

SUMMARY RESEARCH PROGRESS REPORT FOR 1990
AND RESEARCH PROPOSAL FOR 1991

Submitted to:

SLV Research Center Committee

and the

Colorado Potato Administrative Committee (Area II)

TITLE: Physiological and Cultural Studies

PROJECT LEADER: David G. Holm

PROJECT JUSTIFICATION:

Identification of the various strengths and weaknesses in potato clones for various postharvest storage, quality, and physiological characteristics is essential in the selection and release of new cultivars. Each year new selections are included in the postharvest testing scheme. Selections are generally evaluated for at least three years. Also the development of improved cost effective potato production practices is a key component in maximizing the yield of quality potatoes.

PROJECT STATUS: This is an ongoing project.

SIGNIFICANT ACCOMPLISHMENTS FOR 1990:

A total of 116 clones (including duplicates and checks) were evaluated for two or more of the following characteristics: blackspot susceptibility, storage weight loss, dormancy, specific gravity, chip color, french fry color, french fry texture, and enzymatic browning.

Blackspot indices ranged from 2.2-5.0, with an average of 4.4. High levels of blackspot resistance (indices ≥ 4.1) were exhibited by 78% of the samples tested.

The average storage weight loss was 4.2% for a three month period at 45°F. Weight loss ranged from 2.1-7.8%. Dormancy ranged from 81 to 154 days after storage at 45°F. Most samples had shorter dormancy periods than Russet Burbank.

Enzymatic browning potential at 60 minutes ranged from 2-5, with an average of 3.3. Little or no browning (indices > 3.5) was observed for 32% of the samples even 60 minutes after tuber cutting.

Specific gravities were lower in 1990 than in 1989. Specific gravities ranged from 1.060-1.100; 53% were ≥ 1.080 . The average specific gravity was 1.082 compared to 1.091 in 1989. Specific gravities ≥ 1.080 are generally required for processing selections.

Twenty-four samples (36%) produced french fries with acceptable color and texture.

Undercutting roots of AC79100-1 one week prior to harvest did not have any effect on shatter bruise.

Removal of flowers as they formed did not significantly affect tuber yield or grade of Russet Nugget.

The influence of single drop and cut seed on yield, grade, and growth characteristics of four cultivars was evaluated. For all cultivars, except Russet Nugget, a greater percentage of US #1 tubers was obtained by using cut seed (Table 6). Using single drop Russet Nugget seed resulted in 7% more US #1 tubers. Number of stems per plant was greater for plants produced from whole seed.

Forty lots of potatoes were evaluated for raw product processing quality in cooperation with Joe Maga. Specific gravity ranged from an average of 1.076 for Russet Norkotah to 1.090 for Russet Nugget. Fry color was generally acceptable for Russet Burbank and Russet Nugget when stored at 45°F.

OBJECTIVES FOR 1991:

1. Test intermediate and advanced selections from the breeding project and Western Regional Trials for: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture. This information is needed to determine potential weaknesses, relative storability, and processing potential of these selections.
2. Cooperate with Joe Maga, Department of Food Science and Human Nutrition in postharvest evaluations for advanced selections for protein, alkaloids, taste, vitamin C, and sugars and other studies required by the Potato Processing Committee.
3. Compare the influence of whole and cut seed on yield, grade, stand, and stem number for Centennial Russet, Russet Burbank, Russet Norkotah, Russet Nugget, and Sangre.
4. A study will be designed to attempt to induce pink discoloration in Russet Nugget tubers.

FUNDING REQUEST: 1990 Allocation - \$5,900.00 initial allocation +
\$4,100.00 (joint with Joe Maga for
processing survey).

1991 Budget Request

Labor	\$4,200.00
Travel	300.00
Supplies	<u>1,400.00</u>
Total	\$5,900.00

Research Progress Report for 1990
"Physiological and Cultural Studies"

Submitted to the
SLV Research Center Committee
and the
Colorado Potato Administrative
Committee (Area II)

by

David G. Holm

San Luis Valley Research Center

RESEARCH PROGRESS REPORT FOR 1990
"Physiological and Cultural Studies"

Submitted by

David G. Holm

San Luis Valley Research Center

Research was conducted in the following areas in 1990:

- A) Postharvest evaluations
 - 1 - Blackspot Susceptibility
 - 2 - Storage Weight Loss and Dormancy
 - 3 - Enzymatic Browning
 - 4 - Specific Gravity, Chip Color, French Fry Color and Texture
 - 5 - Baked Potato Flavor and Color, Enzymatic Browning, Vitamin C, Glycoalkaloids, Protein, and Sugars (tests conducted by Dr. Joe Maga, Department of Food Science and Human Nutrition)
- B) Raw product processing quality survey
- C) Undercutting Effect on Shatter Bruise
- D) Influence of Flower Removal on Yield and Grade of Russet Nugget
- E) Influence of Cut vs. Single Drop Seed on Yield and Grade of Four Cultivars

POSTHARVEST EVALUATIONS

A total of 116 clones (including duplicates and checks) were evaluated for two or more of the following characteristics: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture. Data collected on specific gravity and chip color is presented in the "Potato Breeding and Selection Report". Thirty-six clones were selected for additional quality evaluations as itemized in item A-5 above. Results of these evaluations will be reported by Dr. Joe Maga.

Blackspot

Ten randomly selected tubers for each clone tested were bruised on the stem and bud ends with a 150 g weight dropped from a height of 60 cm. Tubers were stored at 40°F prior to bruising. After bruising, tubers were stored at room temperature for three days prior to evaluation. Blackspot susceptibility was evaluated by cutting the tubers in half longitudinally and rating the extent of damage.

High levels of blackspot resistance (indices ≥ 4.1) were exhibited by 78% of the samples tested (Figure 1). Blackspot ratings ranged from 2.2-5.0, with an average of 4.4 (Table 1). Selections which should be observed carefully for potential blackspot problems are AC83311-5, CO84111-6, and ND2008-2. All of these selections were selected for chipping potential.

Storage Weight Loss and Dormancy

Ten randomly selected tubers were weighed into storage on October 15, 1990 and held at 45°F for a three month period under low relative humidity conditions to evaluate storage weight loss potential. These tubers were also observed weekly for sprout growth. Dormancy was reported as days after harvest to first visible growth. Results are summarized in Figures 2 and 3 and Table 1.

The average storage weight loss was 4.2% for the three month period. Weight loss ranged from 2.1-7.8%.

Length of dormancy ranged from 81-154 days. Most selections evaluated had shorter dormancy periods than Russet Burbank. Selections with a dormancy period comparable to Russet Burbank were: AC83044-1, AC84209-8, and NDTX9-1069-4RU.

Continuing emphasis will be placed on breeding for longer dormancy, which will be needed if the use of sprout inhibiting chemicals were to be restricted.

Enzymatic Browning

Five tubers of each clone were cut in half lengthwise and rated for degree of darkening at 15 minute intervals up to 60 minutes. Results are shown in Figure 4 and Table 1.

Little or no browning was observed for 31% of the samples even 60 minutes after tuber cutting. Enzymatic browning potential at 60 minutes ranged from 2-5, with an average of 3.3.

Continuing emphasis will also be placed on breeding for reduced enzymatic browning potential because of the concern over the use of sulfites in processed food products.

Specific Gravity

Specific gravities were lower than normal in 1990. Data on specific gravity are summarized in Figure 5 and Table 2.

Specific gravities ranged from 1.060-1.100; 53% were >1.080 . The average specific gravity was 1.082. The lowest specific gravity generally considered ideal for processing is 1.080.

Fry Color and Texture

Data are presented in Figures 6 and 7, and Table 2 on french fry color and texture.

Twenty-four samples (36%) produced french fries with acceptable color and texture. Selections producing excellent fries were: AC78069-17, AC84487-1, A082283-1, C081095-4, and C083027-2.

Baked Flavor and Color, Enzymatic Browning, Vitamin C, Glycoalkaloids, Protein, PerCent Solids, and Sugars

Thirty-six clones were selected for expanded postharvest quality evaluations in 1990. Results of these evaluations are presented in Dr. Joe Maga's report this year.

RAW PRODUCT PROCESSING QUALITY SURVEY

At the request of the Potato Processing Committee a study was undertaken in the fall of 1990 to evaluate the raw product processing characteristics of four San Luis Valley potato cultivars - Centennial Russet, Russet Burbank, Russet Norkotah, and Russet Nugget.

Forty lots of potatoes representing several growers and the overall production area in the Valley were sampled by Agro-Engineering. Ten samples were collected per cultivar.

Samples were evaluated for specific gravity shortly after harvest once all the samples had been collected. Additionally, fry color, % solids, and sugars (total, sucrose, fructose, and glucose) were determined for twenty of the lots (five per cultivar) originally sampled. Dr. Joe Maga analyzed samples for % solids and sugars.

Specific Gravity

Specific gravities ranged from an average of 1.076 for Russet Norkotah to 1.090 for Russet Nugget (Table 1). The average specific gravity for Centennial Russet and Russet Burbank was 1.080.

Fry Color

Centennial Russet did not produce fries with acceptable color at harvest or after storage (Table 3, Figures 8 and 9). Some lots of Russet Norkotah produced acceptable fries initially, but after storage fry color was unacceptable.

All lots of Russet Burbank produced fries with acceptable color at harvest and after storage at 45°F (Table 3, Figure 9). All lots of Russet Nugget also produced acceptable fry color at harvest. However, two of the five lots produced off-color fries after storage at 45°F. Both of these

lots were harvested in mid-October after exposure to cold weather that caused frost damage. Fry color was unacceptable after short term storage at 40°F for both Russet Burbank and Russet Nugget (Table 3, Figure 8).

UNDERCUTTING STUDIES

The influence of undercutting roots just prior to harvest on tuber susceptibility to shatter bruise was studied for a second year. A susceptible clone, AC79100-1, was used.

Undercutting roots one week prior to harvest did not have any effect shatter bruise susceptibility of AC79100-1 (Table 4). The undercut plots had a significantly higher percent of US #1 tubers. This is considered to be an anomaly however.

FLOWER REMOVAL STUDIES

This study was initiated in 1989 to determine if flower removal would have an influence on the yield and grade of Russet Nugget.

Removal of flowers as they formed did not have any effect on yield or grade of Russet Nugget (Table 5). Plots that had flowers removed however had a nonsignificant decrease in total yield (14 cwt). In 1989 there was a nonsignificant increase in total yield of 14 cwt.

Research by other individuals has indicated that there is a competitive relationship between flowering and yield. Perhaps the flowering of Russet Nugget is not as competitive with tuber development in Russet Nugget because of the large, vigorous vine.

INFLUENCE OF CUT VS. SINGLE DROP SEED ON YIELD AND GRADE

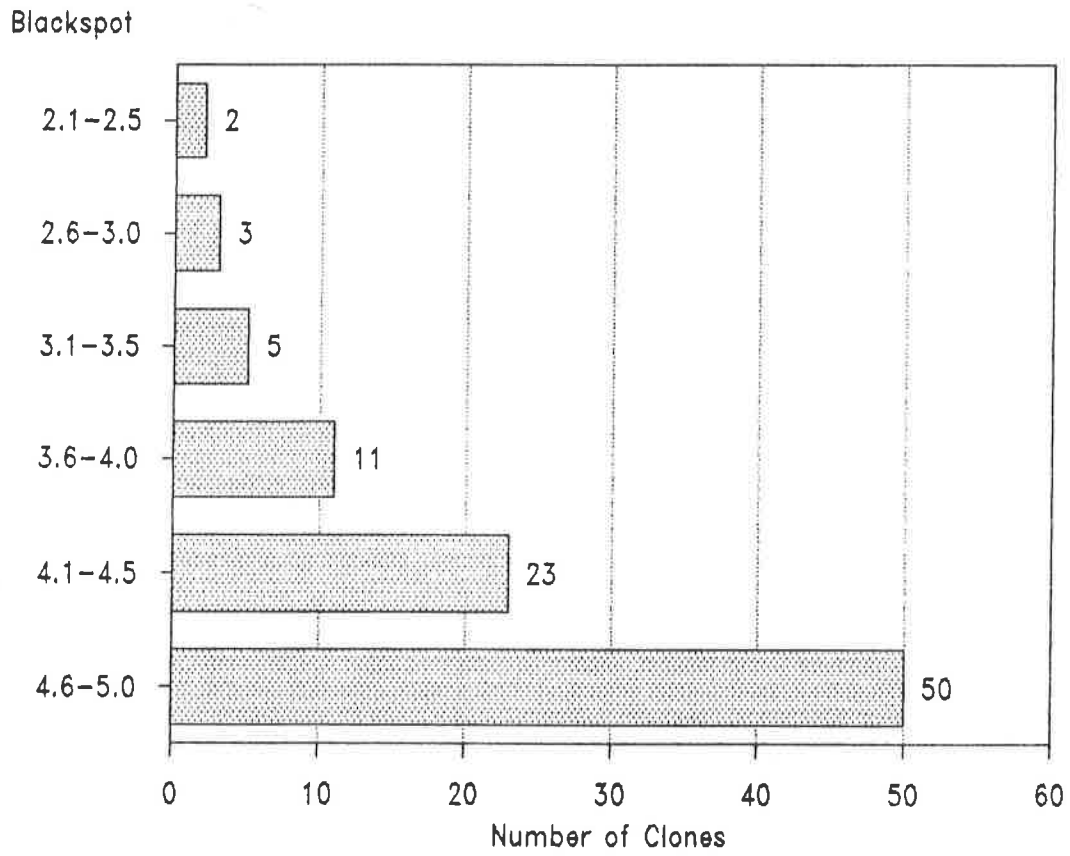
The influence of single drop and cut seed on yield, grade, and growth characteristics of four cultivars was evaluated.

For all cultivars, except Russet Nugget, a greater percentage of US #1 tubers was obtained by using cut seed (Table 6). Using single drop Russet Nugget seed resulted in 7% more US #1 tubers. Number of stems per plant was greater for plants produced from whole seed.

Significant differences were observed between cultivars for all characteristics measured except % stand.

We plan to include Russet Norkotah in this study in 1991.

Figure 1. Blackspot
Distribution (94 Clones) - 1990



5=No Discoloration

Figure 2. % Weight Loss
Distribution (94 Clones) - 1990

% Weight Loss

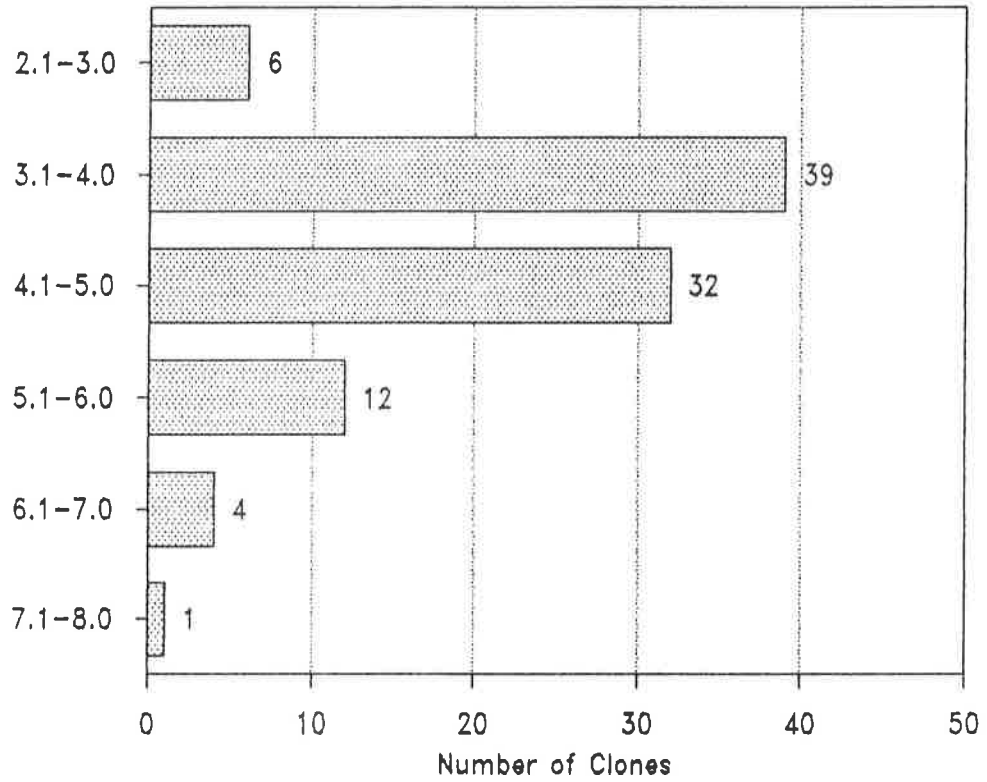


Figure 3. Dormancy
Distribution (94 Clones) - 1990

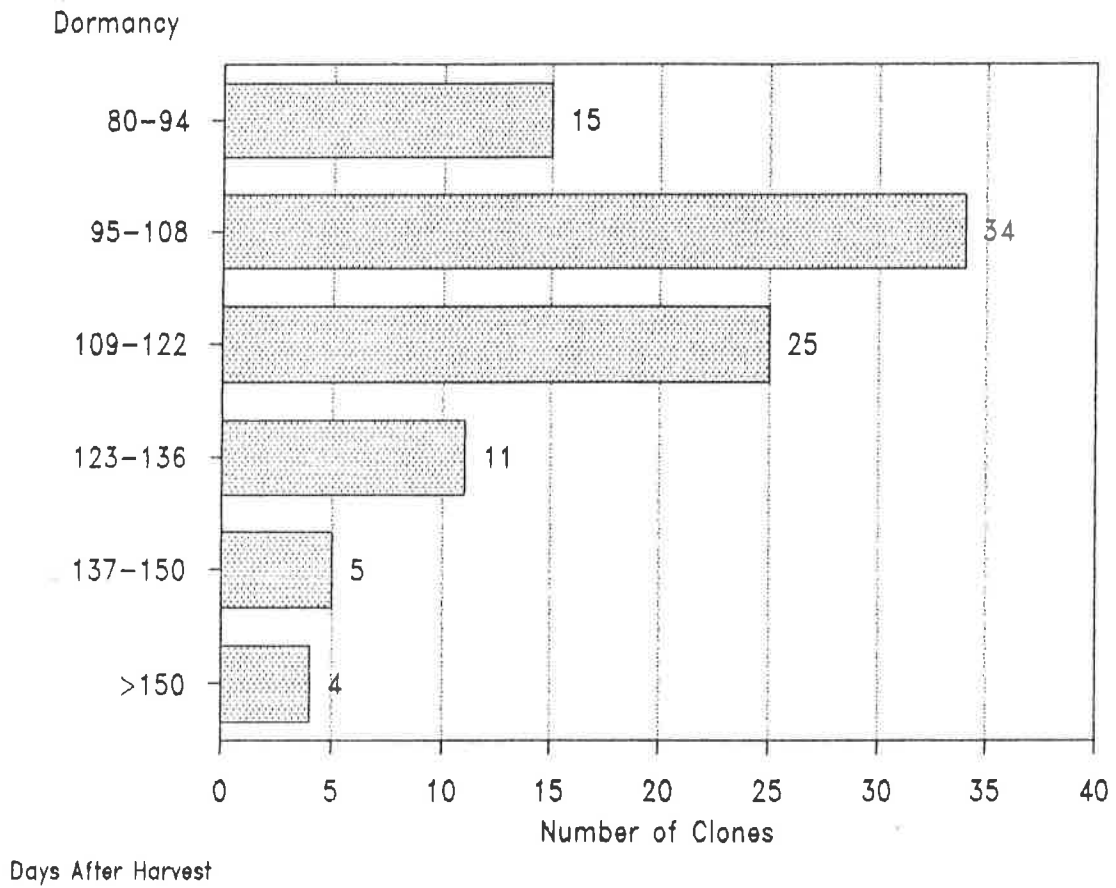
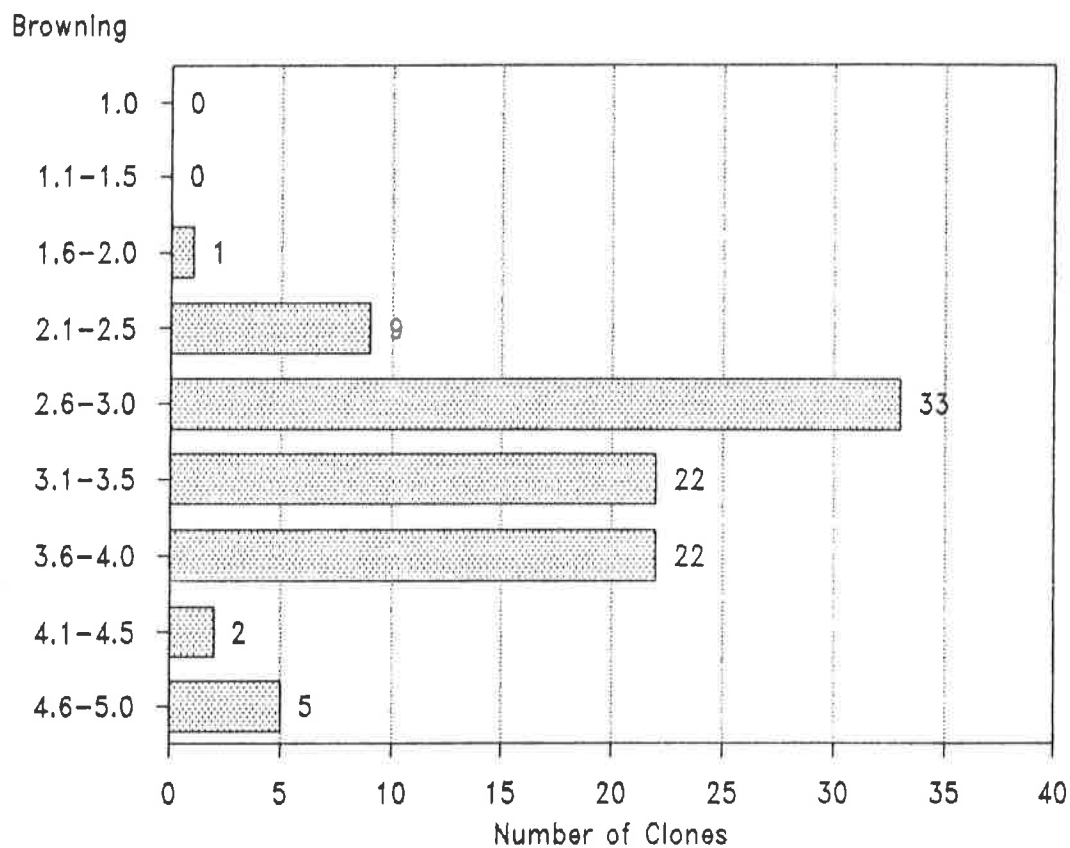


Figure 4. Enzymatic Browning (60 Min)
Distribution (94 Clones) - 1990



5=No Discoloration

Table 1. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for chipping, intermediate, advanced, and Regional Trial clones - 1990.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴			
	Bud End	Stem End	Average			15 Min	30 Min	45 Min	60 Min
*** SLV Chipping Study ***									
A80559-2	3.0	3.3	3.2	5.6	129	5.0	4.6	4.4	4.4
AC80545-1	3.5	4.3	3.9	4.0	126	4.8	4.0	3.8	3.2
AC83306-1	5.0	4.8	4.9	4.2	136	4.4	4.2	3.6	3.6
AC83311-1	4.9	4.5	4.7	4.2	102	4.8	4.2	3.8	3.6
AC83311-2	4.7	4.1	4.4	4.9	102	5.0	4.2	4.0	3.4
AC83311-5	2.4	2.1	2.3	4.8	102	4.4	3.8	3.0	3.0
AC83368-3	4.0	3.7	3.9	4.9	102	4.8	4.0	4.0	4.0
AC84601-1	4.6	4.1	4.3	4.3	137	5.0	4.0	4.0	4.0
AC84610-2	4.5	4.3	4.4	5.7	137	5.0	5.0	5.0	4.8
AC84610-5	4.7	3.0	3.9	7.8	95	4.4	4.0	4.0	3.8
AC85438-4	4.5	4.7	4.6	5.7	95	5.0	5.0	4.8	4.8
CO84111-6	2.2	2.8	2.5	5.0	116	3.4	2.4	2.4	2.0
ND651-9	4.5	4.4	4.5	5.4	102	4.8	4.4	4.0	4.0
ND1995-1	3.4	2.8	3.1	6.5	91	5.0	4.8	4.0	4.0
ND2008-2	3.6	4.3	4.0	4.4	102	3.8	3.8	2.8	2.6
ND2109-7	3.4	3.1	3.3	4.3	102	3.8	3.4	3.4	2.8
NDO1496-1	4.6	4.1	4.4	5.2	112	4.0	4.0	4.0	3.2
Atlantic	3.5	3.6	3.6	5.4	123	5.0	5.0	5.0	5.0
Gemchip	5.0	3.6	4.3	6.3	134	4.0	4.0	3.0	3.0
Norchip	4.5	4.5	4.5	5.1	109	4.2	4.0	3.4	3.4
*** Intermediate Trial ***									
AC82052-1	4.3	4.7	4.5	3.7	116	3.6	3.4	2.8	2.4
AC82693-4	4.6	4.2	4.4	4.2	95	5.0	4.0	4.0	3.2
AC82706-2	5.0	4.8	4.9	4.3	123	4.4	3.4	3.4	3.2
CO85026-4	4.9	5.0	5.0	4.3	109	4.6	4.0	4.0	4.0
CO85168-4	5.0	5.0	5.0	6.6	109	4.4	3.6	3.6	3.6
COO8014-1	4.6	4.8	4.7	4.8	123	4.8	4.0	3.6	3.2
TX6-1216-1RU	4.8	5.0	4.9	4.3	95	3.6	3.4	2.6	2.6
TXAV657-27	4.7	4.9	4.8	4.2	123	4.4	4.2	3.6	3.4
TXND329-1	4.8	5.0	4.9	6.3	112	4.0	4.0	3.4	3.0
Centennial Russet	4.9	5.0	5.0	5.1	107	4.4	4.2	3.8	3.4
Lemhi Russet	4.1	4.7	4.4	4.6	119	4.2	3.6	3.0	2.2
Norgold Russet	4.8	4.5	4.7	4.5	102	3.8	3.6	2.8	2.8
Russet Burbank	5.0	4.8	4.9	3.6	154	4.2	3.2	2.2	2.2
Russet Norkotah	5.0	5.0	5.0	3.6	116	4.0	3.8	3.0	3.0
Russet Nugget	5.0	5.0	5.0	3.6	100	4.2	3.8	3.6	3.2
Sangre	5.0	5.0	5.0	3.7	106	3.8	3.8	2.8	2.8

Continued

Table 1. Continued.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴			
	Bud	End Stem	End Average			15 Min	30 Min	45 Min	60 Min
*** Advanced Yield Trial ***									
AC75430-1	4.6	3.8	4.2	2.1	116	4.8	4.6	4.4	4.0
AC83044-1	4.4	2.8	3.6	5.4	151	4.8	3.6	3.6	2.8
AC83044-2	4.0	2.6	3.3	3.8	95	4.4	3.8	3.6	3.4
AC83064-1	5.0	5.0	5.0	3.3	88	5.0	5.0	4.8	4.6
AC83064-6	4.7	4.8	4.8	3.8	81	4.0	4.0	3.4	3.4
AC83068-1	4.7	4.0	4.4	3.2	109	4.0	3.4	3.2	3.0
AC83172-1	5.0	4.7	4.9	4.2	95	4.4	3.8	3.6	3.6
AC83330-4	5.0	4.7	4.9	3.2	116	3.8	3.8	3.0	2.6
AC84017-3	3.9	3.4	3.7	3.6	116	5.0	4.4	4.2	4.0
AC84028-4	4.9	4.3	4.6	5.9	95	4.0	4.0	3.4	3.0
AC84069-3	5.0	4.6	4.8	3.8	88	5.0	4.2	4.0	4.0
AC84209-8	4.4	3.9	4.2	4.3	151	4.0	3.8	3.4	3.2
AC84413-4	5.0	5.0	5.0	4.7	81	4.0	4.0	3.4	3.0
AC84472-1	5.0	4.6	4.8	5.3	137	5.0	4.6	4.2	4.0
AC84487-1	5.0	4.9	5.0	5.0	109	4.6	4.0	3.6	3.0
AC84509-2	4.7	3.9	4.3	4.1	95	4.2	4.0	3.4	3.2
AC84638-1	4.9	4.5	4.7	3.8	116	3.8	3.8	3.4	2.8
CO81082-1	5.0	5.0	5.0	4.0	95	4.4	4.0	3.6	3.4
CO81095-4	4.6	4.1	4.4	4.0	102	4.0	3.8	3.2	3.0
CO83027-2	5.0	5.0	5.0	4.3	81	5.0	4.8	4.4	3.8
CO84074-2	5.0	5.0	5.0	2.9	123	5.0	5.0	5.0	5.0
CO84205-3	5.0	5.0	5.0	3.6	102	4.2	4.6	4.0	4.0
CO84205-5	4.9	5.0	5.0	3.7	109	4.8	4.6	4.4	4.2
CO84N6-12	4.6	3.9	4.3	3.3	123	4.0	3.6	3.2	3.0
MN10874	4.2	4.6	4.4	2.9	102	4.0	3.8	3.4	2.6
NDTX9-1069-4RU	4.0	4.5	4.3	3.0	137	4.8	4.2	3.8	3.8
Centennial Russet	5.0	5.0	5.0	5.1	102	4.0	4.0	4.0	3.8
Norgold Russet	4.9	4.8	4.9	4.1	95	4.0	3.8	3.2	3.0
Russet Burbank	4.3	4.8	4.6	3.2	151	4.2	3.4	3.2	2.2
Russet Nugget	5.0	4.8	4.9	2.8	109	4.2	4.0	4.0	3.2
Sangre	4.5	4.9	4.7	3.2	109	4.4	4.0	4.0	3.2

Continued

Table 1. Continued.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴			
	Bud	End Stem	End Average			15 Min	30 Min	45 Min	60 Min
*** Western Regional Trial ***									
AC77101-1	5.0	5.0	5.0	3.7	102	4.0	4.0	3.4	3.0
AC78069-17	4.9	5.0	5.0	3.3	95	4.2	3.2	2.8	2.8
AC81198-11	4.4	4.7	4.6	3.3	102	4.0	3.8	3.2	3.0
AO82283-1	4.7	2.5	3.6	4.0	88	4.4	4.2	4.0	3.6
AO82611-7	4.9	4.7	4.8	3.6	109	4.0	3.6	3.0	3.0
BC0038-1	4.8	4.9	4.9	4.3	88	4.0	3.8	3.0	3.0
CO79018-11	5.0	4.8	4.9	3.2	102	4.6	4.0	3.4	3.0
CO80011-5	4.6	5.0	4.8	4.4	116	4.6	4.0	3.0	3.0
CO82142-4	5.0	5.0	5.0	3.6	88	4.2	3.6	3.0	2.8
ND671-4RUSS	5.0	5.0	5.0	3.8	102	4.6	4.0	3.6	3.4
ND1538-1RUSS	5.0	5.0	5.0	3.9	88	4.8	4.4	4.0	3.6
NDTX8-731-1R	4.0	4.3	4.2	4.9	95	3.8	3.4	3.2	3.2
Centennial Russet	5.0	4.8	4.9	4.9	123	4.2	3.8	3.2	3.2
Lemhi Russet	2.8	2.4	2.6	3.4	88	3.4	3.4	2.4	2.4
Norgold Russet	4.6	4.3	4.5	3.8	81	3.6	3.2	2.4	2.2
Red LaSoda	3.2	4.6	3.9	4.1	95	3.6	3.2	2.4	2.2
Russet Burbank	4.7	4.1	4.4	3.2	144	4.0	3.0	3.0	2.4
Russet Norkotah	5.0	5.0	5.0	3.6	116	4.4	4.0	4.0	3.0
Sangre	3.8	4.8	4.3	3.1	102	4.0	4.0	4.0	3.0
Shepody	4.6	4.7	4.7	2.8	116	5.0	4.6	4.0	3.8
*** Western Regional Chipping Trial ***									
AC80545-1	4.1	3.5	3.8	3.1	116	4.0	4.0	3.2	3.0
AC83306-1	4.9	4.3	4.6	3.5	116	4.6	4.2	3.6	3.2
CO84111-6	3.1	2.8	3.0	4.5	88	3.2	3.2	2.6	2.2
ND2008-2	3.0	2.9	3.0	4.1	88	4.6	4.0	3.8	3.0
Atlantic	3.3	3.1	3.2	3.6	95	4.8	4.4	4.2	3.8
Gemchip	4.2	3.6	3.9	4.2	109	4.0	4.0	4.0	3.4
Norchip	4.2	4.2	4.2	3.9	88	4.0	3.8	3.4	3.0

¹Blackspot was rated on a 1 to 5 scale, with 5 indicating no discoloration.

²Tubers were stored at 45°F for a three month period.

³Days from harvest to first visible growth.

⁴Degree of darkening rated at various time intervals after slicing fresh tubers in half lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Figure 5. Specific Gravity Distribution (116 Clones) - 1990

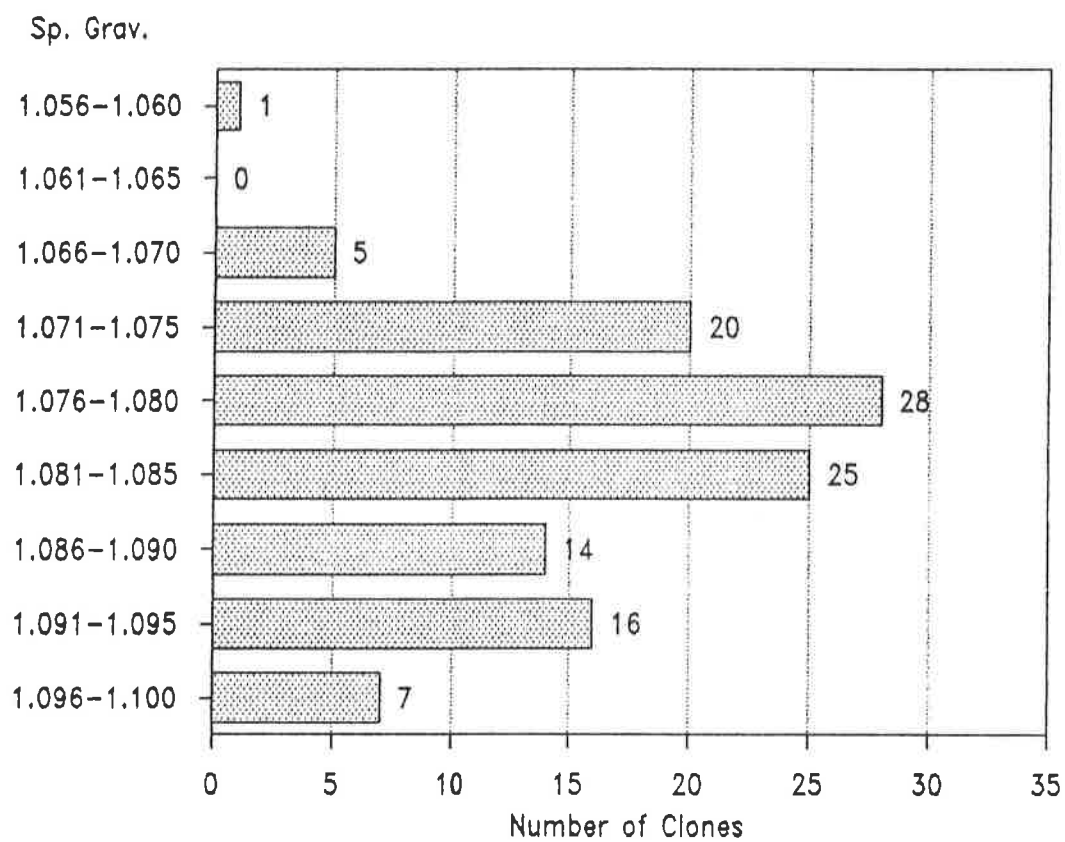


Figure 6. Fry Color
Distribution (67 Clones) - 1990

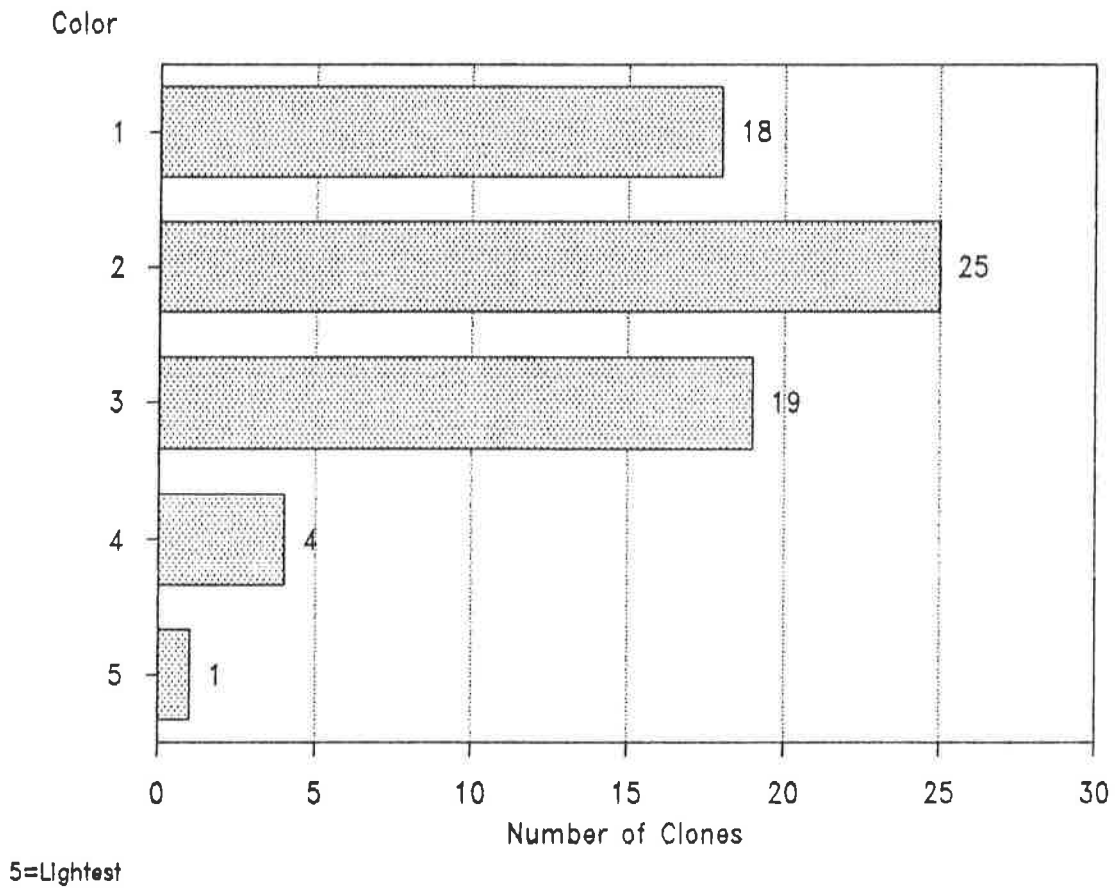
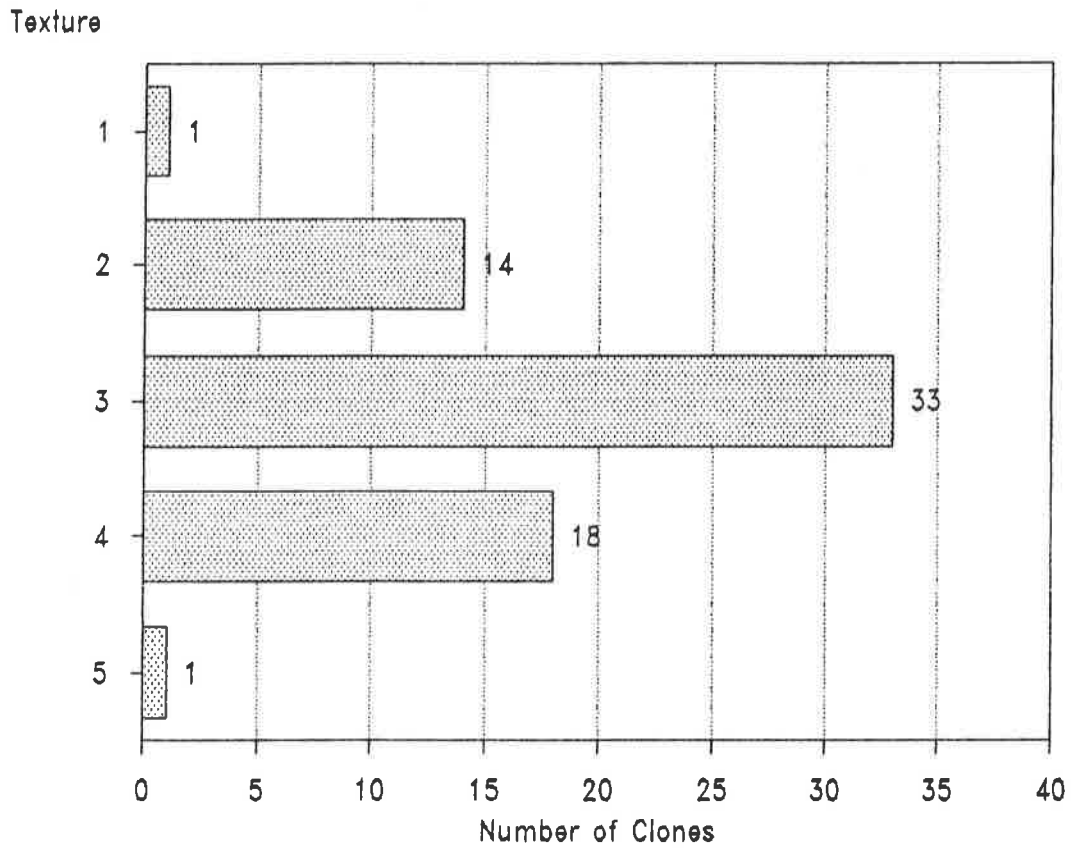


Figure 7. Fry Texture
Distribution (67 Clones) - 1990



5=Dry

Table 2. Specific gravity, french fry color, and fry texture for intermediate, advanced, and Western Regional Trial clones - 1990

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	4 wks 50°F+ 8 wks 45°F	At Harvest	4 wks 50°F+ 8 wks 45°F
*** Intermediate Trial ***					
AC82052-1	1.080	1	1	2	2
AC82693-4	1.059	1	1	2	1
AC82706-2	1.074	1	1	2	2
CO85026-4	1.076	3	2	3	3
CO85168-4	1.085	2	2	4	3
CO08014-1	1.088	3	3	5	5
TX6-1216-1RU	1.073	2	1	3	3
TXAV657-27	1.084	3	2	4	3
TXND329-1	1.075	3	2	4	3
Centennial Russet	1.079	2	2	3	3
Lemhi Russet	1.083	3	3	5	4
Norgold Russet	1.073	1	1	3	3
Russet Burbank	1.080	3	2	4	4
Russet Norkotah	1.075	2	2	3	2
Russet Nugget	1.087	3	3	5	4
Sangre	1.069	2	1	3	2
*** Advanced Yield Trial ***					
AC75430-1	1.097	4	3	4	4
AC83044-1	1.087	3	3	4	4
AC83044-2	1.083	2	2	3	2
AC83064-1	1.079	3	2	4	3
AC83064-6	1.082	4	3	4	3
AC83068-1	1.083	3	2	3	3
AC83172-1	1.092	3	3	4	4
AC83330-4	1.081	3	2	3	3
AC84017-3	1.080	4	3	3	3
AC84028-4	1.085	3	2	2	3
AC84069-3	1.086	2	2	4	4
AC84209-8	1.079	3	3	3	3
AC84413-4	1.082	2	3	5	3
AC84472-1	1.069	2	2	3	3
AC84487-1	1.074	4	4	3	4
AC84509-2	1.089	3	3	3	4
AC84638-1	1.076	3	2	4	4
CO81082-1	1.074	1	1	2	2

Continued

Table 2. Continued.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	4 wks 50°F+ 8 wks 45°F	At Harvest	4 wks 50°F+ 8 wks 45°F
*** Advanced Yield Trial (continued) ***					
CO81095-4	1.098	4	4	4	4
CO83027-2	1.089	3	4	3	4
CO84074-2	1.074	1	1	2	3
CO84205-3	1.086	3	2	4	3
CO84205-5	1.070	1	1	2	2
CO84N6-12	1.084	2	1	3	3
MN10874	1.080	2	1	4	3
NDTX9-1069-4RU	1.072	2	2	3	2
Centennial Russet	1.078	2	1	3	2
Norgold Russet	1.075	2	2	3	2
Russet Burbank	1.082	4	3	4	3
Russet Nugget	1.098	4	3	4	4
Sangre	1.074	3	2	3	2
*** Western Regional Trial ***					
AC77101-1	1.080	3	2	2	3
AC78069-17	1.085	4	4	4	4
AC81198-11	1.086	2	1	3	3
AO82283-1	1.095	5	5	4	4
AO82611-7	1.090	3	2	3	3
BC0038-1	1.089	3	3	4	4
CO79018-11	1.081	3	3	4	3
CO80011-5	1.072	3	3	3	3
CO82142-4	1.093	2	1	3	2
ND671-4RUSS	1.076	3	3	5	3
ND1538-1RUSS	1.079	2	2	3	2
NDTX8-731-1R	1.068	2	1	3	2
Centennial Russet	1.079	2	1	3	3
Lemhi Russet	1.093	4	3	4	4
Norgold Russet	1.077	3	1	3	3
Red LaSoda	1.074	3	2	3	3
Russet Burbank	1.086	3	3	4	4
Russet Norkotah	1.074	3	2	3	3
Sangre	1.079	3	1	3	3
Shepody	1.082	3	2	4	3

¹Fry color was rated on a 1 to 5 scale, with 5 being the lightest or best color. Color ratings of ≥ 3 are acceptable.

²Fry texture was rated on a 1 to 5 scale, with 5 indicating the cooked flesh was dry, with 1 representing a soggy, wet texture.

Table 3. Raw product quality survey of specific gravity and fry color for four cultivars - 1990.

Cultivar	Specific Gravity	Initial	Color ¹					
			2 wks/ 40F	4 wks/ 40F	8 wks/ 40F	2 wks/ 45F	4 wks/ 45F	8 wks/ 45F
Centennial Russet	1.081	1.8	1.0	1.0	1.0	1.4	1.2	1.2
Russet Burbank	1.081	3.4	2.2	1.8	1.2	3.6	3.2	3.0
Russet Norkotah	1.076	2.4	1.8	1.0	1.0	2.6	2.0	2.0
Russet Nugget	1.090	3.2	2.0	1.4	1.4	3.0	3.0	2.8

¹Fry color was rated on a 1-5 scale, with 5 being the lightest or best color. Ratings ≥ 3 are acceptable.

Figure 8. Fry Color - Stored at 40F

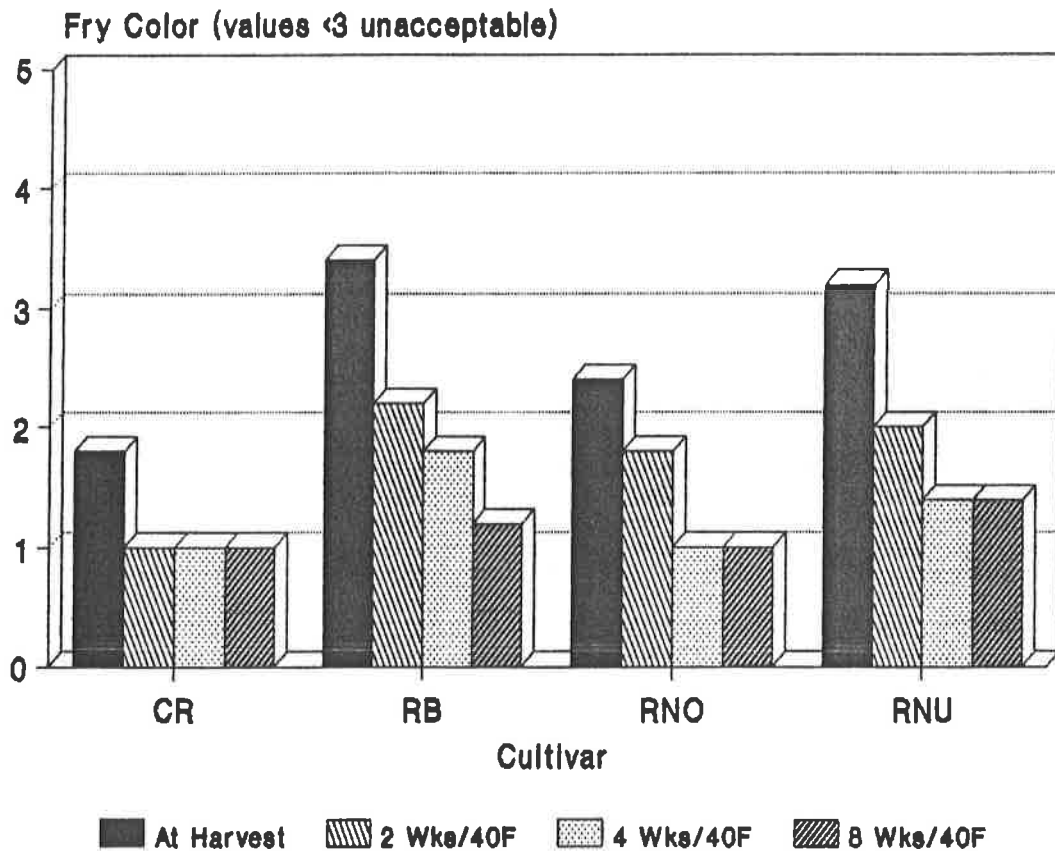


Figure 9. Fry Color - Stored at 45F

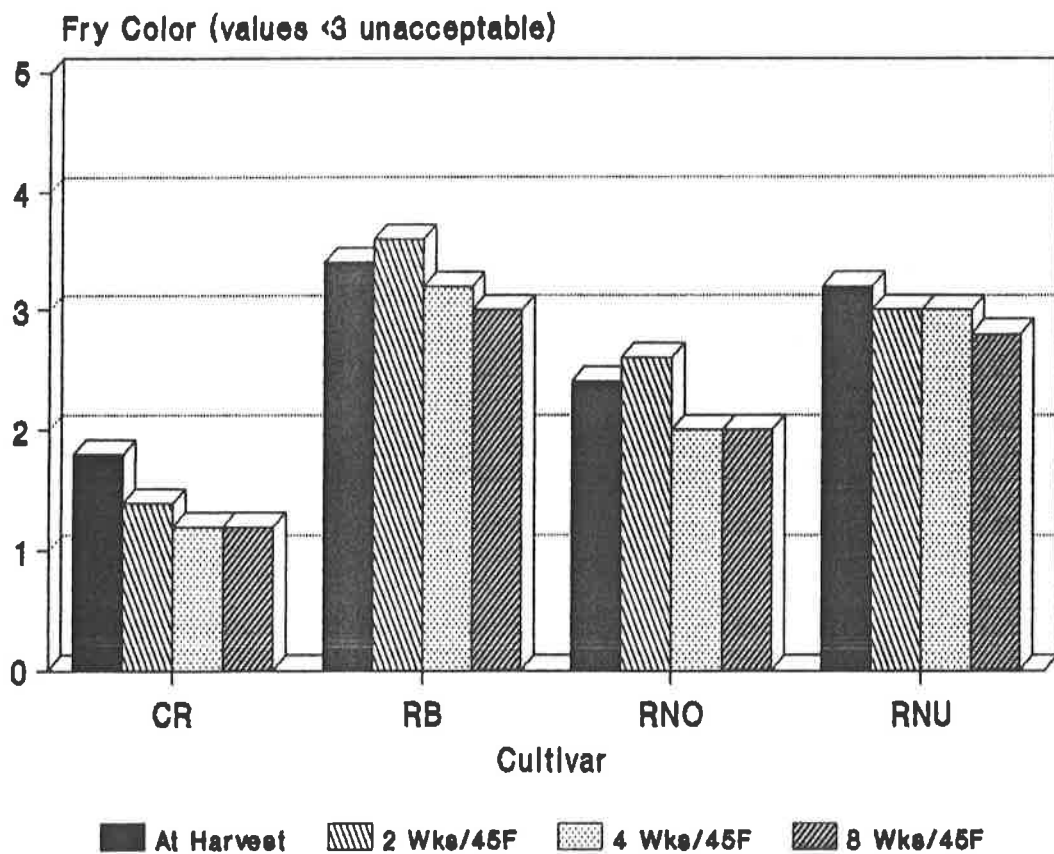


Table 4. Yield, grade, and shatter bruise index for AC79100-1 as influenced by undercutting - 1990.

Treatment	Yield (Cwt/A)					Shatter Bruise Index ¹
	Total	US #1			<4 oz	
		Total	%	>10 oz		
Control	419	343	81.9	91	52	37.5
Undercut	364	319	87.7	71	26	43.5
Significance ²	NS	NS	*	NS	NS	NS

¹The shatter bruise index is the average length of the cracks on a tuber measured in mm.

²NS=not significant; *P=0.05.

Table 5. Yield, grade, stand, and vine maturity of Russet Nugget as influenced by flower removal - 1990.

Treatment	Yield (Cwt/A)					% Stand	Vine Maturity ¹
	Total	US #1			< 4 oz		
		Total	%	>10 oz			
Control	334	242	72.2	19	89	99	3.0
Flowers Removed	320	222	69.4	26	94	99	3.3
Significance ²	NS	NS	NS	NS	NS	NS	NS

¹Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

²NS=not significant.

Table 6. Influence of seed type on yield, grade, stand, vine maturity, average tuber weight, stems per plant, and tubers per stem of four cultivars - 1990.

Treatment	Yield (Cwt/A)					% Stand	Vine Maturity ¹	Avg. Tuber Weight (oz)	Stems/Plant	Tubers/Stem
	Total	Total	US #1	>10 oz	<4 oz					
Centennial Russet										
Cut Seed	375	286	76.2	28	89	99	3.0	4.7	3.2	2.6
Whole Seed	389	279	71.9	20	109	100	3.0	4.5	3.9	2.4
Russet Burbank										
Cut Seed	370	169	46.7	6	181	99	3.0	3.7	3.5	3.2
Whole Seed	368	156	42.6	19	193	98	3.0	3.7	4.1	2.6
Russet Nugget										
Cut Seed	438	317	72.4	43	119	95	3.2	4.7	4.1	2.5
Whole Seed	452	358	79.4	60	93	99	3.5	5.2	4.5	2.0
Sangre										
Cut Seed	505	425	84.1	84	79	98	2.8	5.7	3.6	2.6
Whole Seed	523	434	82.9	65	83	96	2.8	5.4	3.6	3.0
Interaction										
Cultivar x Seed Type										
LSD ²	NS	NS	5.7 ⁺	NS	NS	NS	NS	NS	NS	NS
Main Effects										
Cultivar										
Centennial Russet	382	282	74.1	24	99	100	3.0	4.6	3.6	2.5
Russet Burbank	369	163	44.6	13	187	98	3.0	3.7	3.8	2.9
Russet Nugget	445	338	75.8	51	106	97	3.4	5.0	4.3	2.3
Sangre	514	429	83.5	74	81	97	2.8	5.6	3.6	2.8
LSD ²	62 [*]	49 [*]	4.9 [*]	23 [*]	33 [*]	NS	0.3 [*]	0.4 [*]	0.5 [*]	0.4 ⁺
Seed Type										
Cut Seed	422	299	69.8	40	117	98	3.0	4.7	3.6	2.7
Whole Seed	433	307	69.2	41	119	98	3.1	4.7	4.0	2.5
Significance ²	NS	NS	NS	NS	NS	NS	NS	NS	*	NS

¹Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

²LSD=least significant difference. NS=not significant; ⁺P=0.10; *P=0.05.