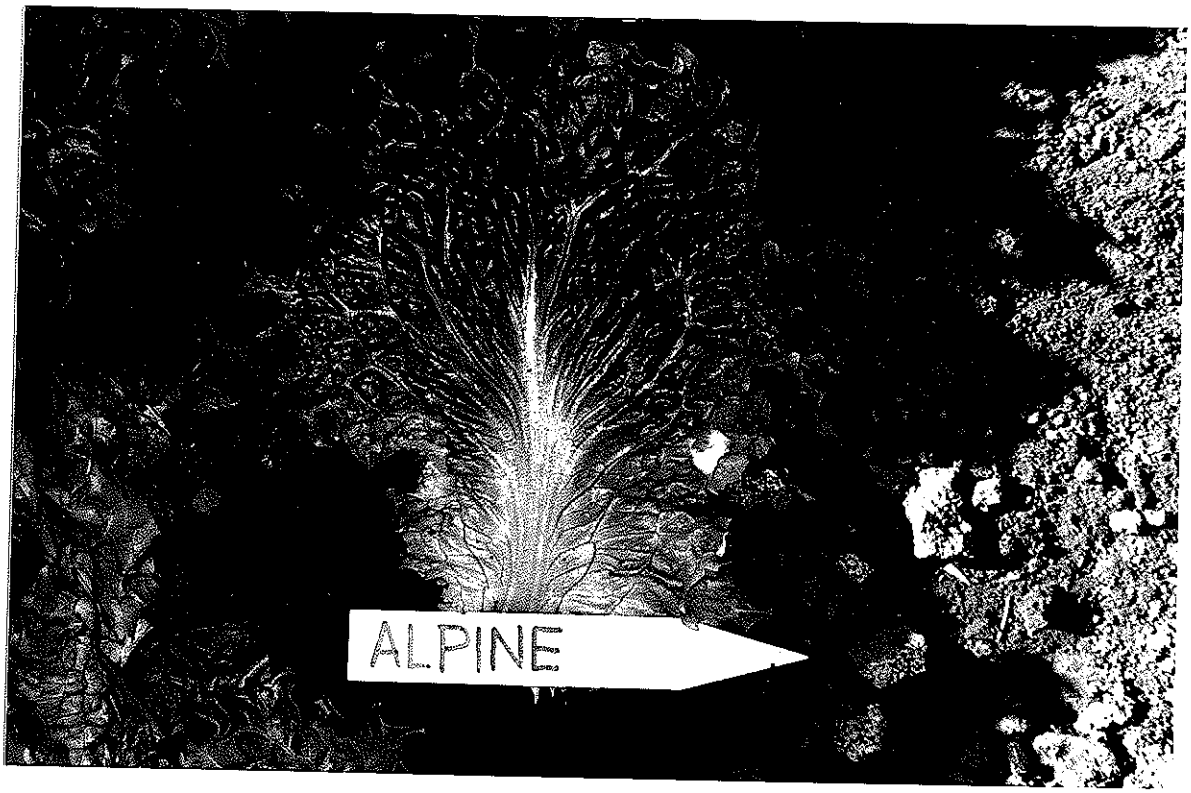

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Exhibit D

Alpine is an unusually large green leaf lettuce that is darker in color and has longer leafs that other varieties similar in type. Alpine is an extremely pliable leaf lettuce which reduces problems associated with harvest and handling. Where as the ribs of other green leaf varieties tend to break when packed into a carton, Alpine is much more pliable and the midribs remain intact.

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PERFORMANCE INDEX

Comparison of Head Characteristics

Trial map #: SV0004
Wet Date: 2/19/00
Date evald: 5/11/00

Location: Soledad
Grower: Braga

Ranch: Sillman
Lot: 1

Maturity Date:
1 Alpine 5/14/00
2 GC Green 5/15/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green
1	3.0	4.9	3.7	3.0	19.0	23.1	6.3	4.7	39	38	506	288
2	3.2	4.2	3.5	3.5	21.5	21.2	6.7	5.0	39	38	353	215
3	4.4	3.6	3.5	3.0	22.3	21.8	5.1	6.1	38	39	497	450
4	4.2	3.5	3.4	3.5	20.2	20.2	4.8	5.8	42	38	530	375
5	3.2	4.9	3.7	3.6	20.4	20.9	6.4	4.3	42	37	418	331
6	4.1	2.6	3.7	3.4	21.4	21.2	5.2	8.2	40	37	506	314
7	3.6	2.8	3.2	2.7	21.4	20.3	5.9	7.3	40	35	393	381
8	4.1	3.8	3.5	3.5	22.3	19.2	5.4	5.1	42	34	423	215
9	3.1	3.0	3.2	3.1	20.5	21.1	6.6	7.0	41	37	446	391
10	3.9	5.0	3.5	3.7	21.5	20.9	5.5	4.2	40	34	581	294
11	3.8	3.0	3.5	3.1	22.0	29.2	5.8	9.7	41	40	340	206
12	4.5	4.2	3.5	3.1	22.6	21.4	5.0	5.1	38	38	539	302
13	3.0	4.4	3.5	3.2	22.8	19.5	7.6	4.4	41	35	286	366
14	4.0	3.3	3.2	3.0	21.6	18.6	5.4	5.6	40	38	376	197
15	3.1	3.1	3.2	3.5	20.2	18.1	6.5	5.8	38	35	428	448
16	2.6	2.8	3.6	3.0	19.2	18.6	7.4	6.6	42	40	361	281
17	4.0	3.9	3.5	3.5	23.2	18.7	5.8	4.8	40	39	460	411
18	4.1	4.2	3.7	3.1	23.4	23.5	5.7	5.6	40	38	381	545
19	4.5	3.7	3.6	3.2	20.2	21.9	4.5	5.9	39	38	435	213
20	3.1	2.6	3.5	2.7	20.5	18.5	6.6	7.1	40	38	344	303
21	3.9	4.5	3.5	3.6	21.2	19.0	5.4	4.2	41	36	389	368
22	3.8	3.9	3.4	3.0	20.5	21.5	5.4	5.5	40	36	304	389
23	3.5	4.2	3.4	3.6	21.6	17.2	6.2	4.1	38	35	356	506
24	3.5	4.2	3.6	3.6	21.8	18.6	6.2	4.4	38	36	322	508
Average	3.7	3.8	3.5	3.3	21.3	20.6	5.9	5.7	40.0	37.0	415.6	345.7
Stan dev	5.37E-01	7.38E-01	1.58E-01	2.98E-01	1.16E+00	2.45E+00	7.80E-01	1.40E+00	1.37E+00	1.76E+00	7.95E+01	1.01E+02
T test	6.41E-01		2.03E-03		2.05E-01		5.27E-01		6.77E-08		1.05E-02	

2001000030

PERFORMANCE INDEX

Comparison of Head Characteristics

Trial map #: SV00060
Wet Date: 4/2/00
Date evald: 6/5/00

Location: Gonzalas
Grower: Costa Farms

Ranch: Feno
Lot: 7B

Maturity Date:
1 GCGreen 6/7/00
2 Alpine 6/7/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine
1	3.2	3.1	2.5	3.0	16.5	20.4	5.2	6.6	31	33	287	320
2	3.0	3.0	2.4	3.0	15.0	19.4	5.0	6.5	30	32	209	277
3	2.9	3.2	2.5	3.6	19.2	20.1	6.6	6.3	31	32	269	291
4	3.5	3.4	2.6	3.2	14.5	17.5	4.1	5.1	30	33	194	297
5	3.2	3.5	2.6	3.1	16.4	17.5	5.1	5.0	30	32	183	271
6	2.2	2.9	2.6	2.9	16.4	17.6	7.5	6.1	34	33	268	317
7	3.0	2.5	2.0	3.1	17.2	16.4	5.7	6.6	31	32	294	370
8	3.2	3.5	2.9	3.2	17.1	21.9	5.3	6.3	31	30	217	313
9	3.2	3.2	2.6	3.1	17.9	20.1	5.6	6.3	34	30	285	291
10	3.6	2.6	2.5	2.6	16.3	19.5	4.5	7.5	33	31	186	240
11	3.0	4.0	2.4	2.8	18.1	22.5	6.0	5.6	32	35	152	312
12	3.5	3.1	2.6	2.6	19.2	20.8	5.5	6.7	32	33	195	355
13	3.2	3.9	2.2	3.0	18.7	22.1	5.8	5.7	32	33	188	236
14	4.0	3.1	2.3	3.0	19.0	18.2	4.8	5.9	30	31	268	237
15	3.0	3.0	2.9	2.6	17.5	22.6	5.8	7.5	31	33	264	289
16	2.2	3.7	2.4	3.1	18.0	23.0	8.2	6.2	33	32	205	296
17	3.1	3.0	2.5	3.1	18.2	16.5	5.9	5.5	30	32	210	332
18	3.5	3.1	2.6	3.1	16.5	16.0	4.7	5.2	29	31	231	235
19	3.6	3.0	2.0	3.0	19.2	17.4	5.3	5.8	31	31	196	316
20	3.0	3.6	2.5	3.0	17.9	20.4	6.0	5.7	30	32	279	221
21	3.2	3.5	2.2	2.7	16.6	22.4	5.2	6.4	31	32	175	259
22	2.6	2.9	2.9	3.1	15.1	18.6	5.8	6.4	31	34	202	266
23	4.0	3.0	2.7	3.4	17.6	16.4	4.4	5.5	28	32	202	205
24	2.5	3.9	2.6	3.3	16.6	18.4	6.6	4.7	28	31	226	228
Average	3.1	3.2	2.5	3.0	17.3	19.4	5.6	6.0	31.0	32.1	224.4	282.3
Stan dev	4.63E-01	3.94E-01	2.41E-01	2.44E-01	1.34E+00	2.24E+00	9.35E-01	7.09E-01	1.57E+00	1.18E+00	4.14E+01	4.35E+01
T test	4.44E-01		1.63E-09		2.41E-04		8.44E-02		7.35E-03		2.23E-05	

2001000

Trial map #: SV00090
Wet Date: 4/29/00
Date evald: 6/15/00

PERFORMANCE INDEX
Comparison of Head Characteristics

Location: Chualar
Grower: Franchoni

Ranch: Wing
Lot: 308A

Maturity Date:
1 Alpine 6/15/00
2 GCGreen 6/18/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GCGreen	Alpine	GC Green
1	4.4	3.0	3.0	2.2	24.8	24.2	5.6	8.1	33	31	288	214
2	3.1	2.6	3.4	3.0	20.2	21.1	6.5	8.1	32	31	448	315
3	4.2	2.5	3.3	2.6	22.6	25.0	5.4	10.0	36	33	506	269
4	4.0	3.5	3.2	3.0	24.2	21.2	6.1	6.1	33	30	327	484
5	3.2	3.5	3.3	2.5	20.0	22.3	6.3	6.4	38	30	445	347
6	4.2	3.5	3.0	2.0	24.5	19.6	5.8	5.6	39	31	336	320
7	4.0	3.2	3.6	2.2	22.1	19.2	5.5	6.0	37	32	340	300
8	3.5	3.1	3.5	2.2	22.4	19.5	6.4	6.3	34	31	405	218
9	4.0	2.9	3.2	2.3	22.6	18.6	5.7	6.4	33	33	339	262
10	4.5	2.4	3.0	2.5	21.4	20.0	4.8	8.3	35	31	450	467
11	2.5	3.5	3.0	2.3	20.9	19.2	8.4	5.5	36	31	236	219
12	4.5	2.7	3.6	2.4	24.6	19.4	5.5	7.2	37	32	385	271
13	3.0	4.2	3.6	2.3	18.2	20.4	6.1	4.9	35	33	451	238
14	4.0	2.6	3.2	2.6	23.2	19.6	5.8	7.5	36	33	353	332
15	3.0	3.9	3.2	2.5	19.4	21.2	6.5	5.4	34	31	347	209
16	3.9	3.1	3.0	2.0	24.0	19.2	6.2	6.2	36	33	364	222
17	4.0	2.2	3.0	2.0	21.2	20.6	5.3	9.4	32	32	352	300
18	4.0	3.1	3.0	2.1	22.6	21.4	5.7	6.9	37	32	467	308
19	3.1	2.6	3.2	2.8	19.2	19.5	6.2	7.5	35	32	386	299
20	2.5	3.2	3.5	2.0	19.6	20.4	7.8	6.4	37	33	494	428
21	3.0	3.1	3.1	2.6	21.2	18.0	7.1	5.8	36	33	412	318
22	4.0	3.2	3.1	2.3	21.9	18.4	5.5	5.8	32	32	368	283
23	4.2	2.0	3.6	2.3	23.6	20.2	5.6	10.1	34	30	369	372
24	3.0	2.1	3.5	2.1	21.8	17.9	7.3	8.5	34	30	430	261
Average	3.7	3.0	3.3	2.4	21.9	20.3	6.1	7.0	35.0	31.7	387.4	302.3
Stan dev	0.6254853	0.5534968	0.228376	0.294392	1.862035	1.7343033	0.83304336	1.470134317	1.9666605	1.0901403	65.431622	75.577583
T test	2.79E-04		2.40E-15		2.38E-03		1.24E-02		2.70E-09		1.33E-04	

2001000 9

Trial map #: PD0005
Wet Date: 5/5/00
Date evald: 6/29/00

Location: Chualar
Grower: Costa

PERFORMANCE INDEX
Comparison of Head Characteristics

Ranch: Short
Lot: 14

Maturity Date:
1 Alpine 6/27/00
2 GC Green 6/28/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green	Alpine	GC Green
1	4.5	4.5	2.8	3.0	24.1	21.9	5.4	4.9	39	39	293	401
2	5.2	5.2	3.1	2.6	24.5	21.4	4.7	4.1	40	39	366	274
3	3.9	3.0	3.1	2.5	21.5	21.6	5.5	7.2	39	39	460	249
4	4.4	3.6	2.5	3.6	22.1	22.0	5.0	6.1	39	36	282	323
5	5.9	3.9	3.2	3.2	23.8	21.5	4.0	5.5	40	40	254	284
6	3.0	4.7	3.7	2.5	21.6	24.5	7.2	5.2	40	38	310	286
7	3.9	4.5	3.2	3.0	22.1	21.4	5.7	4.8	38	39	312	269
8	2.9	4.0	2.5	3.0	22.2	20.5	7.7	5.1	41	37	403	274
9	4.5	3.2	2.6	3.0	22.2	21.6	4.9	6.8	44	36	290	185
10	4.2	3.8	2.5	3.2	20.9	21.2	5.0	5.6	41	40	288	304
11	3.0	5.0	2.6	3.0	21.6	20.5	7.2	4.1	41	40	259	407
12	4.6	4.0	2.9	3.1	23.2	20.9	5.0	5.2	38	39	279	304
13	4.1	4.1	2.9	3.2	23.5	20.5	5.7	5.0	38	34	433	328
14	5.0	4.5	3.1	3.0	22.0	23.1	4.4	5.1	41	38	383	263
15	5.0	4.1	3.1	3.1	24.9	21.9	5.0	5.3	39	38	276	308
16	3.0	4.2	2.6	3.2	22.4	22.4	7.5	5.3	39	39	352	267
17	3.1	4.5	2.7	2.8	22.9	21.5	7.4	4.8	44	37	309	379
18	4.5	4.2	3.0	3.0	22.6	20.5	5.0	4.9	44	38	488	269
19	4.5	4.1	3.0	3.2	25.2	20.9	5.6	5.1	39	39	345	382
20	3.5	4.2	3.2	3.2	21.4	20.5	6.1	4.9	42	39	390	308
21	5.2	3.0	3.0	3.1	24.1	19.2	4.6	6.4	42	37	476	203
22	4.2	5.1	2.7	3.2	21.4	21.6	5.1	4.2	36	38	445	321
23	4.7	5.0	3.6	3.4	23.5	21.5	5.0	4.3	42	37	436	275
24	3.9	2.5	3.0	3.3	21.6	20.3	5.5	8.1	41	39	325	330
Average	4.2	4.1	2.9	3.1	22.7	21.4	5.6	5.3	40.3	38.1	352.3	299.7
Stan dev	8.07E-01	6.93E-01	3.23E-01	2.59E-01	1.23E+00	1.05E+00	1.04E+00	9.76E-01		1.45E+00	7.36E+01	5.50E+01
T test	7.31E-01		1.74E-01		1.63E-04		3.77E-01		1.14E-04		7.41E-03	

2001000

PERFORMANCE INDEX

Comparison of Head Characteristics

Trial map #: SV00135
Wet Date: 5/24/00
Date evald: 7/18/00

Location: Gonzales
Grower: RC Farms

Ranch: Williams
Lot: 16

Maturity Date:
1 Alpine 7/16/00
2 GCGreeen 7/18/00

	Core Diameter (cm)		Core Length (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	GCGreeen	Alpine	GCGreeen	Alpine	GCGreeen	Alpine	GCGreeen	Alpine	GCGreeen	Alpine	GCGreeen
1	3.5	3.6	4.4	3.4	23.0	26.5	5.2	7.8	46	42	463	481
2	3.4	2.9	3.3	4.9	32.5	25.0	9.8	5.1	45	40	408	439
3	3.8	3.3	4.0	4.4	30.0	25.0	7.5	5.7	49	43	549	315
4	3.3	3.5	7.1	5.0	30.0	27.5	4.2	5.5	42	44	418	547
5	3.7	3.3	6.4	3.5	32.0	26.0	5.0	7.4	48	40	591	304
6	3.2	3.4	7.5	5.7	31.0	24.0	4.1	4.2	48	40	408	370
7	3.4	3.5	4.4	5.6	27.0	27.0	6.1	4.8	42	42	422	312
8	3.4	3.4	4.5	3.6	30.0	23.0	6.7	6.4	44	39	552	431
9	3.6	3.5	4.7	2.6	27.0	26.0	5.7	10.0	44	41	497	353
10	3.6	2.9	5.7	3.3	26.0	24.0	4.6	7.3	43	43	445	381
11	3.6	3.5	3.6	4.4	28.0	27.0	7.8	6.1	48	38	561	530
12	3.3	3.6	3.9	4.0	29.0	27.0	7.4	6.8	49	39	460	480
13	3.5	3.5	4.0	4.4	26.0	27.0	6.5	6.1	50	44	351	375
14	3.6	3.7	3.7	2.9	29.0	21.0	7.8	7.2	45	41	407	356
15	3.5	3.4	6.6	6.0	29.0	28.0	4.4	4.7	42	43	656	261
16	3.3	3.0	5.3	3.9	29.0	25.0	5.5	6.4	41	43	569	480
17	3.4	3.4	4.3	5.6	27.5	23.5	6.4	4.2	43	38	492	498
18	3.5	3.3	4.6	4.7	29.0	26.5	6.3	5.6	39	44	436	405
19	3.5	3.5	5.9	3.9	32.0	23.0	5.4	5.9	38	45	436	367
20	3.6	3.2	4.5	5.5	26.0	25.0	5.8	4.5	37	43	490	406
21	4.0	3.4	5.0	6.0	23.0	23.0	4.6	3.8	42	46	558	485
22	3.3	3.5	4.6	4.0	29.0	24.0	6.3	6.0	47	41	762	623
23	3.0	3.2	5.2	4.2	28.5	25.0	5.5	6.0	42	43	876	261
24	3.6	3.6	4.4	4.5	30.0	28.0	6.8	6.2	41	41	583	340
Average	3.5	3.4	4.9	4.4	28.5	25.3	6.1	6.0	44.0	41.8	516.3	408.3
Stan dev	2.06E-01	2.13E-01	1.12E+00	9.69E-01	2.49E+00	1.84E+00	1.37E+00	1.37E+00	3.61E+00	2.17E+00	1.21E+02	9.30E+01
T test	9.12E-02		1.16E-01		7.51E-06		8.55E-01		1.51E-02		1.14E-03	

2001000

20

Trial map #: SV00060
Wet Date: 4/2/00
Date evald: 6/5/00

PERFORMANCE INDEX
Comparison of Head Characteristics

Location: Gonzalas
Grower: Costa Farms

Ranch: Feno
Lot: 7B

Maturity Date:
1 Atlas 6/9/00
2 Alpine 6/7/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine
1	3.2	3.1	2.6	3.0	15.5	20.4	4.8	6.6	29	33	171	320
2	2.7	3.0	3.0	3.0	16.4	19.4	6.1	6.5	29	32	170	277
3	2.6	3.2	3.0	3.6	14.4	20.1	5.5	6.3	27	32	269	291
4	3.1	3.4	3.1	3.2	16.0	17.5	5.2	5.1	28	33	171	297
5	2.8	3.5	2.6	3.1	18.9	17.5	6.8	5.0	30	32	256	271
6	3.3	2.9	2.5	2.9	17.5	17.6	5.3	6.1	30	33	285	317
7	2.8	2.5	2.6	3.1	19.5	16.4	7.0	6.6	30	32	228	370
8	2.6	3.5	3.0	3.2	18.7	21.9	7.2	6.3	29	30	249	313
9	2.5	3.2	2.6	3.1	16.2	20.1	6.5	6.3	26	30	172	291
10	2.1	2.6	2.7	2.6	16.5	19.5	7.9	7.5	26	31	225	240
11	2.0	4.0	3.0	2.8	20.1	22.5	10.1	5.6	31	35	241	312
12	2.0	3.1	3.6	2.6	16.2	20.8	8.1	6.7	26	33	219	355
13	2.2	3.9	3.5	3.0	15.1	22.1	6.9	5.7	30	33	235	236
14	2.6	3.1	3.0	3.0	17.9	18.2	6.9	5.9	31	31	160	237
15	2.0	3.0	3.3	2.6	18.4	22.6	9.2	7.5	28	33	164	289
16	3.0	3.7	3.2	3.1	18.2	23.0	6.1	6.2	39	32	194	296
17	3.2	3.0	3.4	3.1	17.6	16.5	5.5	5.5	35	32	176	332
18	3.6	3.1	3.0	3.1	17.6	16.0	4.9	5.2	25	31	174	235
19	2.5	3.0	3.0	3.0	18.2	17.4	7.3	5.8	27	31	208	316
20	3.1	3.6	3.2	3.0	17.2	20.4	5.5	5.7	31	32	252	221
21	2.8	3.5	2.5	2.7	18.5	22.4	6.6	6.4	30	32	227	259
22	3.2	2.9	3.0	3.1	15.7	18.6	4.9	6.4	26	34	217	266
23	2.0	3.0	3.6	3.4	17.3	16.4	8.7	5.5	28	32	249	205
24	3.2	3.9	3.3	3.3	16.1	18.4	5.0	4.7	29	31	297	228
Average	2.7	3.2	3.0	3.0	17.2	19.4	6.6	6.0	29.2	32.1	217.0	282.3
Stan dev	4.79E-01	3.94E-01	3.38E-01	2.44E-01	1.45E+00	2.24E+00	1.43E+00	7.09E-01	3.06E+00	1.18E+00	4.08E+01	4.35E+01
T test	1.45E-04		8.84E-01		2.46E-04		1.07E-01		7.28E-05		2.65E-06	

2001000

Trial map #: SV00090
Wet Date: 4/29/00
Date evald: 6/15/00

PERFORMANCE INDEX
Comparison of Head Characteristics

Location: Chualar
Grower: Franchoni

Ranch: Wing
Lot: 308A

Maturity Date:
1 Alpine 6/15/00
2 Atlas 6/16/00

	Core length (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas
1	4.4	3.5	3.0	3.5	24.8	20.6	5.6	5.9	33	31	288	288
2	3.1	3.9	3.4	3.0	20.2	18.5	6.5	4.7	32	32	448	264
3	4.2	4.1	3.3	3.3	22.6	19.4	5.4	4.7	36	32	506	365
4	4.0	2.7	3.2	3.4	24.2	18.4	6.1	6.8	33	32	327	302
5	3.2	3.0	3.3	3.5	20.0	17.2	6.3	5.7	38	32	445	240
6	4.2	3.0	3.0	3.0	24.5	19.3	5.8	6.4	39	34	336	187
7	4.0	3.2	3.6	3.5	22.1	17.4	5.5	5.4	37	35	340	291
8	3.5	3.0	3.5	3.0	22.4	17.1	6.4	5.7	34	33	405	241
9	4.0	3.6	3.2	3.1	22.6	20.2	5.7	5.6	33	34	339	418
10	4.5	3.2	3.0	3.0	21.4	18.4	4.8	5.8	35	33	450	178
11	2.5	3.1	3.0	3.0	20.9	16.4	8.4	5.3	36	32	236	399
12	4.5	2.6	3.6	3.2	24.6	16.4	5.5	6.3	37	32	385	252
13	3.0	2.0	3.6	3.0	18.2	17.0	6.1	8.5	35	33	451	268
14	4.0	2.6	3.2	3.4	23.2	16.5	5.8	6.3	36	35	353	365
15	3.0	2.5	3.2	3.4	19.4	16.6	6.5	6.6	34	34	347	212
16	3.9	2.5	3.0	3.0	24.0	16.5	6.2	6.6	36	35	364	288
17	4.0	3.5	3.0	3.2	21.2	18.2	5.3	5.2	32	35	352	253
18	4.0	2.5	3.0	3.6	22.6	16.0	5.7	6.4	37	34	467	245
19	3.1	3.5	3.2	3.2	19.2	18.2	6.2	5.2	35	34	386	413
20	2.5	3.0	3.5	3.5	19.6	16.4	7.8	5.5	37	35	494	179
21	3.0	3.5	3.1	3.0	21.2	17.2	7.1	4.9	36	35	412	305
22	4.0	3.1	3.1	3.0	21.9	15.4	5.5	5.0	32	35	368	344
23	4.2	3.2	3.6	3.4	23.6	16.0	5.6	5.0	34	32	369	298
24	3.0	3.0	3.5	3.4	21.8	17.3	7.3	5.8	34	33	430	406
Average	3.7	3.1	3.3	3.2	21.9	17.5	6.1	5.8	35.0	33.4	387.4	291.7
Stan dev	0.6254853	0.4910061	0.228376	0.216025	1.862035	1.3724779	0.83304336	0.85052281		1.3160107	65.431622	73.379584
T test	7.91E-04		7.47E-01		3.66E-12		2.18E-01		1.56E-03		1.90E-05	

2

2001000

22

PERFORMANCE INDEX

Comparison of Head Characteristics

Trial map #: PD0005
Wet Date: 5/5/00
Date evald: 6/29/00

Location: Chualar
Grower: Costa

Ranch: Short
Lot: 14

Maturity Date:
1 Alpine 6/27/00
2 Atlas 6/28/00

	Core length. (cm)		Core diam. (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas
1	4.5	3.3	2.8	3.4	24.1	19.4	5.4	5.9	39	39	293	198
2	5.2	3.3	3.1	3.1	24.5	18.6	4.7	5.6	40	38	366	140
3	3.9	3.0	3.1	3.0	21.5	17.2	5.5	5.7	39	37	460	248
4	4.4	4.2	2.5	3.0	22.1	20.4	5.0	4.9	39	37	282	194
5	5.9	4.0	3.2	3.0	23.8	21.6	4.0	5.4	40	39	254	313
6	3.0	5.0	3.7	3.5	21.6	21.0	7.2	4.2	40	39	310	240
7	3.9	3.2	3.2	3.2	22.1	18.7	5.7	5.8	38	39	312	339
8	2.9	2.7	2.5	3.1	22.2	19.1	7.7	7.1	41	37	403	299
9	4.5	3.9	2.6	3.8	22.2	21.9	4.9	5.6	44	37	290	291
10	4.2	4.0	2.5	3.0	20.9	19.6	5.0	4.9	41	39	288	267
11	3.0	4.0	2.6	3.0	21.6	22.5	7.2	5.6	41	40	259	184
12	4.6	3.0	2.9	3.0	23.2	22.1	5.0	7.4	38	37	279	336
13	4.1	2.8	2.9	3.0	23.5	22.9	5.7	8.2	38	37	433	195
14	5.0	4.0	3.1	3.2	22.0	22.1	4.4	5.5	41	36	383	286
15	5.0	4.1	3.1	3.2	24.9	21.6	5.0	5.3	39	38	276	213
16	3.0	3.2	2.6	3.1	22.4	20.9	7.5	6.5	39	39	352	274
17	3.1	3.4	2.7	3.6	22.9	20.9	7.4	6.1	44	37	309	355
18	4.5	3.2	3.0	3.0	22.6	19.9	5.0	6.2	44	37	488	317
19	4.5	3.9	3.0	3.5	25.2	22.6	5.6	5.8	39	40	345	301
20	3.5	4.2	3.2	3.2	21.4	23.1	6.1	5.5	42	36	390	268
21	5.2	3.0	3.0	3.3	24.1	21.5	4.6	7.2	42	39	476	299
22	4.2	3.5	2.7	3.2	21.4	28.6	5.1	8.1	36	38	445	196
23	4.7	2.1	3.6	3.5	23.5	19.5	5.0	9.3	42	37	436	333
24	3.9	2.5	3.0	3.3	21.6	20.4	5.5	8.2	41	37	325	277
Average	4.2	3.5	2.9	3.2	22.7	21.1	5.6	6.3	40.3	37.9	352.3	265.1
Stan dev	8.07E-01	6.63E-01	3.23E-01	2.28E-01	1.23E+00	2.21E+00	1.04E+00	1.24E+00	2.05E+00	1.19E+00	7.36E+01	5.83E+01
T test	1.58E-03		1.36E-03		2.74E-03		5.33E-02		9.16E-06		3.98E-05	

2001000

PERFORMANCE INDEX

Comparison of Head Characteristics

Trial map #: SV00135
Wet Date: 5/24/00
Date evald: 7/18/00

Location: Gonzales
Grower: RC Farms

Ranch: Williams
Lot: 16

Maturity Date:
1 Alpine 7/16/00
2 Atlas 7/19/00

	Core Diameter (cm)		Core Length (cm)		Head length (cm)		Head length:Core Length		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas
1	3.5	4.3	4.4	3.5	23.0	24.0	5.2	6.9	46	42	463	473
2	3.4	4.7	3.3	5.2	32.5	24.0	9.8	4.6	45	40	408	456
3	3.8	3.5	4.0	4.2	30.0	23.0	7.5	5.5	49	37	549	491
4	3.3	3.7	7.1	5.7	30.0	26.0	4.2	4.6	42	43	418	478
5	3.7	4.1	6.4	4.4	32.0	23.0	5.0	5.2	48	39	591	532
6	3.2	4.3	7.5	5.0	31.0	21.0	4.1	4.2	48	39	408	403
7	3.4	4.3	4.4	3.4	27.0	23.0	6.1	6.8	42	44	422	583
8	3.4	4.1	4.5	5.5	30.0	23.0	6.7	4.2	44	43	552	420
9	3.6	3.9	4.7	4.9	27.0	23.0	5.7	4.7	44	42	497	502
10	3.6	4.1	5.7	5.5	26.0	24.0	4.6	4.4	43	41	445	294
11	3.6	4.0	3.6	3.6	28.0	23.0	7.8	6.4	48	40	561	460
12	3.3	3.5	3.9	7.6	29.0	24.5	7.4	3.2	49	40	460	504
13	3.5	3.8	4.0	3.5	26.0	24.0	6.5	6.9	50	42	351	407
14	3.6	3.8	3.7	4.2	29.0	21.0	7.8	5.0	45	43	407	427
15	3.5	4.3	6.6	7.2	29.0	25.0	4.4	3.5	42	36	656	463
16	3.3	4.8	5.3	3.0	29.0	23.0	5.5	7.7	41	44	569	483
17	3.4	4.0	4.3	4.8	27.5	25.0	6.4	5.2	43	43	492	514
18	3.5	4.3	4.6	4.5	29.0	23.0	6.3	5.1	39	41	436	374
19	3.5	3.8	5.9	3.6	32.0	22.0	5.4	6.1	38	43	436	344
20	3.6	4.3	4.5	5.7	26.0	25.0	5.8	4.4	37	41	490	405
21	4.0	3.9	5.0	4.9	23.0	23.0	4.6	4.7	42	43	558	480
22	3.3	4.1	4.6	5.5	29.0	23.0	6.3	4.2	47	44	762	653
23	3.0	4.1	5.2	4.2	28.5	27.0	5.5	6.4	42	42	876	301
24	3.6	4.0	4.4	4.3	30.0	25.0	6.8	5.8	41	39	583	362
Average	3.5	4.1	4.9	4.7	28.5	23.6	6.1	5.2	44.0	41.3	516.3	450.4
Stan dev	2.06E-01	3.18E-01	1.12E+00	1.14E+00	2.49E+00	1.42E+00	1.37E+00	1.16E+00	3.61E+00	2.18E+00	1.21E+02	8.33E+01
T test	1.18E-09		6.38E-01		1.18E-10		2.69E-02		3.28E-03		3.28E-02	

24

Trial map #: SV00153
Wet Date: 6/8/00
Date evald: 8/1/00

Location: Soledad
Grower: RCFarms

PERFORMANCE INDEX
Comparison of Head Characteristics
Ranch: Salmina
Commerci 2 star

Maturity Date: Alpine 7/30/00
Atlas 8/1/00

	Core Diameter (cm)		Core Length (cm)		Head length (cm)		Head length:Core Len		Frame diam (cm)		Head wt. (g)	
Sample #	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas	Alpine	Atlas
1	3.1	3.4	7.9	3.6	31.0	25.0	3.9	6.9	40	39	433	359
2	3.2	3.7	5.1	5.4	24.0	24.0	4.7	4.4	42	39	513	557
3	3.5	3.0	7.2	7.5	31.0	25.0	4.3	3.3	43	42	493	368
4	3.5	3.6	6.2	4.2	28.0	20.0	4.5	4.8	43	45	403	449
5	3.6	3.7	5.6	7.0	28.0	24.0	5.0	3.4	49	42	606	544
6	3.5	4.0	8.2	4.9	26.0	23.5	3.2	4.8	45	41	534	615
7	3.5	3.7	5.0	3.5	31.0	22.5	6.2	6.4	46	43	792	332
8	3.9	3.5	7.0	5.5	28.0	26.0	4.0	4.7	42	40	504	628
9	3.7	4.0	5.5	7.0	27.0	24.0	4.9	3.4	43	39	473	451
10	3.4	3.8	4.0	4.2	24.0	25.0	6.0	6.0	42	44	604	385
11	3.0	3.3	4.4	8.0	30.0	24.0	6.8	3.0	43	42	533	614
12	3.2	3.8	5.7	3.9	26.0	22.0	4.6	5.6	49	39	622	351
13	3.9	3.8	6.0	4.8	30.0	23.0	5.0	4.8	42	39	606	475
14	3.5	3.2	4.5	5.5	29.0	27.0	6.4	4.9	40	39	496	549
15	3.3	3.4	5.9	4.1	28.0	22.0	4.7	5.4	41	40	668	422
16	3.2	3.0	5.0	5.7	30.0	25.0	6.0	4.4	42	41	526	547
17	3.8	3.1	5.6	6.5	25.0	26.0	4.5	4.0	46	40	373	438
18	3.2	3.2	4.4	7.0	29.0	21.0	6.6	3.0	46	42	471	335
19	3.2	3.7	4.5	7.6	25.0	23.0	5.6	3.0	45	39	423	473
20	3.5	3.6	6.4	5.7	29.0	23.0	4.5	4.0	44	41	625	466
21	3.3	3.4	7.2	4.0	29.0	26.0	4.0	6.5	45	39	578	466
22	3.4	3.5	4.0	3.4	29.0	24.0	7.3	7.1	46	42	485	524
23	3.4	3.2	7.6	4.2	28.0	23.0	3.7	5.5	44	40	408	344
24	3.8	3.2	5.2	5.5	29.0	22.0	5.6	4.0	42	41	512	483
Average	3.4	3.5	5.8	5.4	28.1	23.8	5.1	4.7	43.8	40.8	528.4	465.6
Stan dev	2.50E-01	2.98E-01	1.24E+00	1.43E+00	2.12E+00	1.71E+00	1.08E+00	1.24E+00	2.44E+00	1.73E+00	9.64E+01	9.23E+01
T test	5.32E-01		3.15E-01		6.05E-10		2.95E-01		1.14E-05		2.58E-02	

2001000

PROGENY
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Trialing Protocol for Intellectual Property Protection.

I. Set Up

1. Parental lines and competing varieties are identified.
2. Primary slots are identified.
3. Necessary accession lines are located and purchased/received from seed dealers or growers.
4. All varieties are assigned a number to maintain integrity, and anonymity.
5. Trials are set up in the Progeny warehouse with all necessary varieties. Variety arrangement for trial is diagramed.

II. Planting

1. Commercial plantings are located by contacting commercial growers during the planting slot recommended for the variety.
2. Field is located during commercial planting, and the necessary rows and area is marked off by a Progeny employee with proper training.
3. Varieties are planted according to diagram, in 100 ft. ranges.
4. All varieties are planted in same manner, to mimic the planting of the commercial variety as closely as possible.
5. A trial map is drawn diagramming the trial, the trial location in the field, and directions to the field.

III. Maintenance

1. All varieties are treated identically. The grower handles all watering, fertilization, and pest control, as if it was no different from the commercial field it is grown with.
2. Thinning of the trial is done by a crew contracted by the commercial grower.

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IV. Evaluation

1. Evaluations are done as near to the time of the commercial harvest as possible by knowledgeable Progeny employees.
2. The evaluation is conducted "blindly". The evaluator(s) do not have the key to the trial at the time of evaluation.

3. 24 heads of each variety are evaluated.
    a. The frame diameter of 24 random plants are measured to the nearest cm.
    b. 24 mature heads of each variety are cut to the cap leaf.
    c. The heads are carried to an adequate work station
    d. The following measurements are then conducted and recorded:
        1. Each head is weighed to the nearest gram.
        2. The core diameter of each head is measured to the nearest mm.
        3. The heads are then sliced in to halves, discarding 1 half.
        4. The core lengths (from the cut stem to the core tip) are measured to the nearest mm.
        5. The head length (from the cut stem to the cap leaf) is measured to the nearest mm.
        6. The head diameter (at its widest point) is measured to the nearest mm.
        7. The ideal maturity or harvest date is then estimated based on the solidity of the head, the core length and any other physiological characteristics present.
        8. The leaf color is documented using the Munsell Color Charts for Plant Tissue.
    e. From these measurements, we then use an Excell program to calculate the averages, the standard deviations and the T-Tests for the compared varieties.

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