Research Progress Report for 1999

Potato Breeding and Selection

Submitted to the

San Luis Valley Research Center Committee

and the

Colorado Potato Administrative Committee (Area II)

by

David G. Holm & Fernanda G. Popiel

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INTRODUCTION

The primary objectives of the Colorado Potato Breeding and Selection Program are to develop new potato cultivars with increased yield, improved quality, resistance to diseases and pests, and tolerance to environmental stresses for Colorado. Other objectives are to provide a basic seed source to growers for seed increase and commercial testing; and to evaluate promising selections for potential seed export.

The primary emphasis of the Colorado Potato Breeding and Selection Program is placed on developing dual purpose fresh and processing russets (70-80%). The balance of the breeding effort is devoted to developing reds (10-15%), chippers (5-10%), and specialty cultivars (5%). The development of "low input" cultivars, primarily for reduced nitrogen and fungicide input has always been emphasized. A major concentration has been placed on incorporating late blight resistant germplasm into the breeding program over the last 4 years.

Areas with recent increased emphasis or new emphasis are: 1) developing germplasm/cultivars with tuber resistance to dry rot (Fusarium and early blight) and bacterial soft rot; 2) developing germplasm/cultivars with late blight resistance (foliage and tuber); and 3) developing protocols to screen and evaluate advanced selections for reduced tuber greening potential and red skin color retention in storage. Continued emphasis will be placed on breeding for improved postharvest and processing qualities such as lengthened dormancy and ability to process after cold storage. Cultivars with these characteristics will help assure that the potato industry in Colorado will remain productive and in a competitive position.

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[1] *Financial support by the Colorado potato industry and the Colorado Agricultural Experiment Station for the Potato Breeding and Selection Program is gratefully acknowledged.*

It takes 14+ years to develop a new potato cultivar. Years 1 and 2 are the potato breeding phase of the development process. Parents are selected and crossed producing true potato seed. Seedling tubers are then produced from the true seed in year 2. Subsequent years (3+) represent the selection phase of the development process. Each year represents another cycle of field selection. As each cycle is completed, fewer and fewer clones remain and the amount of seed per selection is increased. Clones surviving after eight cycles of field selection are released to growers for evaluations prior to official release as a named cultivar.

Table 1 presents a detailed description of the steps involved in developing new potato cultivars. The reader may want to refer to these items while reviewing the "Potato Breeding" and "Seedling Selection and Clonal Development" sections of this report.

Table 2 and Figure 1 present statistics on the primary cultivars grown in the San Luis Valley during 1983-1999. This information shows trends in the production of the various cultivars over the years. Figure 2 presents a comparison of the production levels of the primary potato cultivars during 1997-1999. Russet Nugget, released by Colorado in 1988, was the primary cultivar grown on fall planted acreage in Colorado in 1997. Russet Nugget acreage has declined some due to the occurrence of late blight in 1998. The top four cultivars grown in the San Luis Valley in 1999 based on acreage produced were Russet Norkotah, Russet Nugget, Centennial Russet, and Sangre. Cultivars released by CSU or in cooperation with other agencies accounted for 40% of the potato acreage planted in the San Luis Valley. Russet Nugget accounted for 29% of the acreage making it second in area planted in the San Luis Valley and the fourth most popular russet cultivar in the United States. Another 19% of the acreage of the 1999 San Luis Valley acreage was estimated to have been planted to Russet Norkotah Selections 3 and 8. These selections accounted for 69% of the Russet Norkotah certified seed production in Colorado.

The annual value from increased yield and quality associated with new potato cultivars and clonal selections is estimated to be $11,000,000 - $12,000,000.

POTATO BREEDING

Sixty-eight parental clones were intercrossed in 1999. Seeds from 406 combinations were obtained. Approximately 35,500 seedlings tubers representing 134 families were produced from 1998 crosses for initial field selection in 2000. Second through fourth size tubers will be distributed to Idaho, Minnesota, Oregon, Texas, and Alberta, Canada.

Additional seedling tubers were obtained from Dr. J. J. Pavek, USDA-ARS, Aberdeen, Idaho; Dr. Dermot Lynch, Agriculture Canada, Lethbridge, Alberta; and Dr. J. Creighton Miller, Texas A&M University, College Station, Texas.

SEEDLING SELECTION AND CLONAL DEVELOPMENT

Approximately 79,700 first-year seedlings were grown in 1999 with 847 being selected for subsequent planting, evaluation, and increase in future years. Another 1,074 clones were in 12-hill, preliminary, and intermediate stages of selection. Of these, 299 were saved for further observation. Twenty-five advanced selections were saved and will be increased pending final evaluations. Another 178 selections were maintained for germplasm development, breeding, other experimental purposes, or seed increases for the other programs.

Appendix 1 summarizes the cultural information for the trials conducted by the Potato Breeding and Selection Program at the San Luis Valley Research Center in 1999. Appendix 2 lists the procedures used for the postharvest evaluations for the trials summarized in this section of the report. Appendices 3-10 present additional information regarding the frequency distribution for the results of the postharvest evaluations for all selections and named cultivars included in the trials. Appendices 3-10 are useful in understanding how a given selection compares with the population of clones being evaluated. Remarks regarding the results of the postharvest evaluations will generally be limited except to highlight particular clones with certain strengths or weaknesses.

Preliminary Trial. The Preliminary Trials (P1 and P2) are composed of selections undergoing the third and fourth cycles (years) of selection in the field. Fourth year materials (P2) selected at harvest are evaluated for several postharvest characteristics before being advanced to the Intermediate Yield Trial (IYT) the following year. This allows us to start to characterize each clone for tuber quality and identify those with potentially serious quality defects.

Thirteen selections and six cultivars were evaluated in the Preliminary Trial (P2). Results of the postharvest evaluations are presented in Tables 3A-B.

Selections CO94055-8 and VC0967-5 had long dormancy. Most of the selections showed good resistance to enzymatic browning. The exception was CO94019-1. Selections CO94084-12, NDC4069-4 and NDC6184-3 were very susceptible to blackspot bruising. Selections with acceptable fry color were CO94055-8, VC0967-2, and VC0967-5.

Intermediate Trial. The Intermediate Yield Trial (IYT) is composed of selections undergoing the fifth cycle of selection in the field. Selected IYT clones are entered in the Advanced Yield Trial (AYT) the following year.

Thirteen selections and two cultivars were evaluated in the Intermediate Yield Trial. Results on yield, grade, growth characteristics, and postharvest evaluations are summarized in Tables 4A-E.

Average yield for the trial was 385 cwt/A. The highest yielding selection was CO93024-2 with 454 cwt/A and 362 cwt/A of US #1 tubers.

Generally the selections evaluated had acceptable levels of tuber defects. Notable exceptions were selections AC93012-11 and CO93024-2 had 16.0 and 12.1% external defects

respectively. Excessive amounts of hollow heart were observed in selections AC93012-11 (14.2%) and CO93024-2 (21.1%).

All of the selections tested were earlier maturing than Russet Nugget. All of the selections were early to medium in maturing.

Selections with potential blackspot susceptibility are AC92428-10, AC93012-6, AC93026-9, CO93020-4, and CO93024-2. Selections AC93012-11 and CO93024-2 were very susceptible to enzymatic browning.

Several selections had acceptable fry color and fry texture. Selections with notable fry color and texture were AC93063-1, CO93001-11, and CO93051-5.

Advanced Yield Trial. The Advanced Yield Trial (AYT) is composed of russet and long white selections advanced from the IYT the previous year. Additionally, advanced selections are included that have graduated from the Southwest Regional and Western Regional Trials. Data is collected on these selections until a final decision is made to name or discard.

The AYT generally includes selections in the 6^{th}-7^{th} and 12+ cycles of selection in the field. Selections in the 6^{th} cycle of field selection are indexed for viruses and cleanup/micropropagation is initiated. Selections in the 7^{th} cycle of field selection are also entered into cultural management trials and postharvest disease reaction evaluations in cooperation with Dr. Susie Thompson and Dr. Robert Davidson.

Fifteen entries, 13 advanced selections and 2 cultivars, were evaluated in the Advanced Yield Trial. Results on yield, grade, growth characteristics, and postharvest evaluations are summarized in Tables 5A-E.

The highest yielding selection was TC1682-1 with 457 cwt/A. Trial average was 381 cwt/A.

Advanced russet selections that have graduated from Western Regional Trials and that were placed in this trial again for continued evaluation are AC83064-1, AC83064-6, CO80011-5, CO85026-4. These selections have been extensively evaluated by growers. Please refer to the Grower Evaluations section of this report for a status report of these and other advanced selections.

The only selection with greater than 1% hollow heart was AC91365-1 (4.5%). The only selection demonstrating severe blackspot susceptibility was CO85026-4. AC92009-4 had a long dormancy (126 days). Clones with susceptibility to enzymatic browning were AC91365-1 and CO92077-2.

Selections to be entered in the 2000 Southwestern Trial include AC90636-3, AC91014-2, and AC91365-1.

Southwestern Regional Trial. After selections have been evaluated for two years in advanced yield trials, they are entered into the Southwestern Regional Trial. This tri-state effort involving Colorado, Texas, and California was initiated in 1998.

Thirteen selections and four selections were compared in the Colorado Southwestern Regional Trial. Tables 6A-F present the data for this trial. Colorado entries were AC89536-5 and AC90017-2.

Yields were very high, with Chipeta yielding 509 cwt/A. The average yield for the trial was 426 cwt/A. Several selections had relatively high yields of <4 oz tubers.

Most selections had <5% external defects. Selections with >10% external defects were ATX9202-1RU, ATX92230-1RU, and ATX9312-1RU. BTX1544-2W/Y had 4.2% hollow heart.

Selection AC90017-2 had no observable blackspot (5.0 rating). Potential blackspot susceptibility was observed for ATX9202-3RU, BTX1544-2W/Y, BTX1750-1W/Y, NDTX4930-5W, and TX1673-2W. Enzymatic browning was evident in ATX9312-1RU, BTX1750-1W/Y, and Russet Norkotah.

Acceptable fry color was observed for ATX9202-3RU, BTX1544-2W/Y, and TX1574-1W/Y. Selections with acceptable chip color at 50F storage and 50F with reconditioning were BTX1750-1W/Y and NDTX4930-5W.

One Colorado and two Texas selections will be entered in the Western Regional Trials in 2000. They are AC89536-5 (CO), ATX9202-3RU (TX), and NDTX4930-5W (TX). Selection AC90017-2 will be discarded from further evaluation due to small tuber size and excessive growth cracking observed in the Colorado seed increase.

Western Regional Main Trial. After selections have been evaluated for a year in the Southwestern Regional Trial they are advanced to one of three Western Regional Trials (Main, Chip, and Red/Specialty) at 10+ locations in the Western United States. The regional trials are designed to evaluate the adaptability of selections over a range of environments and production management systems.

Eight selections and five cultivars were entered in the Colorado Western Regional Main Trial. Tables 7A-E present the data collected on these selections in the Colorado trial.

The number of entries in this trial has been significantly reduced since 1995. This is due to the exclusion of all entries coming from areas where seed stocks potentially have been exposed to late blight. We are attempting to initiate tissue culture based increases of all potential entries from the various cooperating programs two years in advanced of entrance in the Western Regional Trials. The plan is to have suitable stocks ready in the event they are entered in the Western Regional Trials.

Selections entered by Colorado in 1999 included AC87079-3, AC87084-3, AC87138-4, and CO89036-10. AC87084-3 graduated from the Western Regional Trial having completed three years of evaluation in 1999. Selection CO89036-10 was withdrawn and discarded from further evaluations because of poor overall performance. The other Colorado entries will be tested again in 2000.

The top yielding selection was Russet Burbank (471 cwt/A). Russet Burbank also had the greatest yield of undersize tubers (202 cwt/A). Selections with fry potential include AC87079-3 and AC87138-4.

Chipping Studies. Fifty-three clones, 50 selections and 3 cultivars, were tested for chipping potential after various storage regimes. Additional information on postharvest characteristics was collected on 23 of these selections. Data from this study are summarized in Tables 8A-B. Appendix 10 shows the percent of the samples producing acceptable chips after the various storage regimes. This figure also includes information for the Western Regional Chip Trial.

None the selections and cultivars evaluated produced acceptable chips after 6 weeks of 40F storage. Selections with acceptable chip color ratings after 40F storage with reconditioning at 60F were AC93377-5, CO94027-6, and CO94032-5. Six percent of the clones evaluated under this storage regime produced acceptable chips.

Chipeta was the least susceptible to blackspot and Atlantic was most susceptible. Selections with blackspot susceptibility are AC93377-5, AC93395-5, CO92059-8, CO94027-6, CO94032-3, CO94138-1, CO94225-1, NDC5433-5, and NDC6135-1. Only selection AC85457-1 was susceptible to enzymatic browning.

Western Regional Chip Trial. The Colorado Western Regional Chip Trial also includes intermediate and advanced chipping selections from the Colorado program that are not formally entered into the regional chip trials. This is due to the limited number of intermediate and advanced chipping clones in the Colorado program.

Eighteen entries, 13 selections and 5 cultivars, were included in the Colorado Western Regional Chip Trial. Trial results are presented in Tables 9A-E.

Colorado entries in the 1999 Western Regional Chip Trials included AC87340-2 and AC89653-3. Both will be reentered in the 2000 Trials. An advanced selection in this trial (not part of the formal Wester Regional Chip Trial), CO92059-8 will be entered in the Southwestern Regional Trials in 2000.

The highest yielding selections were AC89653-3 and ATX85404-8. For the trial, the average yield of >10 oz tubers was low (47 cwt/A) in 1999. Yield of tubers <4 oz (133 cwt/A) was high.

None of the selections produced acceptable chips out of 40F storage. The only selection showing chipping potential after 40F storage with reconditioning at 60F was AC93377-5. Several selections have potential to chip out of 50F or 50F with reconditioning.

Western Regional Red/Specialty Trial. The Colorado Western Regional Red Trial also includes intermediate and advanced red selections from the selection program that were not formally entered into the regional red trials. This is due to the limited number of intermediate and advanced red clones in the Colorado program.

The Colorado trial included 13 entries, 10 selections and 3 cultivars. Trial results are summarized in Tables 10A-E.

Selection CO89097-2 was entered by Colorado and will be reentered in the 2000 Western Regional Red/Specialty. An advanced selection (not part of the formal trial), NDC5281-2 will be entered in the Southwestern Regional Trials in 2000.

The highest yielding selection was CO93037-6 followed by CO89097-2. Several selections had very high yields of <4 oz tubers. Included were CO93037-6, NDC4069-4R/R, NDC5281-2, and W8497R. Larger tubers of W8497R tended to be very rough (hooded eyes).

Selections with high levels of resistance to blackspot bruising were CO86218-2, CO89097-2, and DT6063-1R. Selections with susceptibility to blackspot bruising were NDC4069-4 (red fleshed) and W8497R. Several selections were susceptible to enzymatic browning. DT6063-1R was the most resistant to enzymatic browning.

Please refer to the Grower Evaluations section of this report for a status report of these and other advanced selections.

Grower Evaluations. Grower evaluations were conducted on eight russets (AC83064-1, AC83064-6, AC87079-3, AC87084-3, AC87138-4, CO80011-5, CO86026-4, and CO89036-10), three reds (CO86218-2, CO89097-2, and DT6063-1R), and two chipping selections (AC87340-2 and BC0894-2).

Release notices for the cultivars AC83064-1 (Keystone Russet), AC83064-6 (Silverton Russet), and DT6063-1R (Cherry Red) are in preparation. Selections to be recommended for release and naming in 2000 are CO85026-5 (fresh market russet) and CO86218-2 (red). Selections that will continue to undergo grower evaluation are AC87079-3, AC87084-3, AC87138-4, AC87340-2, BC0894-2, and CO89097-2. Comparative date for these selections and standard cultivars is presented in Table 11.

Colorado initially entered BC0894-2 into the Western Regional Chip Trials in 1994. This selection graduated from this trial in 1996. BC0894-2 was also entered into the Snack Food Association (SFA) Trials in 1995-1997. This selection is still undergoing evaluation for commercial production and possible international seed export. CO86218-2 also shows potential for international seed export.

Selection CO80011-5 was discarded after several years of grower evaluation. Problems with PVY expression and sporadic problems with stand and tuber growth cracks contributed to this decision. CO89036-10 was also discarded primarily due to low yields.

Two new selections will be evaluated by growers in 2000. They are AC89536-5 and AC89536-3. AC89536-5 is a high yielding, medium maturing russet selection with fresh market potential. AC89536-3 is a chipping selection with high yield potential.

OTHER PHYSIOLOGICAL STUDIES

The 1999 Research Proposal included studies to develop protocols to evaluate advanced selections for tuber greening potential, red skin color retention in storage, and the reconditioning ability of advanced selections and named cultivars. These studies are currently underway. A supplemental report will be prepared upon completion of these studies.

Table 1. Potato breeding and selection scheme used at the SLV Research Center.

Year	Comments
1	Select parents, crossing, and true seed production in the greenhouse.
2	Produce seedling tubers from true seed in the greenhouse.
3	70,000-80,000 seedling tubers planted in the field as single hills. Several thousand tubers are obtained from other breeding programs. Initial selection of this material takes place at harvest. First cycle of field selection.
4	Twelve-hills of each single-hill selection are planted. Second cycle of field selection.
5	Preliminary Trial 1 (P1). Third cycle of field selection. Initial evaluations for chipping qualities (chip color after various storage regimes and specific gravity) are conducted this year and subsequently.
6	Preliminary Trial 2 (P2). Fourth cycle of field selection. Initial evaluations to characterize selections for blackspot bruise potential, storage weight loss, dormancy, and enzymatic browning. Initial evaluations for french fry potential (french fry color and specific gravity) are conducted this year and subsequently. Evaluations for chipping qualities are continued.
7	Intermediate Yield Trial (IYT). Fifth cycle of field selection. Initial data collected on yield, grade, and growth characteristics.
8-9, 14+	Advanced Yield Trials (AYT): Includes selections that have advanced from the IYT. Additionally included selections are included that have graduated from the Southwest Regional and Western Regional Trials. The advanced yield trials for chippers and reds are planted with entries in the Western Regional Chip and Red Trials. Selection are in the 6th-7th and 12+ cycles of field selection. Selections in the sixth cycle of selection are indexed for viruses and cleanup/micropropagation is initiated. Testing for ring rot and PLRV reaction is also initiated at this stage and continues as needed. Selections in the 7th cycle of field selection are entered into cultural management trials and postharvest disease reaction (dry rot and soft rot) evaluations.
10	Southwestern Regional Trials (4 locations - CO, TX, CA). Cultural management trials and postharvest disease reaction evaluations continue as needed.
11-13	Western Regional Trials (3 trials): main trial (russets and long whites), chip trial, and red/specialty trial. The Western Coordinating Committee (WCC-27) directs these trials at 10+ locations in the Western United States each year. Cultural management trials and postharvest disease reaction evaluations continue as needed.
11+	Grower/industry evaluations. The Colorado Potato Breeding and Selection Project relies on the cooperation of several growers, shippers, and processors (in-state and out-of-state) to evaluate advanced selections for adaptability and marketability.
14+	Released as a named cultivar.

Table 2. Colorado fall potatoes: Production of primary potato cultivars, 1983-1999[1].

Cultivar	%/Acreage	Year																
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Russet Burbank	%	23.9	22.9	24.3	23.7	21.7	16.0	13.2	7.1	8.3	8.7	—	7.6	—	1.6	—	—	—
	Acreage	11,233	12,252	13,730	13,509	13,237	9,600	8,184	4,651	5,644	5,742	—	5,624	—	1,248	—	—	—
Centennial Russet	%	62.7	68.0	66.9	66.0	67.3	68.8	55.3	61.2	47.5	44.4	38.3	30.3	20.5	15.0	12.3	9.3	7.6
	Acreage	29,469	36,380	37,799	37,620	41,053	41,280	34,286	40,086	32,300	29,304	27,768	22,422	15,785	11,700	9,471	7,049	5,687
Russet Norkotah	%	—	—	—	—	—	2.2	9.9	14.0	20.1	26.1	23.5	26.6	36.2	35.6	37.6	41.6	42.0
	Acreage	—	—	—	—	—	1,320	6,138	9,170	13,668	17,226	17,038	19,684	27,874	27,768	28,952	31,533	32,424
Russet Nugget	%	—	—	—	—	—	—	—	—	9.6	10.1	13.7	23.1	27.0	34.0	38.8	35.1	29.0
	Acreage	—	—	—	—	—	—	—	—	6,528	6,666	9,933	17,094	20,790	26,520	29,876	26,606	22,388
Ranger Russet	%	—	—	—	—	—	—	—	—	—	—	—	2.8	2.8	0.7	—	—	1.2
	Acreage	—	—	—	—	—	—	—	—	—	—	—	2,072	2,156	546	—	—	926
Century Russet	%	—	—	—	—	—	—	—	—	—	—	—	2.5	—	—	—	—	—
	Acreage	—	—	—	—	—	—	—	—	—	—	—	1,850	—	—	—	—	—
Red McClure	%	3.7	1.6	1.9	1.0	1.0	—	—	—	—	—	—	—	—	—	—	—	—
	Acreage	1,739	856	1,074	570	610	—	—	—	—	—	—	—	—	—	—	—	—
Sangre	%	5.7	3.1	5.1	7.2	6.3	6.3	7.9	7.6	—	5.9	7.5	3.8	3.8	4.4	4.4	2.7	2.5
	Acreage	2,679	1,659	2,882	4,104	3,843	3,780	4,898	4,978	—	3,894	5,438	2,812	2,926	3,432	3,388	2,047	1,930
Yukon Gold	%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.4	1.4
	Acreage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,577	1,081
Total Fall Acreage Planted		47,000	53,500	56,500	57,000	61,000	60,000	62,000	65,000	68,000	66,000	72,500	74,000	77,000	78,000	77,000	75,800	77,200

[1]Data provided by the Colorado Agricultural Statistics Service.

Figure 1. Primary SLV Cultivars Planted 1983 - 1999

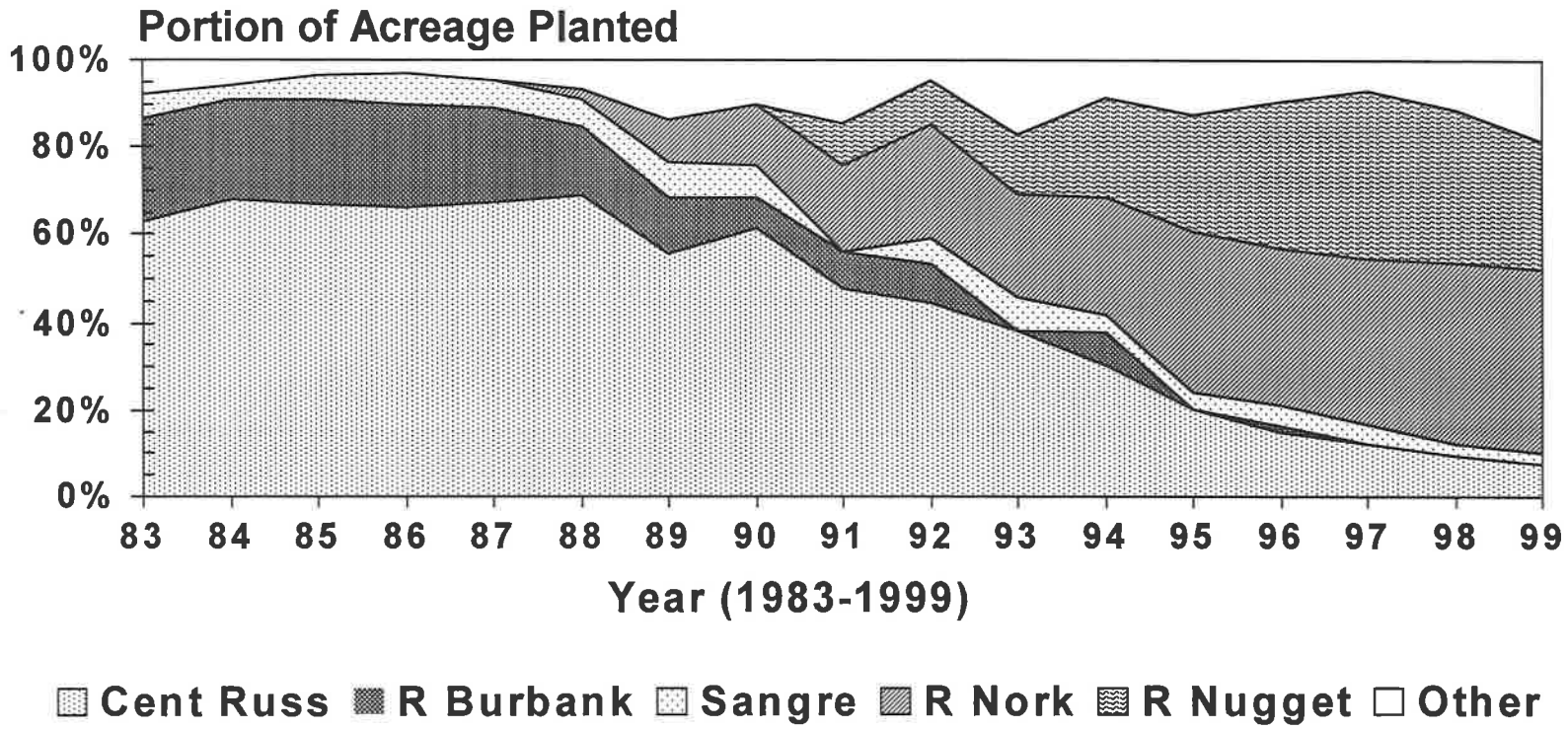


Figure 2. Primary SLV Potato Cultivars 1997-1999 Comparison

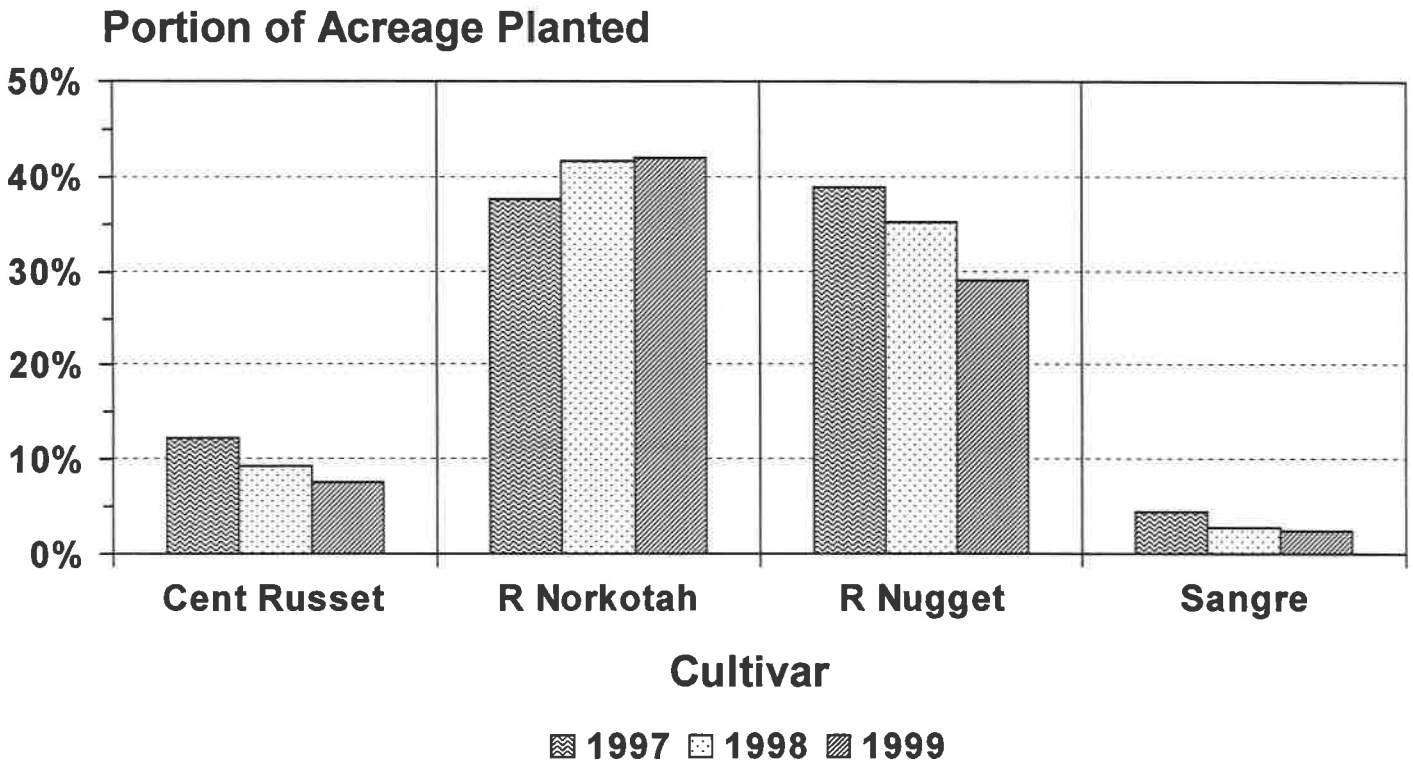


Table 3A. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Preliminary Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
CO94019-1	2.7	3.3	3.0	5.4	112	2.6
CO94024-4	4.1	4.1	4.1	5.3	119	3.0
CO94024-16	4.1	3.9	4.0	5.1	77	3.6
CO94035-15	3.9	4.4	4.2	6.1	105	4.2
CO94055-8	4.8	4.0	4.4	3.2	141	4.8
CO94065-2	3.4	4.2	3.8	5.8	119	4.8
CO94084-12	2.9	2.5	2.7	4.0	105	4.8
CO94222-6	4.1	3.5	3.8	4.6	77	4.8
NDC4069-4	1.8	1.9	1.9	6.7	95	---
NDC6174-1	2.8	3.8	3.3	8.1	84	3.4
NDC6184-3	2.4	1.3	1.9	7.0	77	3.4
VC0967-2	3.7	4.2	4.0	4.2	91	3.8
VC0967-5	4.1	3.4	3.8	3.4	126	4.6
Centennial Russet	5.0	4.9	5.0	7.5	96	4.8
Ranger Russet	4.0	3.1	3.6	3.9	96	3.4
Russet Norkotah	5.0	5.0	5.0	3.5	117	3.2
Russet Nugget	4.1	3.9	4.0	4.1	116	3.2
Sangre-S10	4.0	4.7	4.4	4.0	97	2.8
Shepody	4.8	4.5	4.7	3.7	117	4.6

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 3B. Specific gravity, french fry color, and texture for Preliminary Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1] At Harvest	Fry Color[1] 6 wks 50F+ 8 wks 45F	Fry Texture[2] At Harvest	Fry Texture[2] 6 wks 50F+ 8 wks 45F
CO94019-1	1.071	3	4	2	2
CO94024-4	1.077	2	3	3	3
CO94024-16	1.071	2	3	3	2
CO94035-15	1.074	2	3	3	3
CO94055-8	1.068	1	2	3	2
CO94065-2	1.074	4	4	3	3
CO94084-12	1.065	1	2	3	3
CO94222-6	1.089	3	3	4	3
NDC4069-4	1.078	-	-	3	4
NDC6174-1	1.072	3	4	3	3
NDC6184-3	1.081	2	3	1	3
VC0967-2	1.071	1	1	3	2
VC0967-5	1.065	1	2	3	3
Centennial Russet	1.073	4	4	2	2
Ranger Russet	1.082	2	2	3	4
Russet Norkotah	1.082	4	3	3	4
Russet Nugget	1.086	1	2	5	4
Sangre-S10	1.066	4	4	3	3
Shepody	1.075	3	3	3	3

[1]Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤2 are acceptable.

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

Table 4A. Yield, grade, tuber shape, and skin type for Intermediate Yield Trial clones - 1999.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	>10 oz	<4 oz	Tuber Shape & Skin Type[1]
AC92428-10	407	322	78.9	40	73	L,Ru
AC93012-6	383	229	59.6	2	146	L,Ru
AC93012-11	381	274	71.9	97	46	L,Ru
AC93026-9	424	325	76.6	58	88	L,Ru
AC93047-1	331	239	72.3	13	80	L,Ru
AC93063-1	370	299	80.9	90	45	L,Ru
AC93135-1	335	217	64.7	18	107	L,Ru
CO93001-11	420	351	83.7	104	44	L,Ru
CO93016-3	383	256	66.4	22	128	L,Ru
CO93020-4	439	362	82.4	108	68	L,Ru
CO93024-2	454	369	81.4	114	30	L,Ru
CO93051-5	389	336	86.2	116	47	Ob,Ru
CO93067-4	347	280	80.4	45	49	L,Ru
Russet Norkotah	388	322	82.9	128	52	L,Ru
Russet Nugget	326	241	74.3	29	81	Ob,Ru
Mean	385	295	76.2	65	72	-----
LSD	54	62	8.7	40	29	-----

[1]Tuber shape & skin type: Ob=oblong; L=long; Ru=russet.

[2]LSD=least significant difference.

Table 4B. Grade defects for Intermediate Yield Trial clones - 1999.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC92428-10	2.9	MS,GR*	0.0
AC93012-6	1.9	MS*,GC	0.0
AC93012-11	16.0	MS*,SG,GC,GR	14.2
AC93026-9	2.5	MS*,GC,GR	0.0
AC93047-1	3.6	MS*	0.0
AC93063-1	6.9	SG,GC*	2.7
AC93135-1	3.4	MS*	0.0
CO93001-11	6.1	MS*,GC*	1.3
CO93016-3	0.0		0.8
CO93020-4	2.1	MS*,GC*,GR	0.0
CO93024-2	12.1	MS,SG,GC*,GR	1.7
CO93051-5	1.7	MS*	21.1
CO93067-4	5.2	MS,GC*,GR	0.7
Russet Norkotah	3.5	MS*,GC	2.8
Russet Nugget	1.2	MS*,GC	0.0

[1] Percent external defects based on the proportion of the total sample weight with significant defects.

[2] MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3] Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 4C. Growth characteristics of Intermediate Yield Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC92428-10	96	3.5	3.0	4.4	4.0	3.0	3.0
AC93012-6	100	3.5	3.5	5.5	4.0	3.5	3.0
AC93012-11	100	2.5	3.0	3.8	3.5	3.0	3.0
AC93026-9	98	3.0	3.0	3.9	4.0	4.0	3.0
AC93047-1	96	3.0	3.0	4.6	3.0	2.0	2.0
AC93063-1	96	3.5	2.0	2.6	3.0	3.0	3.0
AC93135-1	98	2.0	2.5	5.6	3.0	3.0	3.0
CO93001-11	100	3.0	3.5	5.7	4.0	2.0	3.0
CO93016-3	100	4.0	3.0	5.4	4.0	2.0	3.0
CO93020-4	100	3.0	3.0	5.4	2.5	2.5	3.0
CO93024-2	98	4.0	4.0	4.0	4.0	2.5	2.0
CO93051-5	100	2.5	3.0	4.8	3.0	2.5	3.0
CO93067-4	100	3.0	3.5	3.9	3.5	3.0	3.0
Russet Norkotah	100	2.5	3.0	3.4	3.0	3.0	3.0
Russet Nugget	96	3.0	3.0	3.4	4.0	4.0	4.0
Mean	98	3.1	3.1	4.4	3.5	2.9	2.9
LSD[6] (0.05)	NS	1.3	0.8	1.0	0.6	1.1	0.0

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference; NS=not significant.

Table 4D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Intermediate Yield Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC92428-10	3.2	2.1	2.7	4.8	82	3.0
AC93012-6	2.2	1.2	1.7	4.6	89	2.6
AC93012-11	3.7	2.2	3.0	4.2	110	1.2
AC93026-9	3.0	2.1	2.6	4.1	117	3.8
AC93047-1	4.4	2.9	3.7	4.8	117	2.8
AC93063-1	4.8	4.1	4.5	4.4	110	2.6
AC93135-1	3.2	3.0	3.1	4.1	110	4.4
CO93001-11	4.7	3.9	4.3	5.4	68	3.0
CO93016-3	3.6	3.1	3.4	5.9	68	2.4
CO93020-4	2.3	1.9	2.1	5.6	75	3.0
CO93024-2	2.6	2.3	2.5	4.6	75	1.6
CO93051-5	3.3	2.9	3.1	6.3	75	2.2
CO93067-4	3.9	3.5	3.7	5.1	117	4.2
Russet Norkotah	4.6	4.4	4.5	5.1	96	3.0
Russet Nugget	3.8	4.2	4.0	4.0	103	4.0

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

[2] Tubers were stored at 45F for 97 days.

[3] Days from harvest to first visible growth. Tubers were stored at 45F.

[4] Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 4E. Specific gravity, french fry color, and texture for Intermediate Yield Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	5 wks 50F+ 8 wks 45F	At Harvest	5 wks 50F+ 8 wks 45F
AC92428-10	1.097	3	4	2	3
AC93012-6	1.100	2	2	4	4
AC93012-11	1.096	2	2	3	4
AC93026-9	1.096	3	3	3	3
AC93047-1	1.094	2	2	3	4
AC93063-1	1.093	1	1	5	4
AC93135-1	1.099	3	3	4	4
CO93001-11	1.086	1	1	2	4
CO93016-3	1.095	2	2	3	3
CO93020-4	1.087	2	3	3	3
CO93024-2	1.100	1	2	5	3
CO93051-5	1.087	2	2	4	3
CO93067-4	1.105	1	1	5	5
Russet Norkotah	1.091	3	3	3	3
Russet Nugget	1.097	2	3	4	3

[1]Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤ 2 are acceptable.

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

Table 5A. Yield, grade, tuber shape, and skin type for Advanced Yield Trial clones - 1999.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	<4 oz	Tuber Shape & Skin Type[1]
AC83064-1	430	386	89.6	109	34	L,Ru
AC83064-6	378	304	80.4	33	49	L,Ru
AC90636-3	375	298	79.4	24	73	Ob,Ru
AC91014-2	356	249	69.9	25	96	L,Ru
AC91365-1	385	301	77.9	39	79	L,Ru
AC92009-4	332	293	88.0	94	31	L,Ru
CO80011-5	355	271	76.4	53	42	Ob,Ru
CO85026-4	333	283	84.6	37	37	L,Ru
CO92027-2	343	247	71.7	8	95	L,Ru
CO92077-2	376	290	77.2	26	85	L,Ru
NDC5372-1	423	334	79.0	73	77	L,Ru
TC1675-1	421	298	70.9	48	100	Ob,Ru
TC1682-1	457	369	80.7	52	74	L,Ru
Russet Norkotah	389	342	88.0	122	44	L,Ru
Russet Nugget	361	277	76.8	47	80	Ob,Ru
Mean	381	303	79.4	53	66	----
LSD[2] (0.05)	31	37	5.7	25	18	----

[1]Tuber shape & skin type: Ob=oblong; L=long; Ru=russet.

[2]LSD=least significant difference.

Table 5B. Grade defects for Advanced Yield Trial clones - 1999.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC83064-1	2.3	MS,GC*	0.0
AC83064-6	6.6	MS,GC*	0.0
AC90636-3	1.1	MS*,SG,GC	0.0
AC91014-2	3.1	MS*	0.0
AC91365-1	1.2	MS*,SG*,GC*	4.5
AC92009-4	2.4	MS*,SG	0.0
CO80011-5	11.7	MS,GC*	0.0
CO85026-4	4.0	MS,GC*	0.0
CO92027-2	0.2	MS*	0.3
CO92077-2	0.1	MS*	0.0
NDC5372-1	2.8	MS*,SG,GC,GR	0.0
TC1675-1	5.3	MS*,GC	0.0
TC1682-1	3.1	MS*,SG,GC,GR	0.0
Russet Norkotah	0.8	MS*	0.9
Russet Nugget	1.1	MS*,GC	0.0

[1]Percent external defects based on the proportion of the total sample weight with significant defects.

[2]MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3]Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 5C. Growth characteristics of Advanced Yield Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC83064-1	98	3.3	3.0	3.9	4.0	2.8	3.0
AC83064-6	97	3.5	3.8	3.3	4.0	3.0	3.0
AC90636-3	98	3.0	2.8	3.2	3.3	3.5	3.0
AC91014-2	98	3.5	3.0	6.4	3.0	2.8	3.0
AC91365-1	100	3.0	2.8	4.6	3.0	2.8	3.0
AC92009-4	97	3.0	2.0	2.4	4.0	3.5	3.0
CO80011-5	94	2.8	2.3	3.1	3.0	2.5	3.0
CO85026-4	99	3.3	2.5	2.8	3.3	3.0	3.3
CO92027-2	97	3.0	3.0	5.4	3.0	3.0	3.3
CO92077-2	99	2.8	2.0	3.1	3.0	2.3	3.0
NDC5372-1	99	3.3	3.0	4.3	3.0	3.0	3.0
TC1675-1	98	3.5	3.0	4.9	3.8	3.0	3.0
TC1682-1	99	4.3	3.0	3.7	4.0	3.8	3.0
Russet Norkotah	99	2.5	3.3	4.1	3.3	2.8	2.3
Russet Nugget	97	3.8	3.0	3.1	4.0	3.8	3.8
Mean	98	3.2	2.8	3.9	3.4	3.0	3.0
LSD[6] (0.05)	4	0.8	0.4	0.7	0.4	0.7	0.4

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference.

Table 5D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Advanced Yield Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC83064-1	4.9	5.0	5.0	3.4	68	4.8
AC83064-6	3.6	4.0	3.8	4.5	68	3.6
AC90636-3	3.1	3.1	3.1	5.3	103	3.8
AC91014-2	3.3	2.7	3.0	6.4	103	3.2
AC91365-1	3.4	3.4	3.4	6.6	103	1.6
AC92009-4	3.8	2.8	3.3	5.4	126	3.4
CO80011-5	3.5	2.8	3.2	4.9	96	3.6
CO85026-4	2.7	1.8	2.3	3.0	89	3.4
CO92027-2	3.8	3.1	3.5	6.8	75	3.0
CO92077-2	4.1	4.4	4.3	4.1	82	1.4
NDC5372-1	4.5	1.9	3.2	6.4	110	2.0
TC1675-1	4.2	3.2	3.7	2.6	110	3.4
TC1682-1	4.4	4.5	4.5	3.7	103	3.6
Russet Norkotah	4.7	3.4	4.1	4.2	96	3.2
Russet Nugget	3.6	3.7	3.7	3.5	96	4.4

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 5E. Specific gravity, french fry color, and texture for Advanced Yield Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	5 wks 50F+ 8 wks 45F	At Harvest	5 wks 50F+ 8 wks 45F
AC83064-1	1.085	3	4	3	3
AC83064-6	1.087	1	2	4	3
AC90636-3	1.094	2	3	3	3
AC91014-2	1.099	1	2	4	4
AC91365-1	1.092	3	3	3	3
AC92009-4	1.102	2	2	3	3
CO80011-5	1.085	2	3	3	3
CO85026-4	1.096	2	3	4	3
CO92027-2	1.099	1	1	4	4
CO92077-2	1.086	2	2	3	3
NDC5372-1	1.092	1	1	3	3
TC1675-1	1.096	1	2	4	4
TC1682-1	1.094	3	4	3	3
Russet Norkotah	1.086	3	3	3	3
Russet Nugget	1.097	2	3	4	4

[1]Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤ 2 are acceptable.

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

Table 6A. Yield, grade, tuber shape, and skin type for Southwest Trial clones - 1999.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
AC89536-5	367	255	69.2	14	81	Ob,Ru
AC90017-2	472	346	72.9	44	114	L,Ru
ATX9202-1RU	391	289	73.9	46	87	L,Ru
ATX9202-3RU	495	366	73.5	162	44	L,Ru
ATX9204-4RU	488	389	79.8	95	82	Ob,W
ATX92230-1RU	427	327	75.5	82	47	Ob,Ru
ATX9312-1RU	349	207	58.5	57	87	L,Ru
BTX1544-2W/Y	469	398	84.7	71	61	R,W
BTX1750-1W/Y	356	209	58.7	13	147	R,W
NDTX4930-5W	426	301	69.9	81	110	R,W
TX1523-1RU/Y	414	343	82.6	95	62	R,Ru
TX1574-1W/Y	446	344	76.8	63	88	Ob,W
TX1673-2W	463	333	71.9	27	129	R,W
Chipeta	509	368	71.9	86	92	R,W
Russet Norkotah	404	335	83.1	101	56	L,Ru
Russet Nugget	386	312	80.5	66	71	Ob,Ru
Yukon Gold	374	310	82.7	93	54	Ov,W
Mean	426	319	74.5	70	83	-----
LSD[2] (0.05)	53	65	7.6	40	25	-----

[1]Tuber shape & skin type: Ob=oblong; L=long; Ru=russet; W=white.

[2]LSD=least significant difference.

Table 6B. Grade defects for Southwest Trial clones - 1999.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC89536-5	8.7	MS,GC*	0.0
AC90017-2	2.7	MS,GC*	0.0
ATX9202-1RU	4.0	MS,SG,GC*,GR	0.3
ATX9202-3RU	17.3	MS,SG,GC*,GR	0.0
ATX9204-4RU	3.5	MS,SG*,GR	0.0
ATX92230-1RU	12.3	MS,SG,GC*	0.6
ATX9312-1RU	15.8	MS,SG,GC*,GR	0.6
BTX1544-2W/Y	2.2	MS*,GC	4.2
BTX1750-1W/Y	0.0		0.0
NDTX4930-5W	3.5	MS*,GC*,GR	0.5
TX1523-1RU/Y	2.0	MS*,GC,GR	0.0
TX1574-1W/Y	3.2	MS*,GR*	0.0
TX1673-2W	0.1	MS*	0.2
Chipeta	9.6	MS,SG,GC*,GR	0.0
Russet Norkotah	2.9	MS*,GR	0.0
Russet Nugget	1.0	MS*,GC,GR	0.4
Yukon Gold	2.6	MS*GC*GR	0.0

[1] Percent external defects based on the proportion of the total sample weight with significant defects.

[2] MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3] Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 6C. Growth characteristics of Southwest Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC89536-5	97	3.0	2.0	3.4	3.5	3.3	3.0
AC90017-2	100	4.0	3.0	4.1	4.0	3.5	3.0
ATX9202-1RU	98	3.3	2.0	2.2	3.8	3.3	3.0
ATX9202-3RU	99	3.3	3.0	2.3	4.3	4.0	3.3
ATX9204-4RU	100	3.0	2.0	2.0	4.0	3.8	3.3
ATX92230-1RU	99	3.0	3.5	3.4	4.0	3.3	3.3
ATX9312-1RU	99	3.0	2.3	2.9	3.5	3.3	3.3
BTX1544-2W/Y	97	4.0	4.0	3.1	3.5	2.8	2.3
BTX1750-1W/Y	99	3.3	3.0	7.8	2.0	2.3	2.0
NDTX4930-5W	99	3.0	3.8	3.4	3.0	3.0	3.0
TX1523-1RU/Y	93	3.0	3.8	4.7	3.0	3.0	2.0
TX1574-1W/Y	99	3.5	3.8	4.4	3.0	2.3	3.3
TX1673-2W	99	2.8	2.5	4.4	4.0	3.0	3.0
Chipeta	99	3.0	4.0	4.2	4.0	3.8	3.3
Russet Norkotah	99	3.3	3.0	4.3	3.0	2.8	2.3
Russet Nugget	100	3.3	3.0	2.9	4.0	3.3	3.8
Yukon Gold	97	2.5	3.3	2.9	3.3	2.5	2.0
Mean	98	3.2	3.0	3.7	3.5	3.1	2.9
LSD[6] (0.05)	3	0.6	0.5	0.8	0.5	0.6	0.5

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference.

Table 6D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Southwest Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC89536-5	4.3	3.0	3.7	4.0	96	3.8
AC90017-2	5.0	5.0	5.0	5.2	96	4.6
ATX9202-1RU	3.9	3.7	3.8	5.1	110	4.2
ATX9202-3RU	3.3	1.5	2.4	5.3	110	3.8
ATX9204-4RU	4.5	4.7	4.6	4.3	103	4.6
ATX92230-1RU	3.6	3.2	3.4	6.5	103	4.2
ATX9312-1RU	2.6	2.9	2.8	7.3	110	2.4
BTX1544-2W/Y	1.9	2.1	2.0	4.0	89	3.2
BTX1750-1W/Y	2.0	2.4	2.2	6.0	68	2.0
NDTX4930-5W	2.8	1.7	2.3	4.3	96	4.2
TX1523-1RU/Y	3.4	2.3	2.9	4.1	89	4.0
TX1574-1W/Y	1.6	3.0	2.3	4.6	82	4.2
TX1673-2W	3.5	3.3	3.4	4.0	82	4.0
Chipeta	2.8	3.4	3.1	3.3	96	3.8
Russet Norkotah	4.1	3.7	3.9	5.2	103	2.4
Russet Nugget	4.5	4.7	4.6	3.7	103	3.8
Yukon Gold	3.0	3.5	3.3	3.2	96	4.0

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 6E. Specific gravity, french fry color, and texture for Southwest Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	5 wks 50F+ 8 wks 45F	At Harvest	5 wks 50F+ 8 wks 45F
AC89536-5	1.089	4	4	3	3
AC90017-2	1.084	1	3	4	3
ATX9202-1RU	1.095	2	3	4	3
ATX9202-3RU	1.090	2	2	4	4
ATX9204-4RU	1.081	3	4	2	2
ATX92230-1RU	1.095	2	3	4	4
ATX9312-1RU	1.093	4	4	4	2
BTX1544-2W/Y	1.090	1	1	4	3
TX1523-1RU/Y	1.084	1	2	3	2
TX1574-1W/Y	1.096	2	2	3	3
Russet Norkotah	1.079	3	3	2	3
Russet Nugget	1.090	2	3	4	4
Yukon Gold	1.087	2	2	1	2

[1] Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤ 2 are acceptable.

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

Table 6F. Chip color[1] after various storage regimes and specific gravity of Southwest Trial clones - 1999.

Clone	Specific Gravity	5 wks 40F	5 wks/40F +3 wks/60F	5 wks 50F	5 wks/50F +3 wks/60F
BTX1750-1W/Y	1.075	4.0	3.0	2.0	1.0
NDTX4930-5	1.096	3.0	2.5	2.0	1.5
TX1673-2W	1.089	5.0	5.0	3.5	4.0
Chipeta	1.092	4.0	4.5	4.0	3.0

[1]Chip color was rated using the Snack Food Association 1-5 scale. Ratings of $\leq$2.0 are acceptable.

Table 7A. Yield, grade, tuber shape, and skin type for Western Regional Main Trial clones - 1999.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	<4 oz	Tuber Shape & Skin Type[1]
A88338-1	370	257	69.3	31	89	Ob,Ru
AC87079-3	351	233	66.1	13	116	Ob,Ru
AC87084-3	440	335	76.2	63	70	Ob,Ru
AC87138-4	437	231	52.6	17	182	L,Ru
CO89036-10	391	279	71.0	25	107	Ob,Ru
NDD840-1	388	216	55.5	43	153	Ob,Ru
TXNS102	404	324	80.1	109	74	L,Ru
TXNS296	436	359	82.3	159	57	L,Ru
Ranger Russet	410	326	79.0	74	69	L,Ru
Russet Burbank	471	245	52.1	31	202	L,Ru
Russet Norkotah	367	297	80.8	90	65	L,Ru
Russet Nugget	368	274	74.7	50	92	Ob,Ru
Shepody	406	327	80.5	105	58	L,W
Mean	403	285	70.8	62	103	-----
LSD[2] (0.05)	48	55	8.1	27	25	-----

[1]Tuber shape & skin type: Ob=oblong; L=long; Ru=russet; W=white.

[2]LSD=least significant difference.

Table 7B. Grade defects for Western Regional Main Trial clones - 1999.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
A88338-1	6.4	MS,GC*	0.3
AC87079-3	0.5	MS,GC*	1.3
AC87084-3	7.9	MS,GC*,GR	0.0
AC87138-4	5.6	MS,GC*,GR	0.4
CO89036-10	1.3	MS*GC*,GR*	0.0
NDD840-1	5.0	MS,SG*,GR	0.8
TXNS102	1.6	MS*,SG,GC*	1.3
TXNS296	4.5	MS,SG*,GC,GR	2.7
Ranger Russet	3.5	MS*,SG*,GC,GR	0.0
Russet Burbank	5.1	MS,SG*,GC	1.4
Russet Norkotah	1.3	MS*	0.0
Russet Nugget	0.5	MS*	0.0
Shepody	5.2	MS,SG*,GC,GR	0.5

[1]Percent external defects based on the proportion of the total sample weight with significant defects.

[2]MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3]Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 7C. Growth characteristics of Western Regional Main Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
A88338-1	97	3.0	3.0	3.5	3.5	3.3	3.8
AC87079-3	98	3.5	3.3	3.7	4.0	2.8	3.0
AC87084-3	98	3.0	3.3	5.1	4.5	4.0	3.0
AC87138-4	99	3.3	3.0	5.9	3.5	3.0	3.0
CO89036-10	97	3.3	3.0	4.5	3.5	2.0	3.0
NDD840-1	100	3.3	2.3	3.3	3.3	3.5	3.3
TXNS102	98	2.5	3.0	5.2	3.0	2.8	3.0
TXNS296	98	3.3	3.5	4.5	3.3	3.0	3.0
Ranger Russet	98	3.5	3.3	4.1	3.8	3.0	3.0
Russet Burbank	99	3.3	3.8	4.2	3.3	3.0	3.0
Russet Norkotah	99	3.0	3.5	4.4	2.8	2.5	2.5
Russet Nugget	100	3.3	3.0	3.1	4.0	4.0	3.5
Shepody	98	3.5	3.3	3.3	3.5	2.5	3.0
Mean	98	3.2	3.2	4.2	3.5	3.0	3.1
LSD[6] (0.05)	NS	0.8	0.6	0.5	0.7	0.7	0.4

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference; NS=not significant.

Table 8B (cont'd). Chip color[1] after various storage regimes and specific gravity of San Luis Valley chipping study clones - 1999.

Clone	Specific Gravity	5 wks 40F	5 wks/40F +3 wks/60F	5 wks 50F	5 wks/50F +3 wks/60F
CO95154-2	1.089	4.5	4.5	3.0	3.0
ND2676-10	1.081	2.5	2.5	2.0	1.5
NDC5118-2	1.089	4.0	3.5	2.5	3.0
NDC5433-5	1.076	4.5	3.5	2.5	2.0
NDC6084C-2	1.086	2.5	2.5	2.0	1.5
NDC6116-3	1.082	3.5	4.0	2.0	2.0
NDC6135-1	1.082	2.5	2.0	1.5	1.5
NDTX4930-5	1.082	4.0	4.0	3.5	3.0
VC1002-1	1.070	5.0	4.5	2.5	1.5
VC1002-3	1.085	5.0	4.5	2.5	3.0
VC1009-1	1.072	5.0	5.0	4.0	3.5
Atlantic	1.090	4.0	4.5	3.0	3.0
Chipeta	1.079	5.0	5.0	4.0	3.0
Snowden	1.086	4.0	2.5	2.0	2.5

[1] Chip color was rated using the Snack Food Association 1-5 scale. Ratings of $\leq$2.0 are acceptable.

Table 9A. Yield, grade, tuber shape, and skin type for Western Regional Chip Trial clones - 1999.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
AC87340-2	460	305	66.4	26	149	R,W
AC89653-3	476	297	62.4	24	178	R,W
AC93377-5	350	242	69.3	41	82	Ov,W
AC93395-5	396	297	74.7	66	100	R,W
AC93400-2	388	232	59.3	21	148	R,W
AF875-15	468	381	81.5	112	52	Ov,W
ATX85404-8	510	308	59.7	22	194	R,W
BC0894-2	383	302	78.6	69	73	R,W
CO92059-8	406	180	44.1	17	209	R,W
ND2676-10	367	235	63.9	17	124	R,W
NDC5118-2	406	209	51.4	2	191	Ov,W
NDC5433-5	457	217	47.3	13	229	R,W
Atlantic	446	391	87.4	176	40	R,W
Chipeta	486	345	70.6	55	93	R,W
Mean	428	281	65.5	47	133	-----
LSD[2] (0.05)	68	66	7.9	32	29	-----

[1]Tuber shape & skin type: R=round; Ov=oval; W=white.

[2]LSD=least significant difference.

Table 7D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Main Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
A88338-1	4.4	4.4	4.4	4.1	110	3.4
AC87079-3	4.2	3.8	4.0	4.8	89	3.4
AC87084-3	2.1	2.1	2.1	4.8	75	1.2
AC87138-4	2.9	2.3	2.6	4.2	89	1.6
CO89036-10	3.8	4.1	4.0	3.2	103	3.6
NDD840-1	3.4	2.7	3.1	2.7	89	4.2
TXNS102	4.6	4.2	4.4	5.2	110	3.2
TXNS296	4.8	4.9	4.8	4.5	96	2.6
Ranger Russet	4.3	2.5	3.4	3.9	82	3.6
Russet Burbank	3.0	2.1	2.6	3.1	138	3.0
Russet Norkotah	4.9	4.6	4.8	5.1	110	3.0
Russet Nugget	4.8	4.3	4.6	4.0	103	4.6
Shepody	4.0	3.5	3.8	3.6	103	4.6

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 7E. Specific gravity, french fry color, and texture for Western Regional Main Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	5 wks 50F+ 8 wks 45F	At Harvest	5 wks 50F+ 8 wks 45F
A88338-1	1.086	2	3	4	4
AC87079-3	1.098	2	2	4	4
AC87084-3	1.101	2	3	4	3
AC87138-4	1.094	2	2	4	3
CO89036-10	1.090	3	4	3	3
NDD840-1	1.085	3	4	2	2
TXNS102	1.093	2	3	2	3
TXNS296	1.085	3	2	3	3
Ranger Russet	1.094	2	2	4	4
Russet Burbank	1.085	2	2	3	4
Russet Norkotah	1.082	1	2	3	3
Russet Nugget	1.097	2	2	3	4
Shepody	1.091	2	3	3	4

[1] Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤ 2 are acceptable.

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

Table 8A. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for San Luis Valley chipping study clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC85457-1	3.5	2.8	3.2	3.4	105	1.2
AC87340-2	3.5	5.0	4.3	4.9	80	4.0
AC89653-3	4.2	3.0	3.6	4.9	71	4.8
AC93377-5	3.5	1.7	2.6	5.2	84	4.0
AC93395-5	3.2	2.2	2.7	4.5	91	4.4
AC93400-2	3.6	2.8	3.2	4.4	84	4.8
BC0894-2	3.6	2.6	3.1	4.9	81	3.8
CO92059-8	2.6	1.5	2.1	4.1	74	4.8
CO94027-6	1.4	1.1	1.3	7.8	112	4.6
CO94032-3	2.0	1.8	1.9	5.7	84	5.0
CO94165-3	---	---	---	4.2	77	---
CO94183-1	1.9	2.4	2.2	5.0	105	---
CO94225-1	2.3	1.7	2.0	5.9	77	5.0
CO94230-1	2.2	2.5	2.4	4.5	98	3.8
ND2676-10	4.0	3.7	3.9	4.8	110	4.8
NDC5118-2	3.7	3.3	3.5	4.9	60	4.2
NDC5433-5	2.0	1.6	1.8	5.2	67	4.0
NDC6084C-2	2.9	2.0	2.5	5.3	105	4.4
NDC6116-3	2.1	2.2	2.2	6.2	84	3.4
NDC6135-1	1.6	1.2	1.4	7.1	98	4.8
NDTX4930-5W	3.5	2.9	3.2	3.9	110	3.4
VC1002-1	3.5	3.3	3.4	4.2	105	4.2
VC1002-3	4.5	4.9	4.7	3.6	105	4.4
Atlantic	2.1	2.1	2.1	5.6	82	4.8
Chipeta	4.5	4.2	4.4	4.6	109	4.2
Snowden	2.9	2.2	2.6	4.7	103	3.6

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 8B. Chip color[1] after various storage regimes and specific gravity of San Luis Valley chipping study clones - 1999.

Clone	Specific Gravity	5 wks 40F	5 wks/40F +3 wks/60F	5 wks 50F	5 wks/50F +3 wks/60F
AC85457-1	1.086	4.5	3.5	2.0	2.5
AC87340-2	1.078	4.5	3.5	2.5	1.5
AC89653-3	1.084	4.0	4.5	3.5	2.5
AC93377-5	1.088	3.5	1.5	1.5	1.0
AC93395-5	1.083	3.5	3.5	2.5	2.0
AC93400-2	1.079	4.5	4.5	2.5	3.0
AC94282-1	1.080	4.0	4.0	3.0	2.5
AC94283-1	1.075	3.5	3.5	2.0	1.5
AC94290-3	1.084	4.5	3.0	2.5	2.5
AC94296-1	1.085	3.5	4.0	1.5	2.0
AC94296-5	1.081	4.0	4.0	2.0	2.0
AC94324-1	1.084	4.5	3.0	2.0	2.0
AC94328-16	1.081	4.0	4.0	1.5	1.0
ATDC9534-11	1.087	3.5	3.5	1.5	1.0
ATDC9535-1	1.086	4.5	4.0	2.5	3.0
BC0894-2	1.087	4.5	4.0	1.5	2.0
CO92059-8	1.088	4.5	4.0	2.5	2.5
CO94027-6	1.094	3.0	1.5	2.0	1.5
CO94032-3	1.087	3.0	1.5	1.5	1.0
CO94165-3	1.084	---	---	---	---
CO94183-1	1.077	---	---	---	---
CO94214-1	1.084	---	---	---	---
CO94215-1	1.087	---	---	---	---
CO94222-4	1.080	5.0	5.0	4.0	4.0
CO94225-1	1.094	4.5	4.0	3.0	3.0
CO94230-1	1.078	4.5	5.0	4.0	4.0
CO94233-1	1.070	5.0	5.0	4.5	4.0
CO95031-2	1.090	3.5	3.0	1.5	1.0
CO95032-1	1.084	4.0	3.5	3.0	2.0
CO95032-6	1.077	5.0	4.5	2.5	3.0
CO95051-7	1.089	4.0	3.0	2.0	1.0
CO95060-4	1.088	3.5	3.0	1.5	1.0
CO95068-3	1.073	5.0	5.0	4.0	3.5
CO95070-7	1.085	3.5	2.5	1.5	1.5
CO95070-9	1.079	4.5	3.5	2.0	2.0
CO95117-8	1.085	4.5	4.5	2.5	1.5
CO95119-2	1.086	4.5	5.0	2.5	2.5
CO95119-6	1.078	5.0	5.0	3.0	2.5
CO95120-6	1.090	4.5	4.0	2.5	2.5

Table 8B continued on the next page.

[1]Chip color was rated using the Snack Food Association 1-5 scale. Ratings of ≤2.0 are acceptable.

Table 9B. Grade defects for Western Regional Chip Trial clones - 1999.

Clone	% External[1]	External Defects Observed[2]	% Hollow Heart[3]
AC87340-2	1.6	MS*,SG,GR	0.0
AC89653-3	0.1	MS*	0.5
AC93377-5	7.4	MS,SG,GC*,GR	0.4
AC93395-5	0.0		0.0
AC93400-2	2.2	MS,GC*,GR	0.0
AF875-15	7.4	MS*,GC,GR	1.1
ATX85404-8	1.6	MS*,GC,GR*	0.5
BC0894-2	2.1	MS,GC,GR*	0.0
CO92059-8	4.1	MS,GC,GR*	0.0
ND2676-10	2.2	MS*,GC,GR	0.8
NDC5118-2	1.4	MS,GC*,GR	0.0
NDC5433-5	2.4	MS*,GC,GR	0.0
Atlantic	3.3	MS,SG,GC,GR*	16.4
Chipeta	9.9	SG,GC*,GR	0.0

[1]Percent external defects based on the proportion of the total sample weight with significant defects.

[2]MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3]Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 9C. Growth characteristics of Western Regional Chip Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC87340-2	97	3.5	3.3	4.8	3.5	3.0	3.0
AC89653-3	99	4.0	3.8	5.5	3.8	3.3	3.0
AC93377-5	93	3.0	3.0	3.7	3.0	3.0	2.3
AC93395-5	93	2.5	3.0	3.3	3.0	2.8	3.0
AC93400-2	99	3.5	3.3	5.6	2.5	2.8	3.0
AF875-15	96	3.8	4.0	4.9	4.0	3.0	3.0
ATX85404-8	100	4.0	4.0	4.8	4.0	3.3	3.0
BC0894-2	98	3.0	3.3	3.4	3.5	2.8	2.8
CO92059-8	99	3.5	3.3	4.1	2.8	2.0	3.0
ND2676-10	99	3.5	3.5	5.2	2.5	2.3	2.8
NDC5118-2	100	3.0	3.0	3.8	3.5	3.3	3.0
NDC5433-5	99	3.8	2.3	4.4	4.0	3.0	3.0
Atlantic	93	3.0	3.3	4.2	4.0	3.8	3.0
Chipeta	97	3.8	3.8	3.8	4.0	4.0	3.0
Mean	97	3.4	3.3	4.4	3.4	3.0	2.9
LSD[6] (0.05)	5	0.8	0.6	0.9	0.6	0.6	0.3

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference.

Table 9D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Chip Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC87340-2	3.5	3.1	3.3	4.5	75	3.4
AC89653-3	3.9	3.4	3.7	4.4	68	4.8
AC93377-5	4.4	1.7	3.1	5.0	75	3.4
AC93395-5	3.2	1.6	2.4	5.5	75	3.8
AC93400-2	3.1	1.8	2.5	4.7	68	3.6
AF875-15	3.4	2.8	3.1	5.3	89	2.6
ATX85404-8	3.8	2.1	3.0	5.5	68	3.8
BC0894-2	3.6	3.2	3.4	4.9	89	2.4
CO92059-8	2.0	2.6	2.3	3.9	68	4.0
ND2676-10	4.1	2.9	3.5	4.0	89	3.6
NDC5118-2	3.2	2.4	2.8	5.0	61	2.6
NDC5433-5	3.9	2.9	3.4	5.3	61	1.8
Atlantic	1.8	2.0	1.9	5.6	89	4.4
Chipeta	4.3	3.7	4.0	3.3	96	4.2

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 9E. Chip color[1] after various storage regimes and specific gravity of Western Regional Chip Trial clones - 1999.

Clone	Specific Gravity	5 wks 40F	5 wks/40F +3 wks/60F	5 wks 50F	5 wks/50F +3 wks/60F
AC87340-2	1.094	3.5	3.0	2.0	1.5
AC89653-3	1.096	3.5	3.5	2.5	2.5
AC93377-5	1.098	2.5	1.0	1.5	1.0
AC93395-5	1.095	3.0	3.5	2.5	1.0
AC93400-2	1.082	4.5	4.0	3.0	2.5
AF875-15	1.094	4.0	4.0	2.5	2.5
ATX85404-8	1.107	3.5	3.0	2.5	2.0
BC0894-2	1.086	3.5	3.0	2.5	2.0
CO92059-8	1.091	4.0	4.5	2.5	1.5
ND2676-10	1.091	2.5	2.5	2.0	1.0
NDC5118-2	1.094	3.5	3.0	2.0	2.0
NDC5433-5	1.090	3.5	3.0	2.5	2.0
Atlantic	1.104	4.0	3.5	2.5	2.5
Chipeta	1.092	4.5	4.5	3.0	2.0

[1] Chip color was rated using the Snack Food Association 1-5 scale. Ratings of $\leq$2.0 are acceptable.

Table 10A. Yield, grade, tuber shape, and skin type for Western Regional Red Trial clones - 1999.

Clone	Yield (Cwt/A)					Tuber Shape & Skin Type[1]
	Total	US #1			<4 oz	
		Total	%	>10 oz		
AC93459-1	426	304	70.9	41	112	R,R
CO86218-2	444	339	76.4	45	85	R,R
CO89097-2	463	352	75.6	71	98	Ov,R
CO93037-6	564	344	59.9	30	208	R,R
DT6063-1R	465	374	80.3	93	73	Ov,R
NDC4069-4R/R	431	171	39.1	6	260	R,R
NDC4655-1	338	214	62.6	24	116	Ov,R
NDC5281-2	406	115	28.4	0	289	R,R
NDTX4271-5R	418	339	81.2	40	73	R,R
W8497R	309	8	2.7	0	300	R,R
Norland-DR	489	351	71.6	50	127	R,R
Red LaSoda	491	366	73.9	97	61	R,R
Sangre-S10	510	421	82.2	119	68	R,R
Mean	443	284	61.9	47	144	-----
LSD[2] (0.05)	51	68	8.7	35	28	-----

[1]Tuber shape & skin type: R=round; Ov=oval; Ob=oblong; R=red.

[2]LSD=least significant difference.

Table 10B. Grade defects for Western Regional Red Trial clones - 1999.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC93459-1	2.5	MS,GC*	0.0
CO86218-2	4.4	MS,GC*	0.0
CO89097-2	2.8	MS*,GR*	0.4
CO93037-6	2.1	MS,GC*,GR	0.3
DT6063-1R	3.8	MS,GC*,GR	0.0
NDC4069-4	0.1	MS*	0.0
NDC4655-1	2.3	MS*,GC	0.0
NDC5281-2	0.4	MS*,GC*,GR	0.0
NDTX4271-5R	1.4	MS,GC*,GR	1.2
W8497R	0.2	MS*	0.0
Norland-DR	2.3	MS,GC*	0.3
Red LaSoda	13.2	MS,SG,GC*,GR	13.4
Sangre-S10	4.3	GC*,GR	0.0

[1]Percent external defects based on the proportion of the total sample weight with significant defects.

[2]MS=misshapen; SG=second growth; GC=growth crack; GR=green. Most prevalent defects for each clone are asterisked.

[3]Percent hollow heart calculated as follows: (Weight of tubers>10 ounces with defects/total sample weight) x 100.

Table 10C. Growth characteristics of Western Regional Red Trial clones - 1999.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC93459-1	96	3.0	2.3	3.8	3.3	2.8	3.3
CO86218-2	96	3.3	2.0	3.2	4.0	3.8	3.0
CO89097-2	97	3.0	3.0	4.5	4.0	3.5	3.0
CO93037-6	100	3.3	3.3	6.7	4.3	3.8	3.3
DT6063-1R	99	3.0	2.8	3.9	3.3	3.0	3.0
NDC4069-4	99	3.3	2.3	6.2	3.5	3.0	3.5
NDC4655-1	91	2.0	2.0	3.4	2.8	3.0	3.0
NDC5281-2	99	3.8	3.3	6.4	3.8	3.5	2.0
NDTX4271-5R	77	2.5	2.0	3.2	3.3	3.3	2.5
W8497R	97	3.3	2.3	4.7	2.8	2.8	2.0
Norland-DR	99	3.0	3.5	5.5	2.8	2.0	2.3
Red LaSoda	99	2.8	3.3	2.7	3.3	3.0	2.3
Sangre-S10	98	3.0	2.3	3.0	4.0	4.0	3.5
Mean	96	3.0	2.6	4.4	3.4	3.2	2.8
LSD[6] (0.05)	7	0.6	0.5	0.9	0.7	0.5	0.5

[1]Emergence uniformity is rated on a 1 to 5 scale, with 5 indicating very uniform emergence.

[2]Vine vigor is rated on a 1 to 5 scale, with 5 indicating very vigorous vines.

[3]Vine size is rated on a 1 to 5 scale, with 5 indicating very large vines.

[4]Vine type is rated on a 1 to 5 scale, with 5 indicating very upright vines.

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

[6]LSD=least significant difference.

Table 10D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Red Trial clones - 1999.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC93459-1	3.9	4.4	4.2	3.8	68	3.6
CO86218-2	4.8	4.9	4.9	4.4	75	1.6
CO89097-2	4.4	4.7	4.6	5.6	68	3.4
CO93037-6	3.9	3.4	3.7	5.3	103	3.6
DT6063-1R	4.6	4.6	4.6	5.4	75	4.2
NDC4069-4	2.1	1.9	2.0	8.9	75	---
NDC4655-1	3.8	3.7	3.8	9.4	75	2.2
NDC5281-2	3.9	3.3	3.6	7.7	82	1.0
NDTX4271-5R	3.2	3.9	3.6	5.9	75	1.6
W8497R	1.4	1.5	1.5	6.1	75	2.6
Norland-DR	3.8	4.3	4.1	5.7	75	2.8
Red LaSoda	2.2	3.0	2.6	5.1	75	1.6
Sangre-S10	4.1	3.6	3.8	3.5	89	3.6

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

[2]Tubers were stored at 45F for 97 days.

[3]Days from harvest to first visible growth. Tubers were stored at 45F.

[4]Degree of darkening rated at 60 minutes after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Table 10E. Specific gravity, french fry color, and texture for Western Regional Red Trial clones - 1999.

Clone	Specific Gravity	Fry Color[1] At Harvest	Fry Color[1] 5 wks 50F+ 8 wks 45F	Fry Texture[2] At Harvest	Fry Texture[2] 5 wks 50F+ 8 wks 45F
AC93459-1	1.066	4	4	2	3
CO86218-2	1.081	2	4	2	2
CO89097-2	1.086	2	3	2	2
CO93037-6	1.084	3	4	3	2
DT6063-1R	1.088	2	2	3	3
NDC4069-4	1.086	-	-	2	3
NDC4655-1	1.079	3	3	3	3
NDC5281-2	1.096	1	2	4	3
NDTX4271-5R	1.077	3	3	2	2
W8497R	1.072	1	1	3	2
Norland-DR	1.076	2	3	2	2
Red LaSoda	1.081	2	3	2	2
Sangre-S10	1.078	4	4	2	2

[1]Fry color was rated on a 0 to 4 scale, with 0 being the lightest or best color. Color ratings of ≤ 2 are acceptable.

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

Table 11. Summary comparison of advanced selections and named cultivars for yield, grade, grade, maturity, specific gravity, and grade defects - 1999. Advanced selections to be released in 2000 are highlighted.

Clone	Usage[1]	Loc x Years	Total Yield (Cwt/A)	% US #1	Vine Maturity[2]	Specific Gravity	% External Defects[3]	% Hollow Heart[4]
Russets								
AC83064-1	FM	11	465	88.6	3.2	1.078	1.6	0.0
AC83064-6	FM/Fry	11	391	85.5	3.0	1.080	1.6	0.2
CO85026-4	FM	9	368	88.6	3.6	1.084	3.8	0.0
AC87084-3	FM/Fry	7	508	88.6	3.5	1.094	3.0	0.0
AC87079-3	FM	5	425	80.9	2.8	1.091	1.7	1.4
AC87138-4	FM/Fry	5	491	76.6	3.2	1.088	3.9	0.5
AC89536-5	FM	4	521	83.0	3.1	1.084	3.3	0.0
Centennial Russet	FM	28	294	77.2	3.0	1.079	0.6	0.2
Russet Norkotah	FM	25	339	84.4	1.7	1.075	1.7	0.2
Russet Nugget	FM/Fry	29	413	81.8	3.8	1.093	1.5	0.1
Chippers								
BC0894-2	Chip	6	399	85.4	2.4	1.081	1.1	0.0
AC87340-2	Chip	5	474	77.9	3.3	1.084	0.9	0.3
AC89653-3	Chip	4	524	76.6	3.1	1.091	0.6	0.1
Atlantic	Chip	11	425	88.0	3.3	1.098	2.3	5.1
Chipeta	Chip	14	487	82.7	3.4	1.092	4.9	0.3
Reds								
CO86218-2	FM	7	404	82.6	3.1	1.076	1.9	0.0
DT6063-1R	FM	6	462	86.6	2.9	1.082	3.1	0.3
CO89097-2	FM	5	499	82.4	2.9	1.081	2.4	0.2
Sangre	FM	11	423	83.9	2.6	1.074	0.7	0.1

[1]FM=fresh market; Fry=french fry; FM/Fry indicates a dual purpose clone.

[2]Vine maturity: 1=very early; 2=early; 3=medium; 4=late; 5=very late.

[3]Includes defects such as misshapen, second growth, growth crack, and green.

[4]Based on tubers greater than 10 ounces.

APPENDIX 1. Cultural information for the Potato Breeding and Selection Program's trials at the San Luis Valley Research Center - 1999.

LOCATION: San Luis Valley Research Center

SOIL TYPE: Sandy Loam

DATE:

Planted - 5/19/99
Hilled - 6/9/99
Vines Killed - 9/1/99 (sulfuric acid - 28 gal/A)
Harvested - 9/23/99

PLOT INFORMATION:

Size of Plots - 1 row x 25'
Spacing Between Hills - 12"
Spacing Between Rows - 34"
Hills Per Plot - 25
Number of Reps - 4 (2 for Intermediate Yield Trial)

METHOD OF HARVEST:

Machine (Grimme 1-row)

FERTILIZER:

130 lbs N + 100 lbs P_2O_5/A (spring applied during row-out)

IRRIGATION:

Center Pivot -14.0" gross application (application frequency and amount based on ET)
Rainfall - 6.0"

INSECTICIDES APPLIED:

7/30/99 - Thiodan 3 EC (1.0 lb a.i./A)
8/13/99 - Thiodan 3 EC (1.0 lb a.i./A)

FUNGICIDES APPLIED:

6/30/99 - Manex (0.8 a.i./A)
7/09/99 - Bravo Ultrex (0.8 lbs a.i./A)
7/19/99 - Quadris (0.1 lbs a.i./A)
7/30/99 - Bravo Ultrex (0.8 lbs a.i./A)
8/07/99 - Quadris (0.1 lb a.i./A)
8/13/99 - Super Tin 80WP (2.6 oz a.i./A) + Curzate 60DF (2.0 oz a.i./A)
8/23/99 - Dithane DF (1.5 a.i./A)
8/31/99 - Champ 2 (0.6 lbs a.i./A) + Quadris (0.1 lbs a.i./A)

HERBICIDES APPLIED:

6/11/99 - Dual II Magnum (1.3 lbs a.i./A) + Sencor DF (0.9 lbs a.i./A)

APPENDIX 2. General procedures used for postharvest evaluations.

Blackspot. Ten randomly selected tubers for each clone tested are bruised on the stem and bud ends with a 150 g weight dropped from a height of 60 cm. Tubers are stored at 40F prior to bruising. After bruising, tubers are stored at room temperature for two or three days prior to evaluation. Blackspot susceptibility is evaluated by cutting the tubers in half longitudinally and rating the extent of damage. Blackspot is rated on a 1 to 5 scale, with 5 indicating no discoloration.

Storage Weight Loss and Dormancy. Ten randomly selected tubers are weighed and stored at 45F for approximately a three month period under low relative humidity conditions to evaluate storage weight loss potential. These tubers are also observed weekly for sprout growth. Dormancy is reported as days after harvest to first visible sprout growth.

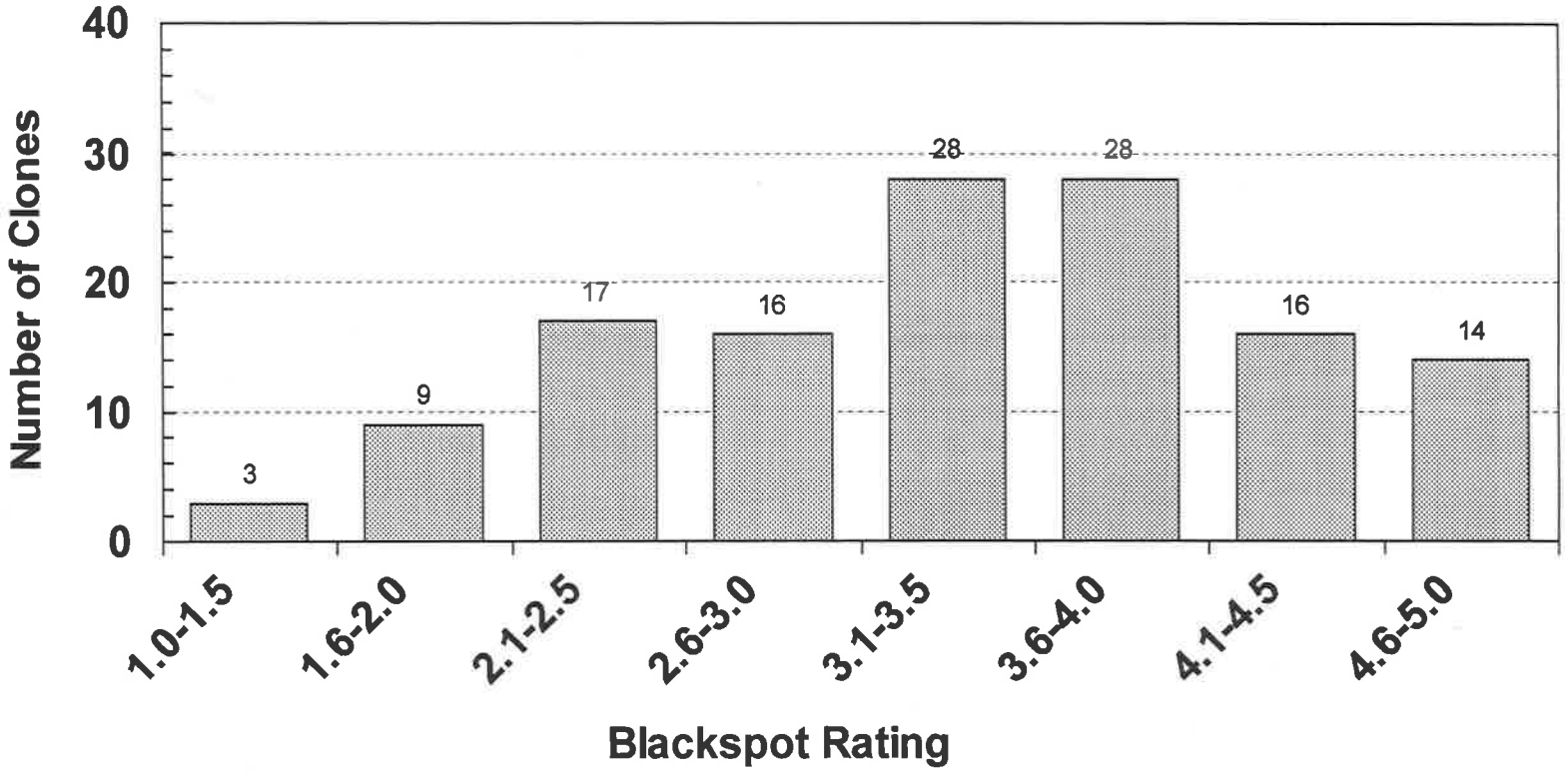
Enzymatic Browning. Five tubers of each clone are cut in half lengthwise and rated for degree of darkening 60 minutes later. Degree of darkening is rated on a 1 to 5 scale, with 5 indicating no discoloration.

Specific Gravity. Specific gravity is determined using the air/water method.

Fry Color and Texture. Fry color and texture is determined at or shortly after harvest and after a minimum of eight weeks of storage at 45F. Fries are cooked for 3 ½ minutes at 375F. Fry color is rated on a 0-4 scale using the USDA color standards. Color ratings $\leq$2 are acceptable. Fry texture is rated on a 1 to 5 scale, with 5 indicating that the cooked flesh was dry and mealy, with 1 representing a soggy, wet texture.

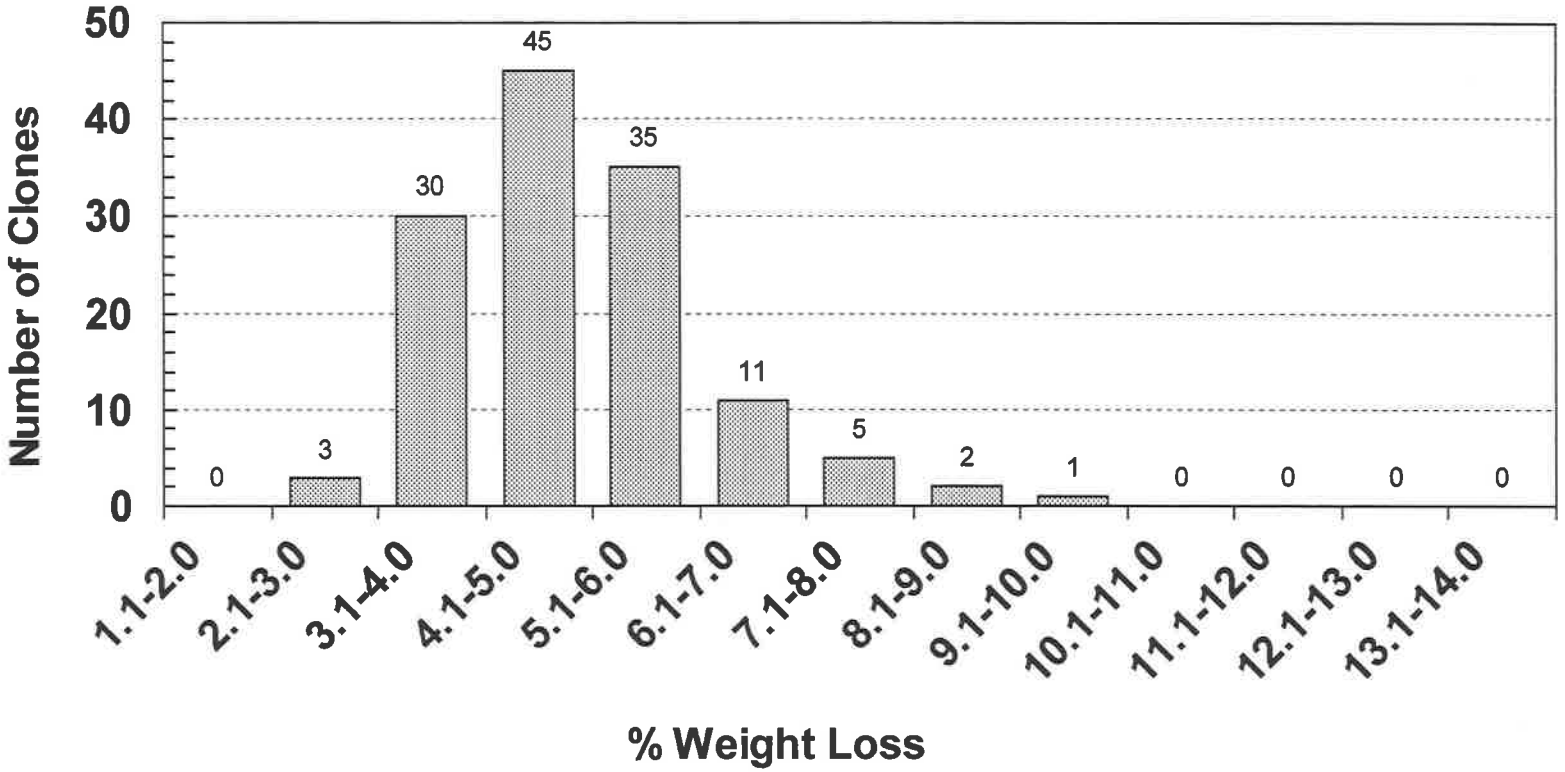
Chip Color. Chip color is determined after an interval of storage at 40 and 50F and after reconditioning for three weeks at 60F. Chips are cooked at 365F until bubbling slows. Chip color is rated using the Snack Food Association 1-5 scale. Ratings $\leq$2.0 are acceptable.

Appendix 3. Blackspot Distribution (131 Clones) - 1999

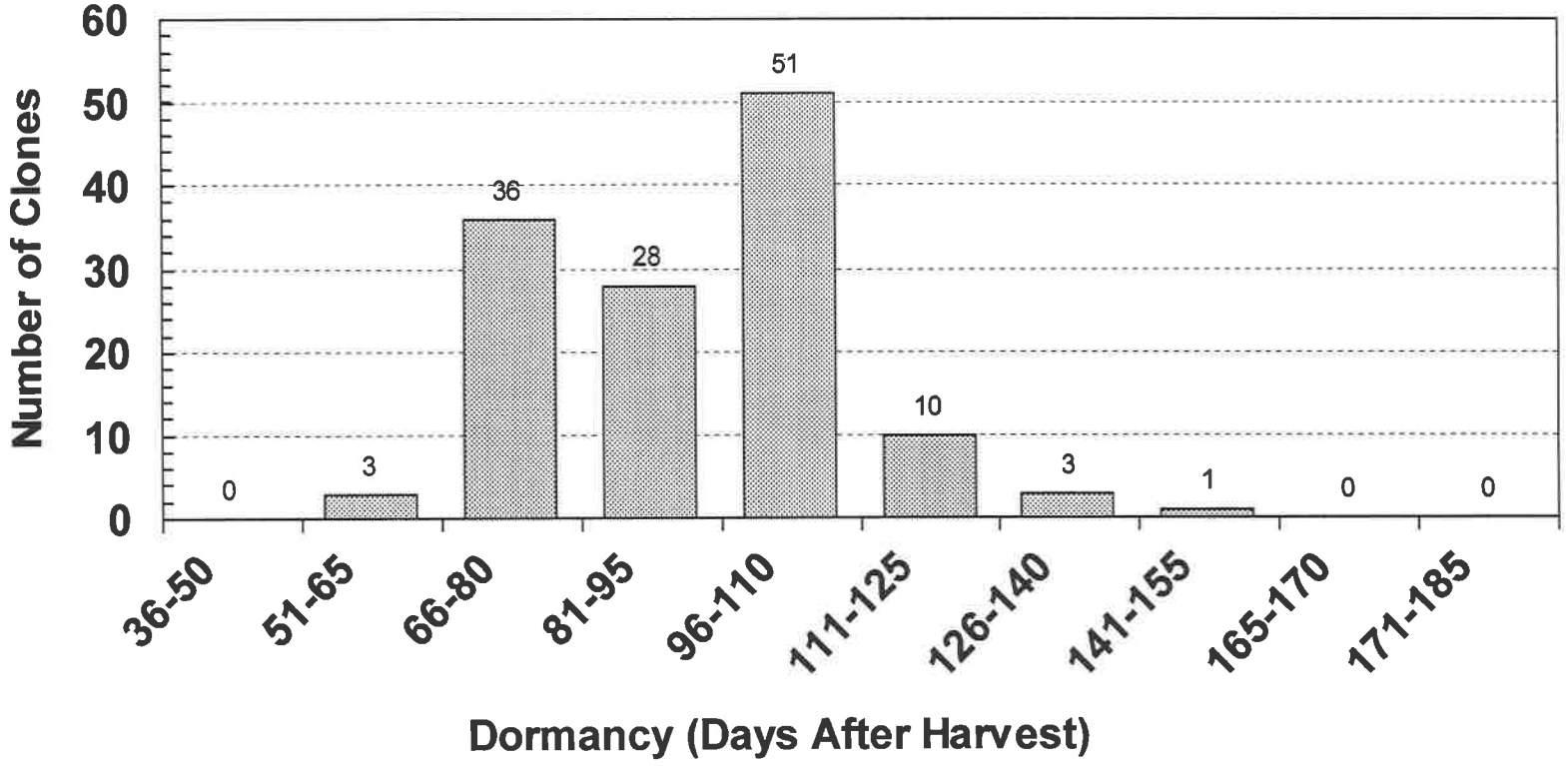


5=No Discoloration

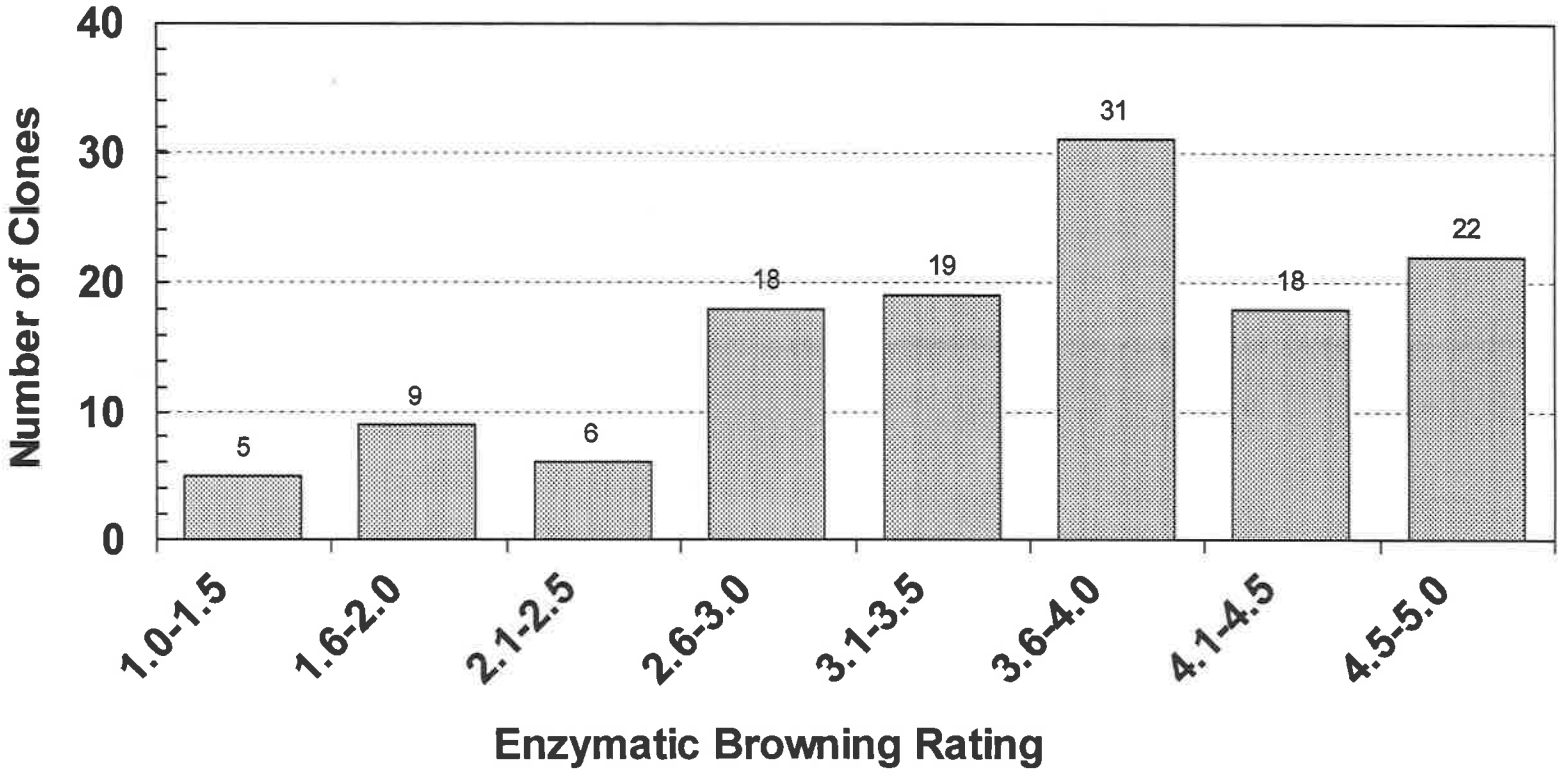
Appendix 4. % Weight Loss Distribution (132 Clones) - 1999



Appendix 5. Dormancy Distribution (132 Clones) - 1999

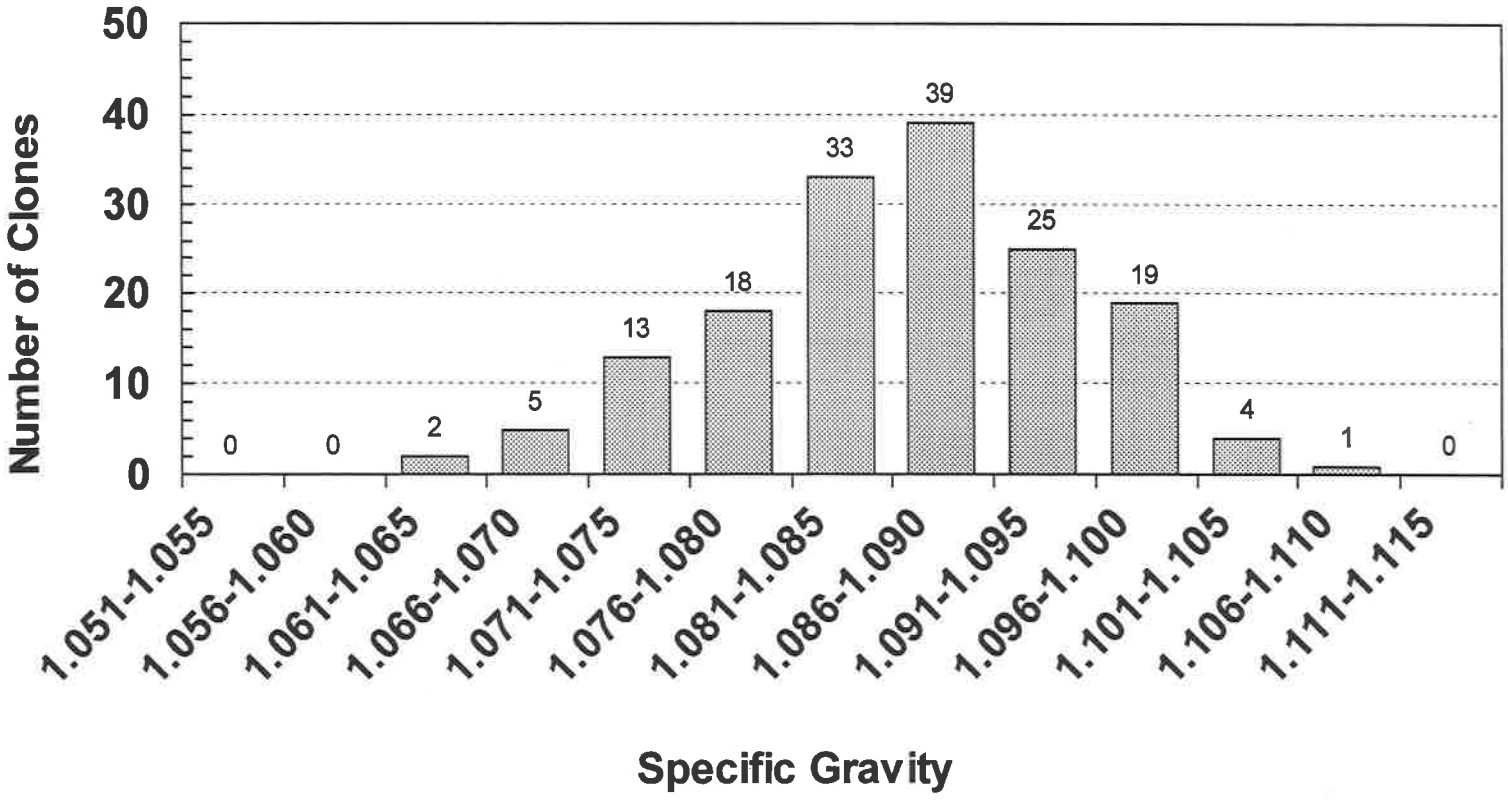


Appendix 6. Enzymatic Browning Distribution (128 Clones) - 1999

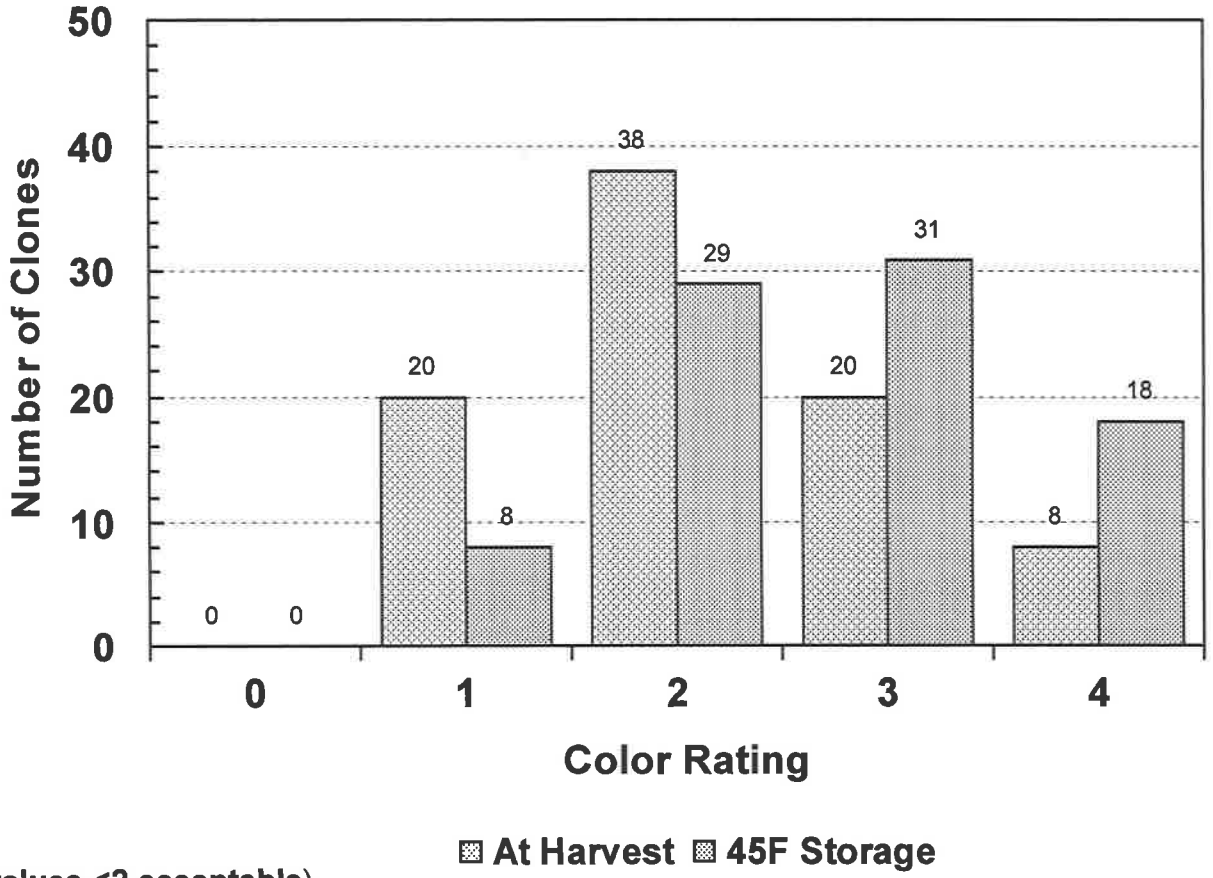


5=No Discoloration

Appendix 7. Specific Gravity Distribution (159 Clones) - 1999

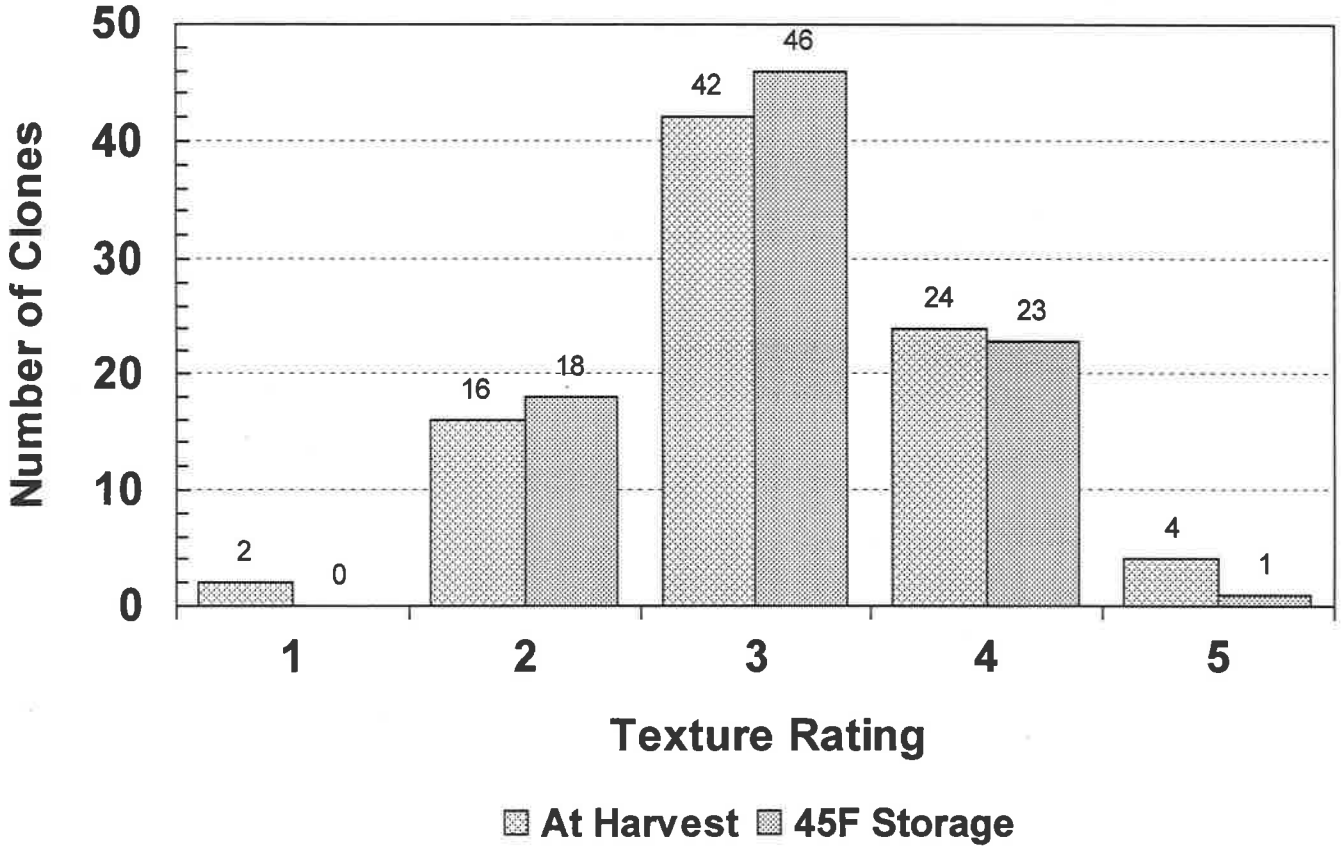


Appendix 8. Fry Color Distribution (86 Clones) - 1999



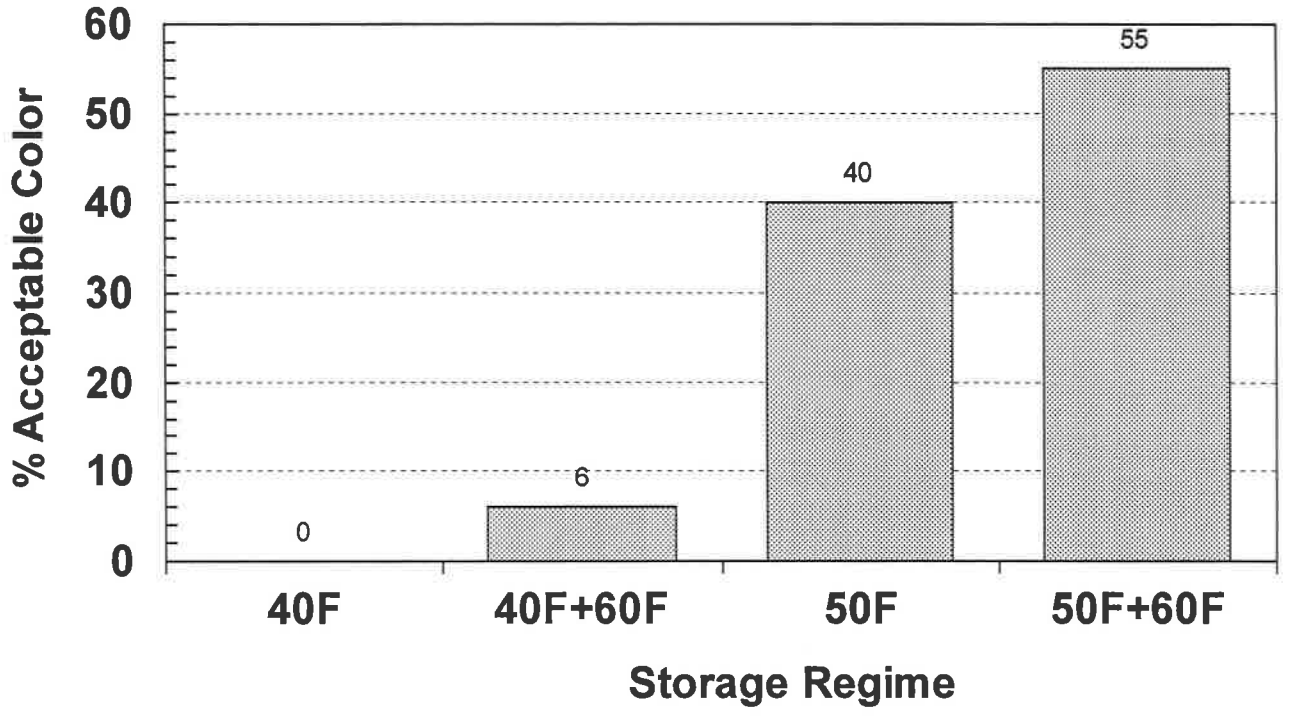
0=Lightest (values ≤2 acceptable)

Appendix 9. Fry Texture Distribution (88 Clones) - 1999



5=Dry Texture

Appendix 10. % Acceptable Chip Color (67 Clones) - 1999



Values ≤2 acceptable (SFA 1-5 Scale)