Research Progress Report for 2000

Potato Breeding and Selection

Submitted to the

San Luis Valley Research Center Committee

and the

Colorado Potato Administrative Committee (Area II)

by

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San Luis Valley Research Center



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Preface

We are pleased to provide this copy of the "Potato Breeding and Selection Research Progress Report for 2000."

The Colorado Potato Breeding and Selection Program emphasizes the development of russet cultivars. The balance of the breeding effort, based on priority, is devoted to developing reds, chippers, and specialty cultivars. This broad approach is important for two primary reasons. First, it recognizes the diverse markets accessed by potato growers throughout Colorado. Secondly, it allows us to utilize diverse germplasm resources in the improvement of russet cultivars, particularly for disease resistance and other internal quality characteristics.

This was the first year that PVP funds became available to the Colorado Potato Breeding and Selection Program. These funds, coupled with continued funding from the *Colorado potato industry*, the *Colorado Agricultural Experiment Station*, and the *Cooperative State Research, Education, and Extension Service*, have allowed us to significantly expand and strengthen our Program and other related CSU potato research efforts. The PVP funding has allowed us to increase our breeding efforts for PVY immunity, resistance to late blight, and tuber resistance to dry rot and soft rot. New emphasis will be placed on identifying and incorporating breeding material demonstrating resistance to powdery scab. These pieces of the funding pie are all significant in enhancing our research efforts in developing new potato cultivars for Colorado.

Various research collaborations were strengthened and formed in 2000. Cooperative efforts with Dr. Susie Thompson and Dr. Robert Davidson in conducting cultural management trials and disease evaluations are ongoing and will be developed further as progenies requiring a disease screening move through our Program. Dr. Jorge Vivanco joined the CSU faculty in the Department of Horticulture and Landscape Architecture in 2000. Interactions with his program will allow us to explore molecular aspects of breeding for late blight resistance and other important potato diseases. We are currently in the process of identifying a graduate student to work with us on developing methodologies to rapidly screen crosses for late blight resistance. Other collaborations with Dr. Vivanco, the University of California, and Texas A&M with allow us to expand on our current efforts related to important "consumer" characteristics, such as health benefits associated with potato consumption.

We continue to expand our collaborations with the Southwest Regional Potato Group which involves Colorado, Texas, and California. Other "partners" throughout the United States are supportive in providing breeding material and opportunities to screen our germplasm under various growing conditions and disease pressures not usually available in Colorado.

We invite any readers of this report, to give us your ideas. Please stop by and visit us. You may also call or email us.

Sincerely,

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Colorado potato industry - Area II and III
Colorado State University - Colorado Agricultural Experiment Station
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San Luis Valley Research Center Committee

Jon Brownell	Greg Colbert	Terry Hillin
Art Holland	Mike Mitchell	Mark Peterson
Fran Strnad		

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Dyann Middleton	Eva Price	Ron Price
Stan Price	Tom Sanderson	Susie Thompson
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Tiffanie Morgan	Tim Snyder	Kyler Willet
David Yust		

We also sincerely appreciate the support of numerous growers and other research cooperators who have conducted advanced testing, seed increase, commercial evaluations, or provided breeding material and opportunities to screen our germplasm under various growing conditions and disease pressures not available in Colorado.

Research Progress Report for 2000

Potato Breeding and Selection

Submitted by

David G. Holm and Fernanda G. Popiel

San Luis Valley Research Center

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. The balance of the breeding effort, based on priority, is devoted to developing reds, chippers, and specialty cultivars. The development of "low input" cultivars, primarily for reduced nitrogen and fungicide input has always been emphasized.

A major emphasis is being placed on developing Colorado cultivars that are resistant to late blight (foliar and tuber). Other areas of increased emphasis are: 1) developing cultivars immune to PVY; 2) developing cultivars with tuber resistance to dry rot (*Fusarium* and early blight) and bacterial soft rot; 3) identifying and incorporating breeding material demonstrating resistance to powdery scab; and 4) 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.

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.

CULTIVAR TRENDS/STATISTICS

Table 2 and Figure 1 present statistics on the primary cultivars grown in the San Luis Valley during 1983-2000. 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 1997-2000. 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 since the occurrence of late blight in 1998.

The top five cultivars grown in the San Luis Valley in 2000 based on acreage planted were Russet Norkotah, Russet Nugget, Centennial Russet, Yukon Gold, and Cherry Red (DT6063-1R). This is the first time that Sangre was not the primary red cultivar.

Cultivars released by CSU or in cooperation with other agencies accounted for 36% of the potato acreage planted in the San Luis Valley. Russet Nugget accounted for 21% of the acreage making it second in area planted in the San Luis Valley and the fifth most popular russet cultivar in the United States. Russet Norkotah Selections 3 and 8 accounted for 68% 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

Germplasm Accession and Introgression. Five years ago, clones derived from somatic hybrids of *Solanum tuberosum* x *Solanum bulbocastanum* were obtained from John Helgeson (USDA-ARS). *Solanum bulbocastanum* is a species of potato related to the commercially cultivated potato (*Solanum tuberosum*) grown in the United States. These hybrids have high levels of

resistance to late blight and/or early blight. In 1999, additional germplasm with resistance to late blight was identified and acquired from breeding programs around the United States. These materials have been incorporated into the breeding program.

Other germplasm has been acquired with multiple virus resistance to PVX, PVY, and leafroll from the USDA-ARS in Idaho. Several additional field selections exhibiting field immunity to PVY were obtained from Oregon State University in 2000. These materials have also been incorporated into the breeding program.

Crossing. Ninety-seven parental clones were intercrossed in 2000 in two separate crossing blocks. The emphasis of the first crossing block was late blight resistance and the second emphasized cultivar development and virus resistance. Seed from 417 combinations were obtained. Approximately 36,000 seedling tubers representing 159 families were produced from 1999 and 2000 crosses for initial field selection in 2001. Approximately 21,200 seedlings, representing 72 families, are currently being grown in the greenhouse and will be harvest soon. Most of these families represent the first 2000 crossing block. Second through fourth size tubers will be distributed to Idaho, Minnesota, Oregon, Texas, and Alberta, Canada.

Additional seedlings tubers were obtained from Dr. Richard G. Novy, 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 75,000 first-year seedlings were grown in 2000 with 834 being selected for subsequent planting, evaluation, and increase in future years. Another 1,104 clones were in 12-hill, preliminary, and intermediate stages of selection. Of these, 283 were saved for further observation. Twenty-eight advanced selections were saved at harvest and will be increased pending final evaluations. Another 202 selections were maintained for germplasm development, breeding, other experimental purposed, or seed increases for other programs.

Field trials conducted in 2000 included: Preliminary Trial, Intermediate Yield Trial, Advanced Yield Trial, Southwestern Regional Trial, Western Regional Main Trial, San Luis Valley Chipping Study, Western Regional Chip Trial, Western Regional Red/Specialty Trial, and Yellow Flesh Trial. 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 2000. Appendix 2 lists the procedures used for the postharvest evaluations for the trials. 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.

Colorado advanced selections evaluated in Southwestern Regional Trials, Western Regional Trials, or by growers in 2000 included ten russets (AC83064-1, AC83064-6, AC87079-3, AC87084-3, AC87138-4, AC89536-5, AC90636-3, AC91014-2, AC91365-1, CO85026-4), four reds (CO86218-2, CO89097-2, NDC5281-2, DT6063-1R), and four chippers (AC87340-2, AC89653-3, BC0894-2, CO92059-8). Comparative data for these selections and standard cultivars is presented in Table 3.

Figure 3 includes photographs of advanced selections and recently named cultivars produced by growers in 2000. Included is AC91014-2, a selection that will be released for initial grower evaluation in 2001.

Selections that were discarded from further testing include AC90636-3, AC91365-1, and CO92059-8. Final status of AC87084-3 and AC89653-3 is pending further evaluations.

Release notices for the cultivars *Keystone Russet* (AC83064-1), *Silverton Russet* (AC83064-6) were completed in 2000 (copies attached as Appendices 11 and 12 respectively). Release notices are in preparation for *Cherry Red* (DT6063-1R), *Fremont Russet* (CO85026-4), and *Durango Red* (CO86218-2). BC0894-2, a chipper with international export potential, will be recommended for release and naming in 2001.

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

Year	Comments
1	Select parents for 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 Selections 1 (P1). Third cycle of field selection (48 plant tuber-unit seed increase). Initial evaluations for chipping qualities (chip color after various storage regimes and specific gravity) are conducted this year and subsequently.
6	Preliminary Selections 2 (P2). Fourth cycle of field selection (96 plant tuber-unit seed increase). 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 Selections. Fifth cycle of field selection. Initial data collected on yield, grade, and growth characteristics. Plant a 144 plant tuber-unit seed increase and a 2 rep x 25 plants intermediate yield trial (IYT).
8-9, 14+	Advanced Selections: Includes selections that have advanced from the IYT. Additionally selections are included that have graduated from the Southwest Regional and Western Regional Trials. The advanced yield trials for reds, specialty types, and chippers are planted with entries in the Western Regional Red/Specialty and Chip Trials. Selections are in the 6th-7th and 12+ cycles of field selection. All advanced yield trials (AYT) have 4 reps x 25 plants. Sixth- and seventh- year field selections respectively have a 400/1,600 plant tuber-unit seed increase. 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	All 8th year selections have a 1/2 acre tuber-unit seed increase planted. These selections are entered in the Southwestern Regional Trials (4 locations - CO, TX, CA). Cultural management trials and postharvest disease reaction evaluations continue as needed.
11-13	All 9th year or older selections generally have a 1 acre or greater seed increase. These selections are entered in the Western Regional Trials (3 trials): main trial (russets and long whites), red/specialty trial, and chipping 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 to evaluate advanced selections for adaptability and marketability.
14+	Release as a named cultivar.

Table 2. Colorado fall potatoes: Production of primary potato cultivars, 1983-2000[1].

Cultivar	%/Acreage	Year																	
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
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	9.9
	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	7,484
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	49.3
	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	37,271
Russet Nugget	%	—	—	—	—	—	—	—	—	9.6	10.1	13.7	23.1	27.0	34.0	38.8	35.1	29.0	21.4
	Acreage	—	—	—	—	—	—	—	—	6,528	6,666	9,933	17,094	20,790	26,520	29,876	26,606	22,388	16,178
Ranger Russet	%	—	—	—	—	—	—	—	—	—	—	—	2.8	2.8	0.7	—	—	1.2	—
	Acreage	—	—	—	—	—	—	—	—	—	—	—	2,072	2,156	546	—	—	926	—
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	1.8
	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	1,361
Cherry Red	%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.3
	Acreage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,739
Yukon Gold	%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.4	1.4	3.7
	Acreage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,577	1,081	2,797
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	75,600

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

Figure 1. Primary SLV Potato Cultivars Planted 1983–2000

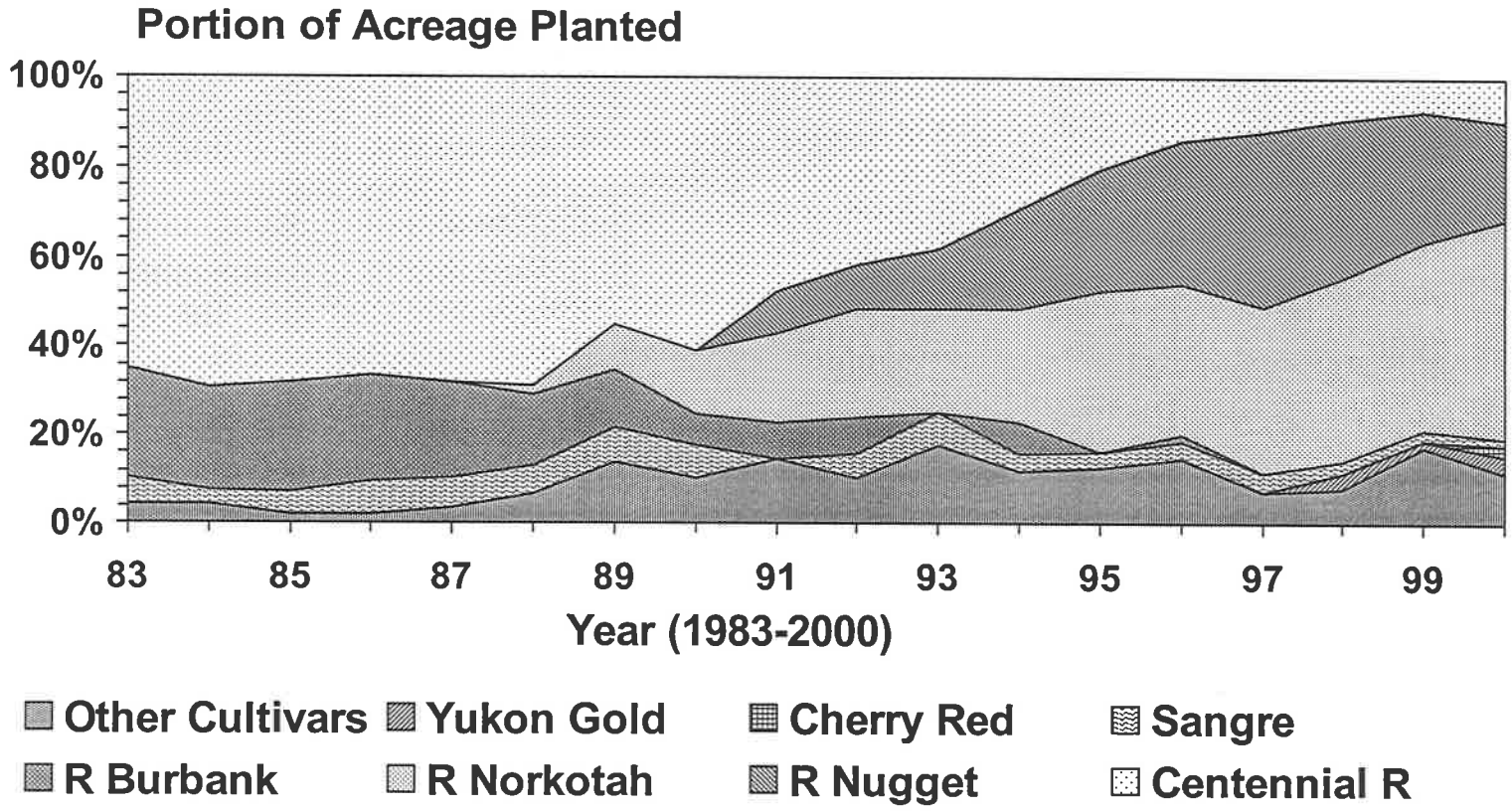


Figure 2. Primary SLV Potato Cultivars 1997-2000 Comparison

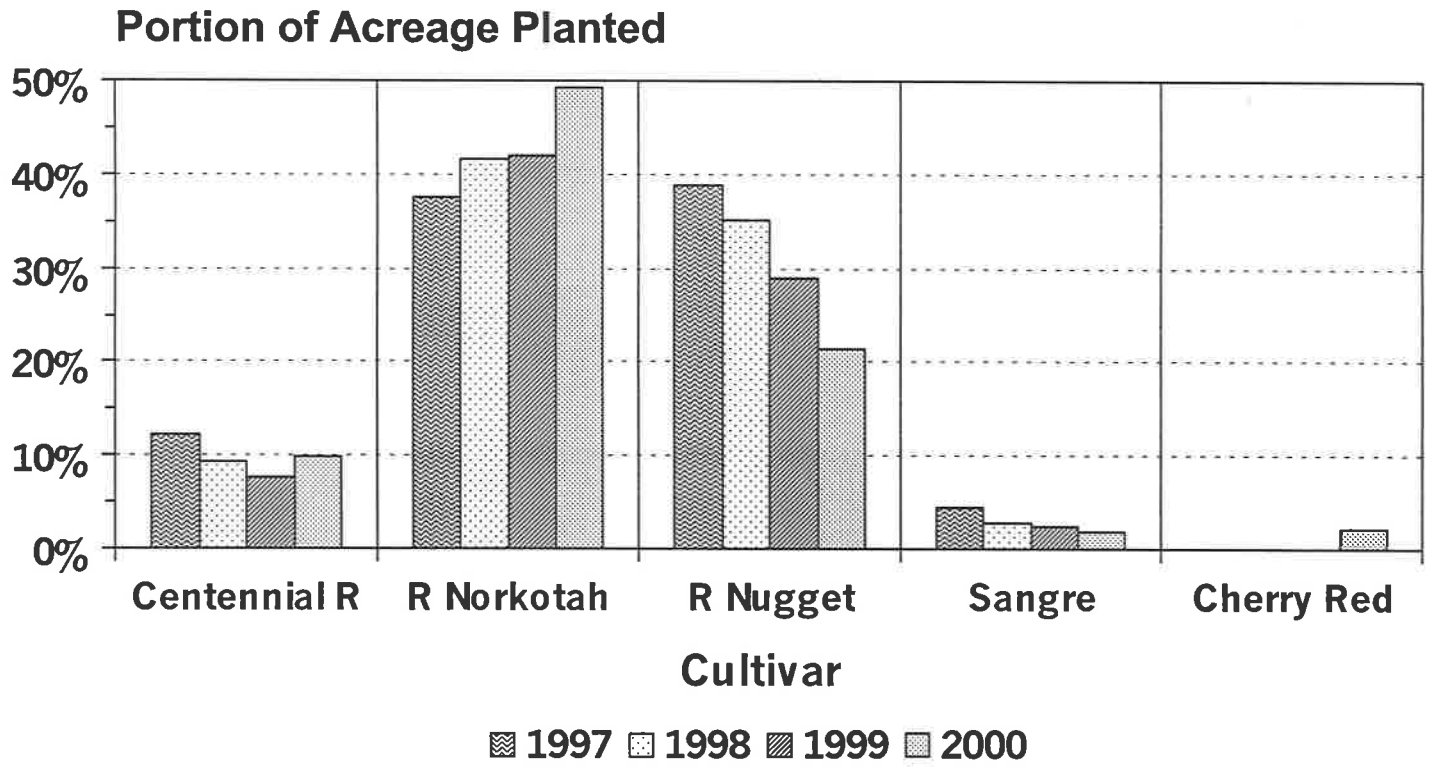


Table 3A. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Preliminary Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC95405-2	3.3	3.8	3.6	2.9	106	4.6
CO95007-1	4.2	4.9	4.6	3.1	78	2.4
CO95007-8	2.2	2.3	2.3	3.0	85	2.4
CO95077-3	3.7	3.2	3.5	5.9	99	2.0
CO95086-8	4.5	4.5	4.5	3.1	92	4.2
CO95172-3	5.0	4.7	4.9	3.5	85	3.2
VC0967-2	3.9	2.6	3.3	3.0	105	3.8
VC0967-5	4.3	4.2	4.3	2.5	133	4.0
VC1009-1	4.3	4.2	4.3	2.8	99	4.8
VC1015-1	1.7	1.4	1.6	2.0	106	4.6
VC1015-5	3.6	3.9	3.8	2.5	120	4.4
VC1015-7	4.1	4.7	4.4	2.8	92	4.8
VC1075-1	2.9	4.1	3.5	3.5	73	3.8
Centennial Russet	5.0	4.7	4.9	4.6	83	4.2
Ranger Russet	3.7	2.8	3.3	2.8	90	3.0
Russet Burbank	3.9	1.8	2.9	3.4	146	1.2
Russet Norkotah	4.7	4.6	4.7	3.3	114	4.0
Russet Nugget	4.6	4.9	4.8	3.5	102	3.6
Sangre-S10	4.4	4.4	4.4	2.4	104	2.8
Shepody	4.8	4.9	4.9	3.3	118	4.2
Yukon Gold	2.9	2.9	2.9	2.3	118	4.6

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

[2]Tubers were stored at 45F for 91 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 - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	6 wks 50F+ 8 wks 45F	At Harvest	6 wks 50F+ 8 wks 45F
AC95405-2	1.083	3	4	3	3
CO95007-1	1.087	2	2	3	3
CO95007-8	1.093	2	3	3	3
CO95077-3	1.085	3	3	2	2
CO95086-8	1.086	2	2	2	3
CO95172-3	1.075	4	4	1	1
CO96488-1	1.075	2	3	2	2
CO96528-1	1.084	2	2	3	3
CO96528-3	1.099	1	1	3	3
VC0967-2	1.075	1	2	3	3
VC0967-5	1.075	2	2	3	3
VC1009-1	1.078	2	3	3	3
VC1015-1	1.070	4	4	2	2
VC1015-5	1.075	2	2	1	1
VC1015-7	1.073	3	3	1	2
VC1075-1	1.078	2	2	2	2
Centennial Russet	1.079	3	4	2	2
Ranger Russet	1.074	2	2	2	3
Russet Burbank	1.078	2	2	3	3
Russet Norkotah	1.075	2	3	2	2
Russet Nugget	1.082	2	2	4	4
Sangre-S10	1.062	4	4	2	2
Shepody	1.077	2	3	3	4
Yukon Gold	1.086	1	2	2	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 - 2000.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	<4 oz	Tuber Shape & Skin Type[1]
CO94024-4	541	460	85.1	153	66	Ob,Ru
CO94024-16	385	317	82.0	101	57	Ob,Ru
CO94035-15	398	345	86.5	124	46	Ob,Ru
CO94055-8	233	202	86.8	100	13	Ob,Ru
CO94084-12	428	387	90.4	214	28	Ob,Ru
CO94222-6	284	176	61.6	2	108	Ov,Ru/Y
Russet Norkotah	435	356	81.6	108	68	Ob,Ru
Russet Nugget	355	260	73.2	64	85	Ob,Ru
Mean	382	313	80.9	108	59	-----
LSD[2] (0.05)	75	101	12.0	NS	39	-----

[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 - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
CO94024-4	2.7	GC,GR*	5.1
CO94024-16	2.7	MS,GC,GR*	1.8
CO94035-15	1.9	MS*,GC,GR	2.2
CO94055-8	7.4	GC*,GR	0.0
CO94084-12	3.1	MS,GC*,GR*	1.1
CO94222-6	0.0		0.0
Russet Norkotah	2.5	MS*,GR	0.8
Russet Nugget	2.9	MS,SG*	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 - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
CO94024-4	98	3.5	3.5	2.9	4.0	3.0	4.0
CO94024-16	96	3.0	4.0	2.6	3.0	3.0	2.0
CO94035-15	94	3.0	4.0	2.2	3.0	3.0	3.0
CO94055-8	88	2.5	2.0	1.4	2.5	3.0	3.0
CO94084-12	96	3.0	3.0	2.1	3.0	3.0	2.5
CO94222-6	98	3.5	3.5	3.2	3.0	3.0	2.5
Russet Norkotah	96	3.5	4.0	4.7	3.0	2.0	2.5
Russet Nugget	100	3.5	3.0	2.1	4.0	3.5	3.5
Mean	96	3.2	3.4	2.6	3.2	2.9	2.9
LSD[6] (0.05)	NS	NS	0.8	1.6	0.6	0.6	1.2

[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 - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
CO94024-4	4.1	4.3	4.2	3.9	112	3.2
CO94024-16	2.6	2.9	2.8	4.1	58	2.6
CO94035-15	3.7	2.7	3.2	4.0	91	4.6
CO94055-8	3.2	3.9	3.6	2.7	126	4.8
CO94084-12	3.3	2.8	3.1	2.8	77	4.2
CO94222-6	3.6	2.4	3.0	4.8	51	2.8
Russet Norkotah	4.8	4.8	4.8	4.3	105	2.2
Russet Nugget	4.5	4.5	4.5	3.0	91	4.6

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

[2]Tubers were stored at 45F for 91 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 - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	6 wks 50F+ 8 wks 45F	At Harvest	6 wks 50F+ 8 wks 45F
CO94024-4	1.084	2	2	3	3
CO94024-16	1.078	2	2	3	3
CO94035-15	1.077	2	2	2	3
CO94055-8	1.065	1	2	1	2
CO94084-12	1.074	1	2	3	3
CO94222-6	1.094	2	2	2	3
Russet Norkotah	1.078	2	2	3	2
Russet Nugget	1.090	3	2	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 - 2000.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
AC83064-1	460	412	89.4	123	44	Ob,Ru
AC83064-6	367	304	82.8	55	58	Ob,Ru
AC87084-3	515	480	93.2	236	26	Ob,Ru
AC92009-4	336	290	86.4	66	42	Ob,Ru
AC93026-9	400	302	75.6	79	85	Ob,Ru
AC93047-1	314	235	74.7	37	65	Ob,Ru
CO85026-4	398	357	89.6	119	30	Ob,Ru
CO92027-2	331	269	81.0	34	60	Ob,Ru
CO92077-2	354	271	76.6	63	75	Ob,Ru
CO93001-11	393	331	84.2	59	54	Ob,Ru
CO93016-3	387	288	74.1	62	96	Ob,Ru
CO93024-2	460	383	83.2	138	35	Ob,Ru
NDC5372-1	388	292	75.0	60	79	Ob,Ru
TC1675-1	409	330	80.4	99	68	Ob,Ru
Russet Norkotah	405	315	77.8	64	83	Ob,Ru
Russet Nugget	397	281	70.9	58	107	Ob,Ru
Mean	395	321	80.9	85	63	-----
LSD[2] (0.05)	48	55	6.6	38	24	-----

[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 - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC83064-1	0.9	MS*,GC*,GR*	0.0
AC83064-6	1.4	GC*,GR	0.0
AC87084-3	1.7	MS,GR*	1.9
AC92009-4	1.0	GR*	0.0
AC93026-9	3.2	MS,GC,GR*	0.0
AC93047-1	4.5	MS,GC*	1.1
CO85026-4	2.8	MS,GC,GR*	0.0
CO92027-2	0.4	GR*	0.4
CO92077-2	2.3	MS*,GC,GR*	0.3
CO93001-11	2.0	MS,GC*	0.0
CO93016-3	0.8	MS*	3.0
CO93024-2	9.3	MS,GC*,GR	1.1
NDC5372-1	4.6	MS,GC,GR*	0.0
TC1675-1	2.7	MS*,GC,GR	0.0
Russet Norkotah	1.7	MS*,GC,GR	0.0
Russet Nugget	2.2	MS*,SG,GC	0.3

[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 - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC83064-1	100	2.8	3.3	3.4	3.3	3.0	3.0
AC83064-6	99	3.5	3.5	2.4	3.3	3.0	2.5
AC87084-3	96	3.3	3.8	2.7	4.0	3.8	3.3
AC92009-4	99	2.5	2.0	1.4	3.0	3.8	3.5
AC93026-9	96	2.8	3.0	2.2	3.5	3.3	3.3
AC93047-1	96	3.8	3.5	2.3	2.5	2.0	1.5
CO85026-4	96	3.5	2.5	1.8	3.0	3.0	3.3
CO92027-2	98	2.5	2.8	2.3	2.5	2.8	3.0
CO92077-2	90	3.0	2.8	1.7	2.5	3.0	3.0
CO93001-11	97	3.8	3.5	2.8	3.0	2.8	2.0
CO93016-3	96	3.8	3.8	3.5	3.0	2.5	3.0
CO93024-2	99	4.3	3.8	2.6	3.5	2.8	2.0
NDC5372-1	96	3.0	2.5	2.4	3.0	3.0	3.0
TC1675-1	95	3.3	3.3	2.5	3.0	3.0	3.3
Russet Norkotah	98	3.3	3.8	4.8	3.0	2.0	2.0
Russet Nugget	99	3.5	3.5	2.2	4.0	4.0	3.8
Mean	97	3.3	3.2	2.5	3.1	3.0	2.8
LSD[6] (0.05)	NS	0.8	0.7	0.5	0.5	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 5D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Advanced Yield Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC83064-1	5.0	5.0	5.0	3.2	63	5.0
AC83064-6	4.0	3.9	4.0	4.1	63	3.6
AC87084-3	1.8	2.5	2.2	4.5	77	1.2
AC92009-4	5.0	4.9	5.0	4.0	133	4.0
AC93026-9	2.8	2.6	2.7	3.9	112	3.6
AC93047-1	2.7	2.7	2.7	4.7	112	2.8
CO85026-4	2.8	1.8	2.3	2.9	84	4.4
CO92027-2	3.7	4.2	4.0	4.2	70	4.6
CO92077-2	4.6	3.7	4.2	3.4	70	2.8
CO93001-11	3.3	3.7	3.5	5.1	51	3.2
CO93016-3	3.7	2.6	3.2	4.4	58	1.2
CO93024-2	1.9	1.9	1.9	4.1	58	1.0
NDC5372-1	5.0	2.8	3.9	4.0	91	2.6
TC1675-1	4.2	2.8	3.5	2.4	105	2.8
Russet Norkotah	4.8	3.9	4.4	3.8	98	3.0
Russet Nugget	4.6	4.8	4.7	3.0	98	3.8

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

[2]Tubers were stored at 45F for 91 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 - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
AC83064-1	1.084	2	4	3	3
AC83064-6	1.083	1	2	2	2
AC87084-3	1.092	2	2	3	3
AC92009-4	1.089	2	3	3	3
AC93026-9	1.084	3	4	3	3
AC93047-1	1.096	2	2	2	3
CO85026-4	1.092	3	4	2	2
CO92027-2	1.087	2	2	4	4
CO92077-2	1.075	2	2	3	2
CO93001-11	1.077	1	1	3	3
CO93016-3	1.090	1	1	4	4
CO93024-2	1.089	2	2	3	3
NDC5372-1	1.081	1	2	2	2
TC1675-1	1.091	1	1	4	4
Russet Norkotah	1.079	2	2	2	3
Russet Nugget	1.091	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 6A. Yield, grade, tuber shape, and skin type for Southwest Regional Trial clones - 2000.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
AC90636-3	394	373	94.6	154	19	Ob,Ru
AC91014-2	406	356	87.8	77	47	Ob,Ru
AC91365-1	475	409	86.1	181	44	Ob,Ru
ATX9202-1	420	300	71.4	59	87	Ob,Ru
ATX9204-4	520	442	84.7	191	38	Ob,Ru
ATX92230-1	423	370	87.2	150	24	Ob,Ru
ATX9312-1	398	263	66.1	50	107	Ob,Ru
BTX1544-2	450	381	84.8	123	39	R,W/Y
BTX1750-1	303	229	75.6	4	73	Ov,W/Y
CO92059-8	391	250	63.8	12	136	R,W
NDC5281-2	321	197	61.2	0	123	R,R
TX1574-1	400	348	86.8	73	47	Ob,W/Y
TX1673-2	407	328	80.6	70	72	R,W
Atlantic	462	399	86.4	118	45	R,W
Chipeta	497	421	84.4	213	29	R,W
Red LaSoda	605	490	81.1	306	25	R,R
Russet Norkotah	451	391	86.7	120	55	L,Ru
Russet Nugget	433	343	79.2	111	84	Ob,Ru
Sangre-S10	481	405	84.3	157	49	R,R
Yukon Gold	418	364	87.1	159	41	Ov,W/Y
Mean	433	353	81.0	116	59	----
LSD[2] (0.05)	51	51	5.4	50	18	-----

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

[2]LSD=least significant difference.

Table 6B. Grade defects for Southwest Regional Trial clones - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC90636-3	0.5	MS*,GR*	0.0
AC91014-2	0.6	MS*	0.8
AC91365-1	4.6	MS,GC,GR*	19.8
ATX9202-1	7.9	MS*,GC*,GR	0.0
ATX9204-4	7.6	MS,SG,GC,GR*	0.7
ATX92230-1	7.0	MS,SG,GC*,GR	2.6
ATX9312-1	6.9	MS,SG,GC*,GR	0.3
BTX1544-2	6.6	MS,GC*,GR	6.5
BTX1750-1	0.3	GR*	0.0
CO92059-8	1.3	MS,GC,GR*	0.0
NDC5281-2	0.3	GR*	0.0
TX1574-1	1.2	MS*,GR*	0.0
TX1673-2	1.6	MS,GR*	1.1
Atlantic	3.9	MS,GC*,GR	2.2
Chipeta	9.5	MS,SG,GC*,GR*	2.4
Red LaSoda	14.9	MS,SG,GC*,GR	43.4
Russet Norkotah	1.0	MS*,GR*	0.0
Russet Nugget	1.3	MS*,GC*,GR*	0.4
Sangre-S10	5.7	MS,SG,GC,GR*	8.2
Yukon Gold	3.1	MS,SG,GR*	1.4

[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 Regional Trial clones - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC90636-3	98	3.3	3.0	1.8	3.0	3.0	3.3
AC91014-2	97	3.5	3.0	3.0	3.0	3.0	3.0
AC91365-1	98	3.3	3.3	2.3	4.0	3.0	4.0
ATX9202-1	97	2.8	3.0	1.2	3.5	3.3	4.0
ATX9204-4	98	3.0	3.0	1.4	4.0	3.8	4.0
ATX92230-1	97	3.5	3.5	1.9	3.8	3.0	3.3
ATX9312-1	98	3.5	3.0	1.6	3.8	3.5	3.3
BTX1544-2	97	3.5	4.0	1.4	3.3	2.5	3.0
BTX1750-1	98	3.8	3.0	3.1	2.0	2.3	1.3
CO92059-8	95	3.5	4.0	2.4	3.0	2.3	3.0
NDC5281-2	96	3.3	3.0	2.9	3.0	3.0	2.0
TX1574-1	96	3.8	3.8	2.2	3.0	3.0	2.8
TX1673-2	96	3.3	3.0	2.3	3.0	3.0	3.0
Atlantic	96	3.8	4.0	2.5	3.0	3.0	3.0
Chipeta	98	3.5	4.0	2.5	4.0	3.5	3.3
Red LaSoda	97	3.3	4.0	2.0	4.0	3.0	3.0
Russet Norkotah	98	3.8	4.0	4.0	2.8	2.3	2.0
Russet Nugget	97	3.3	3.3	2.5	4.0	3.3	4.0
Sangre-S10	92	3.0	3.0	1.9	3.8	3.0	4.0
Yukon Gold	94	3.3	4.0	1.7	3.0	2.3	2.0
Mean	97	3.4	3.4	2.2	3.3	2.9	3.1
LSD[6] (0.05)	NS	NS	0.3	0.5	0.4	0.5	NS

[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 Regional Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC90636-3	4.3	3.6	4.0	4.2	105	4.8
AC91014-2	2.7	3.8	3.3	3.8	91	4.2
AC91365-1	4.5	3.7	4.1	5.2	77	3.0
ATX9202-1	4.6	3.6	4.1	3.4	112	4.6
ATX9204-4	4.5	4.6	4.6	3.6	98	5.0
ATX92230-1	4.2	3.4	3.8	6.2	91	4.8
ATX9312-1	2.5	2.0	2.3	3.1	105	1.4
BTX1544-2	2.0	2.2	2.1	3.2	77	2.4
BTX1750-1	3.3	2.4	2.9	4.9	58	1.2
CO92059-8	3.2	2.1	2.7	4.6	70	4.6
NDC5281-2	2.7	2.9	2.8	6.1	84	1.0
TX1574-1	2.6	3.1	2.9	4.1	77	4.6
TX1673-2	3.9	3.9	3.9	4.5	77	4.0
Atlantic	2.2	1.7	2.0	4.9	91	4.6
Chipeta	3.8	3.5	3.7	3.1	98	4.6
Red LaSoda	3.1	3.2	3.2	4.4	77	2.0
Russet Norkotah	2.9	3.5	3.2	3.9	105	2.4
Russet Nugget	4.8	4.4	4.6	3.0	105	4.4
Sangre-S10	2.9	4.0	3.5	3.1	91	3.4
Yukon Gold	2.0	3.2	2.6	3.0	91	4.4

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

[2]Tubers were stored at 45F for 91 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 Regional Trial clones - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
AC90636-3	1.081	3	4	3	3
AC91014-2	1.089	2	2	3	4
AC91365-1	1.091	3	3	3	3
ATX9202-1	1.090	3	3	3	3
ATX9204-4	1.080	4	4	2	2
ATX92230-1	1.088	3	3	3	3
ATX9312-1	1.085	4	4	2	2
BTX1544-2	1.084	1	2	3	3
BTX1750-1	1.076	1	1	3	3
NDC5281-2	1.086	2	2	3	3
TX1574-1	1.093	2	2	2	3
TX1673-2	1.082	2	2	1	1
Red LaSoda	1.080	3	3	2	3
Russet Norkotah	1.078	2	2	2	3
Russet Nugget	1.091	2	2	4	4
Sangre-S10	1.072	4	4	3	2
Yukon Gold	1.086	2	2	3	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 Regional Trial clones - 2000.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
CO92059-8	1.093	4.5	3.5	3.5	3.0
Atlantic	1.094	4.0	4.0	3.0	2.5
Chipeta	1.094	5.0	5.0	2.5	3.0

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

Table 7A. Yield, grade, tuber shape, and skin type for Western Regional Main Trial clones - 2000.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
AC87079-3	481	418	87.0	163	58	Ob,Ru
AC87138-4	446	383	86.0	144	51	L,Ru
AC89536-5	439	359	81.6	107	70	L,Ru
ATX9202-3	466	389	83.6	112	64	L,Ru
TXNS102	421	384	91.3	250	24	L,Ru
TXNS296	453	405	89.4	248	27	L,Ru
Ranger Russet	421	365	86.7	180	34	L,Ru
Russet Burbank	430	308	71.5	88	88	L,Ru
Russet Norkotah	409	332	81.0	102	59	L,Ru
Russet Nugget	376	281	74.6	85	88	Ob,Ru
Shepody	384	343	89.3	193	26	L,W
Mean	430	361	83.8	152	54	-----
LSD[2] (0.05)	NS	64	6.2	55	22	-----

[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 - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC87079-3	1.0	MS,GC*,GR	6.0
AC87138-4	2.5	MS,SG,GR*	1.9
AC89536-5	2.4	MS*,GC,GR*	0.8
ATX9202-3	2.7	MS*,GC*,GR*	0.0
TXNS102	3.1	MS,GR*	0.5
TXNS296	4.7	MS,GC,GR*	1.1
Ranger Russet	5.1	MS,SG,GC,GR*	1.0
Russet Burbank	8.0	MS,SG*,GC,GR	6.0
Russet Norkotah	4.4	MS*,GR*	0.5
Russet Nugget	2.1	MS,SG,GR*	0.5
Shepody	3.7	MS,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 7C. Growth characteristics of Western Regional Main Trial clones - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC87079-3	98	3.5	4.0	3.2	3.8	3.0	3.0
AC87138-4	95	3.3	3.5	3.2	3.5	3.0	3.5
AC89536-5	98	3.5	3.3	2.0	4.0	3.3	3.5
ATX9202-3	96	3.3	3.5	1.5	4.3	3.0	3.8
TXNS102	98	2.5	2.8	2.6	3.3	3.0	2.8
TXNS296	98	3.3	3.8	2.7	2.8	2.8	2.8
Ranger Russet	97	2.8	3.0	2.2	3.0	3.0	3.3
Russet Burbank	100	4.0	4.0	2.8	3.3	2.8	3.3
Russet Norkotah	96	3.8	4.0	4.7	2.3	2.5	2.3
Russet Nugget	97	3.3	3.3	2.2	4.0	3.8	3.8
Shepody	98	3.3	3.5	2.3	3.3	3.0	3.0
Mean	97	3.3	3.5	2.6	3.4	3.0	3.2
LSD[6] (0.05)	NS	0.7	0.6	0.6	0.6	0.5	0.7

[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 7D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Main Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC87079-3	3.4	3.2	3.3	4.5	77	3.6
AC87138-4	2.3	1.8	2.1	3.7	91	1.8
AC89536-5	4.5	4.5	4.5	4.8	77	4.2
ATX9202-3	3.5	2.7	3.1	3.3	98	4.0
TXNS102	4.8	4.9	4.9	3.5	105	3.8
TXNS296	4.6	4.3	4.5	3.6	105	3.2
Ranger Russet	4.1	2.7	3.4	3.7	70	3.6
Russet Burbank	2.9	1.7	2.3	2.8	126	3.0
Russet Norkotah	4.7	3.9	4.3	3.9	98	3.2
Russet Nugget	5.0	4.6	4.8	2.8	91	3.8
Shepody	4.9	4.8	4.9	3.6	91	4.6

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

[2]Tubers were stored at 45F for 91 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 - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
AC87079-3	1.097	2	2	4	3
AC87138-4	1.089	1	1	3	3
AC89536-5	1.084	3	4	2	3
ATX9202-3	1.084	3	3	4	3
TXNS102	1.079	2	2	3	3
TXNS296	1.079	2	2	3	3
Ranger Russet	1.077	3	4	4	4
Russet Burbank	1.084	2	2	3	3
Russet Norkotah	1.083	2	2	2	3
Russet Nugget	1.081	1	2	4	4
Shepody	1.092	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 8A. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for San Luis Valley chipping study clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC87340-2	3.1	3.9	3.5	3.3	72	3.2
AC89653-3	4.8	4.1	4.5	4.6	69	4.8
AC94283-1	5.0	4.3	4.7	3.9	106	3.0
AC94296-5	5.0	4.6	4.8	4.1	120	4.4
AC94324-1	4.7	4.1	4.4	3.4	99	4.4
ATX85404-8	4.8	4.3	4.6	5.0	74	4.6
BC0894-2	4.9	4.2	4.6	3.6	95	3.8
CO92059-8	2.7	2.3	2.5	4.3	64	4.6
CO94027-6	3.3	1.0	2.2	7.7	113	3.8
CO94032-3	3.2	2.8	3.0	5.9	99	4.8
CO94165-3	---	---	---	3.4	85	---
CO94183-1	1.8	1.6	1.7	5.4	105	---
CO95031-2	1.9	1.1	1.5	3.9	92	3.6
CO95051-7	4.9	3.4	4.2	5.9	99	4.0
CO95070-7	4.7	3.7	4.2	4.4	85	3.8
CO95117-8	3.2	2.4	2.8	3.3	134	4.8
NDC6084C-2	3.1	2.5	2.8	3.7	84	3.8
NDC6116-3	3.6	2.2	2.9	4.1	105	1.2
NDC6135-1	3.7	2.9	3.3	4.4	105	4.6
NY112	4.7	4.3	4.5	4.4	105	3.8
NY115	5.0	3.8	4.4	4.0	98	5.0
VC1002-3	4.7	4.8	4.8	4.1	105	4.8
W1313	3.6	2.7	3.2	4.4	105	4.8
W1355-1	1.2	1.0	1.1	3.3	98	2.2
Atlantic	2.7	2.2	2.5	3.7	104	4.6
Chipeta	3.6	3.4	3.5	2.7	107	4.4
Snowden	2.3	1.8	2.1	3.5	104	3.0

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

[2]Tubers were stored at 45F for 91 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 - 2000.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
AC87340-2	1.084	5.0	5.0	1.5	2.0
AC89653-3	1.090	5.0	4.0	1.5	2.0
AC94283-1	1.080	5.0	4.0	3.0	3.5
AC94296-5	1.085	5.0	4.0	2.5	3.5
AC94324-1	1.088	5.0	4.0	2.5	3.0
AC96817-1	1.093	5.0	4.5	3.0	3.5
AC96817-2	1.096	5.0	4.0	3.0	3.5
ATX85404-8	1.086	5.0	3.5	3.5	2.5
BC0894-2	1.076	4.5	3.5	2.0	2.0
CO92059-8	1.092	4.5	4.0	3.0	1.5
CO94027-6	1.093	4.0	3.5	2.5	2.0
CO94032-3	1.095	4.5	3.5	2.0	1.5
CO94165-3	1.079	---	---	---	---
CO94183-1	1.076	---	---	---	---
CO95031-2	1.096	4.0	4.0	2.5	2.0
CO95051-7	1.091	4.5	3.0	2.5	2.5
CO95070-7	1.088	4.0	4.0	2.0	2.0
CO95117-8	1.094	4.5	4.0	2.0	3.5
CO96076-6	1.083	5.0	5.0	3.0	4.0
CO96076-7	1.086	5.0	4.0	3.5	2.0
CO96076-14	1.082	5.0	4.0	2.0	1.5
CO96077-1	1.096	5.0	4.0	2.0	3.0
CO96083-1	1.069	5.0	4.5	2.0	3.5
CO96083-4	1.077	5.0	4.5	1.5	2.5
CO96083-7	1.079	5.0	4.0	2.5	2.0
CO96122-6	1.088	5.0	4.0	2.0	2.5
CO96124-1	1.086	5.0	3.5	2.0	3.0
CO96124-6	1.090	5.0	4.0	1.5	3.5
CO96124-7	1.086	5.0	4.0	2.0	3.0
CO96124-10	1.076	5.0	5.0	3.5	3.5
CO96124-14	1.098	4.5	4.0	2.0	2.0
CO96124-19	1.090	4.5	4.5	2.0	3.0
CO96124-25	1.093	5.0	4.5	2.0	2.0
CO96140-1	1.072	5.0	4.0	3.5	4.0
CO96141-1	1.079	5.0	5.0	3.5	3.0
CO96141-4	1.084	4.5	3.5	2.0	1.0
CO96142-3	1.073	4.5	3.5	4.0	1.5
CO96142-4	1.085	4.5	4.0	2.0	2.5

Table 8B continued on the next page.

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

Table 8B (cont'd). Chip color[1] after various storage regimes and specific gravity of San Luis Valley chipping study clones - 2000.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
CO96229-1	1.084	5.0	5.0	3.0	2.5
CO96231-4	1.086	5.0	4.5	2.0	2.5
CO96283-2	1.075	5.0	5.0	3.5	2.5
CO96293-4	1.098	4.0	3.5	4.5	1.5
CO96293-6	1.104	5.0	5.0	4.0	3.0
NDC6084C-2	1.089	3.5	4.5	2.5	1.5
NDC6116-3	1.080	4.0	4.0	3.5	2.0
NDC6135-1	1.077	3.0	3.5	4.0	3.0
NY112	1.072	5.0	4.5	3.5	3.0
NY115	1.087	4.0	4.0	3.5	3.0
VC1002-3	1.084	5.0	4.5	3.5	2.0
W1313	1.092	4.0	4.0	3.5	2.0
W1355-1	1.096	4.0	4.0	2.5	1.0
Atlantic	1.088	4.5	4.0	2.5	3.0
Chipeta	1.083	5.0	5.0	2.5	3.0
Snowden	1.088	4.5	3.0	2.0	2.0

[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 Chipping Trial clones - 2000.

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	481	413	85.8	120	61	R,W
AC89653-3	495	368	74.2	37	123	R,W
AF875-15	456	357	78.4	76	85	R,W
BC0894-2	346	283	81.7	59	56	Ov,W
CO94027-6	310	179	57.8	17	127	R,W
CO94032-3	339	230	67.9	19	107	R,W
ND2676-10	369	304	82.6	69	62	R,W
NDC6084C-2	399	327	81.8	92	65	R,W
NDC6116-3	449	373	82.9	70	71	R,W
NDC6135-1	369	218	59.0	16	147	R,W
NDTX4930-5	456	397	86.8	138	53	Ov,W
VC1002-1	306	156	51.5	5	150	R,W/Y
VC1002-3	436	217	50.0	10	219	R,W/Y
Atlantic	468	413	88.0	118	51	R,W
Chipeta	546	415	75.8	194	62	Ov,W
Mean	415	310	73.6	69	96	-----
LSD[2] (0.05)	58	60	7.8	47	29	----

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

[2]LSD=least significant difference.

Table 9B. Grade defects for Western Regional Chipping Trial clones - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC87340-2	1.4	MS,GR*	0.2
AC89653-3	0.6	GC*,GR*	0.3
AF875-15	3.2	MS*,GC,GR*	0.5
BC0894-2	1.9	GR*	0.0
CO94027-6	1.1	GC*,GR	1.0
CO94032-3	0.6	GC*	0.0
ND2676-10	0.7	GR*	5.5
NDC6084C-2	1.7	GR*	0.4
NDC6116-3	1.1	MS,GC,GR*	1.9
NDC6135-1	0.9	MS*,GC*,GR*	0.4
NDTX4930-5	1.3	GC*,GR*	3.7
VC1002-1	0.0		0.0
VC1002-3	0.0		0.0
Atlantic	0.7	GR*	1.8
Chipeta	12.5	MS,SG*,GC*,GR*	1.4

[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 Chipping Trial clones - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
AC87340-2	97	4.0	3.5	2.7	3.0	3.0	3.3
AC89653-3	97	4.0	4.0	3.7	3.8	3.0	3.0
AF875-15	95	3.5	4.0	3.8	3.5	3.0	2.0
BC0894-2	92	3.5	3.0	2.3	3.0	2.5	2.8
CO94027-6	94	3.0	3.3	3.3	2.8	2.3	1.8
CO94032-3	95	3.5	3.0	3.2	2.8	3.0	3.0
ND2676-10	97	3.0	3.8	2.6	2.8	2.5	2.3
NDC6084C-2	97	4.5	4.0	3.1	3.0	2.5	2.3
NDC6116-3	92	3.5	3.8	2.1	3.0	3.0	2.8
NDC6135-1	92	3.5	4.0	4.4	2.8	2.0	2.0
NDTX4930-5	97	3.8	4.0	2.5	3.0	3.0	2.0
VC1002-1	96	3.3	3.0	2.7	2.5	2.0	2.0
VC1002-3	97	3.3	4.0	3.3	4.0	3.3	3.0
Atlantic	98	4.3	4.0	2.4	3.3	3.0	3.0
Chipeta	98	3.5	4.0	2.5	4.0	3.0	3.0
Mean	96	3.6	3.7	3.0	3.1	2.7	2.5
LSD[6] (0.05)	NS	0.8	0.4	0.8	0.6	0.5	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 9D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Chipping Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
AC87340-2	2.7	3.6	3.2	3.5	77	4.0
AC89653-3	4.1	3.8	4.0	4.3	63	4.8
AF875-15	3.4	3.0	3.2	4.9	77	3.8
BC0894-2	4.8	3.8	4.3	3.4	91	2.8
CO94027-6	2.4	1.4	1.9	8.5	91	4.6
CO94032-3	3.0	2.5	2.8	6.1	77	4.4
ND2676-10	4.6	3.3	4.0	4.0	91	4.2
NDC6084C-2	3.8	2.0	2.9	5.5	77	2.4
NDC6116-3	2.7	2.8	2.8	6.1	84	2.2
NDC6135-1	3.8	2.3	3.1	7.2	77	4.2
NDTX4930-5	3.8	2.9	3.4	3.9	91	3.8
VC1002-1	2.8	3.0	2.9	4.2	112	5.0
VC1002-3	4.1	4.3	4.2	3.8	91	4.2
Atlantic	2.8	2.3	2.6	6.2	84	4.4
Chipeta	4.2	3.9	4.1	3.1	91	4.4

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

[2]Tubers were stored at 45F for 91 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 Chipping Trial clones - 2000.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
AC87340-2	1.083	5.0	5.0	2.5	2.5
AC89653-3	1.092	4.5	3.5	3.0	3.5
AF875-15	1.095	4.5	4.0	3.5	4.0
BC0894-2	1.078	4.0	3.5	2.0	3.0
CO94027-6	1.091	4.0	3.5	1.5	3.0
CO94032-3	1.090	3.5	3.0	2.5	3.0
ND2676-10	1.086	3.0	3.5	1.5	2.5
NDC6084C-2	1.090	4.0	3.5	1.5	4.0
NDC6116-3	1.080	4.5	3.5	2.0	4.0
NDC6135-1	1.079	4.0	3.5	1.5	4.0
NDTX4930-5	1.092	3.5	4.0	2.5	3.0
VC1002-1	1.068	5.0	5.0	3.0	2.5
VC1002-3	1.090	5.0	4.5	2.0	3.5
Atlantic	1.099	4.0	4.0	2.5	3.5
Chipeta	1.090	4.5	5.0	2.5	2.5

[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/Specialty Trial clones - 2000.

Clone	Yield (Cwt/A)					Tuber Shape & Skin Type[1]
		US #1				
	Total	Total	%	>10 oz	<4 oz	
CO86218-2	428	361	84.4	120	63	R,R
CO89097-2	458	391	85.1	124	50	Ov,R
CO93037-6	512	363	70.5	81	134	R,R
CO94019-1	391	325	83.1	82	65	Ov,R
CO94065-2	436	317	72.2	40	113	R,R
CO94165-3	472	342	72.3	56	122	Ov,P/P
CO94183-1	385	286	74.4	24	92	Ov,R/R
DT6063-1R	447	396	88.5	111	41	Ov,R
NDC6174-1	396	267	67.3	19	122	Ov,R
NDC6184-3	337	202	59.5	8	131	R,R
Norland-DR	419	378	90.1	139	34	R,R
Red LaSoda	493	438	88.7	252	30	Ov,R
Sangre-S10	485	427	88.2	190	52	R,R
TX1523-1	359	329	91.6	126	29	R,Ru/Y
VC0967-2	355	288	81.5	49	65	Ov,R/Y
VC0967-5	485	423	87.2	148	58	Ob,R/Y
Yukon Gold	361	322	89.3	116	33	Ov,W/Y
Mean	425	344	80.8	99	73	-----
LSD[2] (0.05)	66	70	6.7	44	22	-----

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

[2]LSD=least significant difference.

Table 10B. Grade defects for Western Regional Red/ /Specialty Trial clones - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
CO86218-2	1.0	MS*,GC*	1.9
CO89097-2	3.8	MS*,GC*,GR	0.8
CO93037-6	2.9	MS,GC*	0.3
CO94019-1	0.4	GC*	0.0
CO94065-2	1.3	MS*,GC	0.0
CO94165-3	1.6	MS*,GC	3.4
CO94183-1	1.7	MS,GC*	0.0
DT6063-1R	2.3	MS*,GC	0.9
NDC6174-1	1.7	MS*,GC	0.0
NDC6184-3	1.1	MS*,GC*	0.0
Norland-DR	1.9	MS*,GC*	0.0
Red LaSoda	5.0	MS,GC*	39.0
Sangre-S10	1.0	GC*,GR	4.1
TX1523-1	0.3	GC*	0.0
VC0967-2	0.6	MS*,GC*	0.0
VC0967-5	0.9	MS,GR*	0.0
Yukon Gold	1.7	MS,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 10C. Growth characteristics of Western Regional Red/Specialty Trial clones - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
CO86218-2	88	3.0	2.0	2.0	3.0	3.0	3.0
CO89097-2	95	3.3	3.0	2.3	3.0	3.0	3.0
CO93037-6	94	3.3	3.8	3.3	4.0	3.0	3.3
CO94019-1	89	2.5	2.0	2.2	3.0	3.8	3.5
CO94065-2	96	3.8	3.8	3.3	4.0	3.5	2.5
CO94165-3	99	4.0	4.0	3.6	3.0	2.5	2.0
CO94183-1	96	3.8	3.0	2.9	2.5	3.0	2.5
DT6063-1R	97	3.5	3.8	2.1	3.3	3.0	2.8
NDC6174-1	93	3.5	3.5	4.2	2.5	2.0	1.5
NDC6184-3	96	3.5	3.0	4.1	3.0	2.5	2.3
Norland-DR	98	3.8	3.8	2.7	2.3	2.0	1.3
Red LaSoda	95	3.5	3.8	2.3	3.8	3.0	3.0
Sangre-S10	96	3.5	3.0	2.2	4.0	3.3	3.3
TX1523-1	96	3.8	3.3	2.1	3.0	2.5	2.0
VC0967-2	90	3.5	3.5	2.8	2.8	2.3	2.3
VC0967-5	93	3.8	4.0	2.9	4.5	3.3	3.3
Yukon Gold	94	3.3	3.8	2.0	3.0	2.0	1.8
Mean	94	3.5	3.3	2.8	3.2	2.8	2.5
LSD[6] (0.05)	5	NS	0.6	0.5	0.5	0.5	0.6

[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/Specialty Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
CO86218-2	3.9	4.3	4.1	4.3	91	2.2
CO89097-2	3.5	2.7	3.1	4.7	70	3.4
CO93037-6	2.6	1.8	2.2	4.0	119	3.2
CO94019-1	2.2	2.1	2.2	4.0	105	1.8
CO94065-2	2.7	3.6	3.2	4.4	119	3.6
CO94165-3	---	---	---	3.5	77	---
CO94183-1	2.3	2.0	2.2	5.1	77	---
DT6063-1R	5.0	4.6	4.8	4.2	77	4.0
NDC6174-1	3.3	4.4	3.9	8.4	63	2.8
NDC6184-3	3.4	3.5	3.5	7.3	44	2.6
Norland-DR	1.7	3.6	2.7	7.4	51	3.0
Red LaSoda	3.3	1.9	2.6	3.4	70	2.0
Sangre-S10	3.2	3.8	3.5	3.1	91	2.6
TX1523-1	4.3	2.9	3.6	4.0	63	5.0
VC0967-2	3.7	4.2	4.0	4.2	77	4.2
VC0967-5	4.2	3.8	4.0	2.9	119	4.8
Yukon Gold	3.9	2.8	3.4	3.0	91	4.6

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

[2]Tubers were stored at 45F for 91 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/Specialty Trial clones - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
CO86218-2	1.079	3	3	4	3
CO89097-2	1.083	2	2	3	3
CO93037-6	1.083	3	4	2	2
CO94019-1	1.076	3	4	2	2
CO94065-2	1.081	3	4	3	3
CO94165-3	1.083	-	-	1	2
CO94183-1	1.084	-	-	1	2
DT6063-1R	1.084	3	3	3	3
NDC6174-1	1.073	3	3	2	2
NDC6184-3	1.090	2	2	3	2
Norland-DR	1.069	3	2	2	2
Red LaSoda	1.081	3	3	3	2
Sangre-S10	1.076	4	3	2	1
TX1523-1	1.083	1	1	3	3
VC0967-2	1.071	1	2	2	2
VC0967-5	1.077	2	2	2	3
Yukon Gold	1.086	2	2	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 11A. Yield, grade, tuber shape, and skin type for Yellow Flesh Trial clones - 2000.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	Tuber Shape & Skin Type[1]
Agria	569	505	88.6	209	39	Ob,W/Y
Albatross	555	406	72.9	97	144	Ov,W/Y
Carola	517	368	71.1	100	124	Ob,W/Y
Crispin	392	347	88.5	120	37	R,W/Y
Delikat	395	321	81.2	108	62	Ob,W/Y
Estima	438	382	87.0	107	53	Ov,W/Y
German Butterball	491	318	64.4	51	162	Ov,W/Y
Molli	438	358	81.9	141	64	Ov,W/Y
Valisa	436	396	90.8	147	36	Ov,W/Y
Yukon Gold	321	293	91.2	161	22	Ov,W/Y
Mean	455	369	81.8	124	74	-----
LSD[2] (0.05)	90	82	4.2	70	19	-----

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

[2]LSD=least significant difference.

Table 11B. Grade defects for Yellow Flesh Trial clones - 2000.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
Agria	4.4	MS,SG,GC*,GR*	2.5
Albatross	0.8	MS,GR*	0.0
Carola	4.9	MS*,GC,GR**	1.9
Crispin	2.0	GC*,GR	0.0
Delikat	3.0	MS,GR*	0.0
Estima	0.7	MS,GC,GR*	0.5
German Butterball	2.3	MS*,SG,GR*	0.0
Molli	3.5	MS,GC,GR*	0.0
Valisa	0.7	GC,GR*	0.0
Yukon Gold	1.7	MS*	0.6

[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 11C. Growth characteristics of Yellow Flesh Trial clones - 2000.

Clone	% Stand	Emergence Uniformity[1]	Vine Vigor[2]	Stems/ Plant	Vine Size[3]	Vine Type[4]	Vine Maturity[5]
Agria	99	3.8	4.0	3.1	4.0	3.0	3.0
Albatross	98	3.3	4.0	3.2	4.0	3.8	4.0
Carola	90	3.3	4.0	3.2	3.0	3.0	2.8
Crispin	86	3.0	3.0	2.2	3.0	3.0	3.3
Delikat	98	3.8	3.3	2.7	3.3	3.0	3.0
Estima	92	3.5	3.3	2.6	3.0	3.0	3.0
German Butterball	98	3.8	4.0	3.1	4.0	3.0	3.0
Molli	94	3.5	4.0	2.3	3.0	3.0	3.0
Valisa	91	3.5	3.5	3.0	2.5	2.8	3.0
Yukon Gold	94	3.5	3.5	1.6	3.0	2.3	1.8
Mean	94	3.5	3.7	2.7	3.3	3.0	3.0
LSD[6] (0.05)	7	NS	0.5	0.6	0.4	0.4	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 11D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Yellow Flesh Trial clones - 2000.

Clone	Blackspot Index[1]			% Weight Loss[2]	Dormancy (Days)[3]	Enzymatic Browning[4]
	Bud End	Stem End	Average			
Agria	4.1	5.0	4.6	3.2	112	5.0
Albatross	2.9	2.6	2.8	4.1	63	3.2
Carola	3.9	4.2	4.1	3.8	77	3.8
Crispin	3.2	3.5	3.4	3.4	84	4.4
Delikat	4.9	4.2	4.6	3.6	58	5.0
Estima	4.8	4.1	4.5	3.4	91	4.4
German Butterball	2.7	2.8	2.8	4.3	70	4.2
Molli	4.2	3.9	4.1	4.4	70	4.6
Valisa	3.7	3.7	3.7	4.4	63	3.4
Yukon Gold	3.7	3.1	3.4	2.5	91	4.4

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

[2]Tubers were stored at 45F for 91 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 11E. Specific gravity, french fry color, and texture for Yellow Flesh Trial clones - 2000.

Clone	Specific Gravity	Fry Color[1]		Fry Texture[2]	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
Agria	1.083	1	1	3	3
Albatross	1.109	1	1	3	3
Carola	1.079	3	3	2	3
Crispin	1.083	2	2	3	3
Delikat	1.087	2	2	2	1
Estima	1.078	3	3	3	3
German Butterball	1.083	2	3	2	3
Molli	1.074	2	3	2	3
Valisa	1.078	3	3	2	3
Yukon Gold	1.080	2	2	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 12. Summary comparison of advanced selections and named cultivars for yield, grade, maturity, specific gravity, and grade defects - 2000. Advanced selections to be released in 2001 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	13	465	88.8	3.1	1.079	1.5	0.0
AC83064-6	FM/Fry	13	391	85.4	3.0	1.080	1.5	0.3
CO85026-4	FM	11	375	89.1	3.6	1.085	3.5	0.0
AC87084-3	FM/Fry	8	509	89.2	3.4	1.093	2.8	0.3
AC87079-3	FM	6	434	81.9	2.8	1.092	1.6	2.2
AC87138-4	FM/Fry	6	483	78.1	3.3	1.088	3.7	0.7
AC89536-5	FM	5	504	82.8	3.2	1.084	3.1	0.2
AC91014-2	FM/Fry	4	407	77.6	3.0	1.091	2.6	1.5
Centennial Russet	FM	35	294	77.4	3.0	1.081	0.8	0.3
Russet Norkotah	FM	34	346	84.1	1.8	1.077	2.0	0.4
Russet Nugget	FM/Fry	35	409	80.5	3.8	1.093	1.7	0.2
Chippers								
BC0894-2	Chip	10	388	83.9	2.2	1.081	1.1	0.0
AC87340-2	Chip	6	475	79.2	3.3	1.084	1.0	0.3
AC89653-3	Chip	5	518	76.1	3.1	1.091	0.6	0.2
Atlantic	Chip	16	432	87.6	3.2	1.097	2.2	4.1
Chipeta	Chip	17	496	82.6	3.4	1.092	5.4	0.5
Reds								
CO86218-2	FM	10	414	82.3	3.0	1.076	1.6	0.2
DT6063-1R	FM	7	460	86.8	2.9	1.082	3.0	0.4
CO89097-2	FM	6	492	82.9	2.9	1.082	2.7	0.3
Sangre	FM	19	453	85.5	2.9	1.075	1.6	1.0

[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.

Figure 3. Photographs of advanced selections and recently named cultivars - 2000.

Russets

Figure 3. (Continued).

Russets (Continued)

Reds

Figure 3. (Continued).

Chippers

APPENDIX 1. Cultural information for the Potato Breeding and Selection Program trials at the San Luis Valley Research Center - 2000.

LOCATION: San Luis Valley Research Center

SOIL TYPE: Sandy Loam

DATE:

Planted - 5/17/00
Hilled - 6/1/00
Vines Killed - 8/31/00 (sulfuric acid - 28 gal/A)
Harvested - 9/27/00

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:

5/09/00 - 120 lbs N + 150 lbs P_2O_5 + 60 lbs K_2O/A (liquid applied in-row)
6/29/00 - 20 lbs N (fertigated)
7/13/00 - 20 lbs N (fertigated)

IRRIGATION:

Center Pivot -18.4" gross application (application frequency and amount based on ET)
Rainfall - 2.2"

INSECTICIDES APPLIED:

6/27/00 - Fulfill (5.5 oz a.i./A)
7/08/00 - Fulfill (5.5 oz a.i./A)
7/22/00 - Thiodan 3EC (1.0 lb a.i./A)
8/05/00 - Asana XL (0.7 oz a.i./A)
8/19/00 - Thiodan 3EC (1.0 lb a.i./A)

FUNGICIDES APPLIED:

6/27/00 - Dithane F-45 (1.2 lb a.i./A)
7/08/00 - Quadris (0.1 lb a.i./A)
7/22/00 - Bravo Ultrex (1.1 lb a.i./A)
7/28/00 - Super Tin 80WP (0.2 lb a.i./A)
8/05/00 - Bravo Weather Stick (0.9 lb a.i./A)
8/19/00 - Dithane F-45 (1.5 lb a.i./A)

HERBICIDES APPLIED:

6/02/00 - Dual Magnum (1.2 pint a.i./A) + Sencor DF (0.1 lb a.i./A)
7/10/00 - Poast (0.3 lb 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.

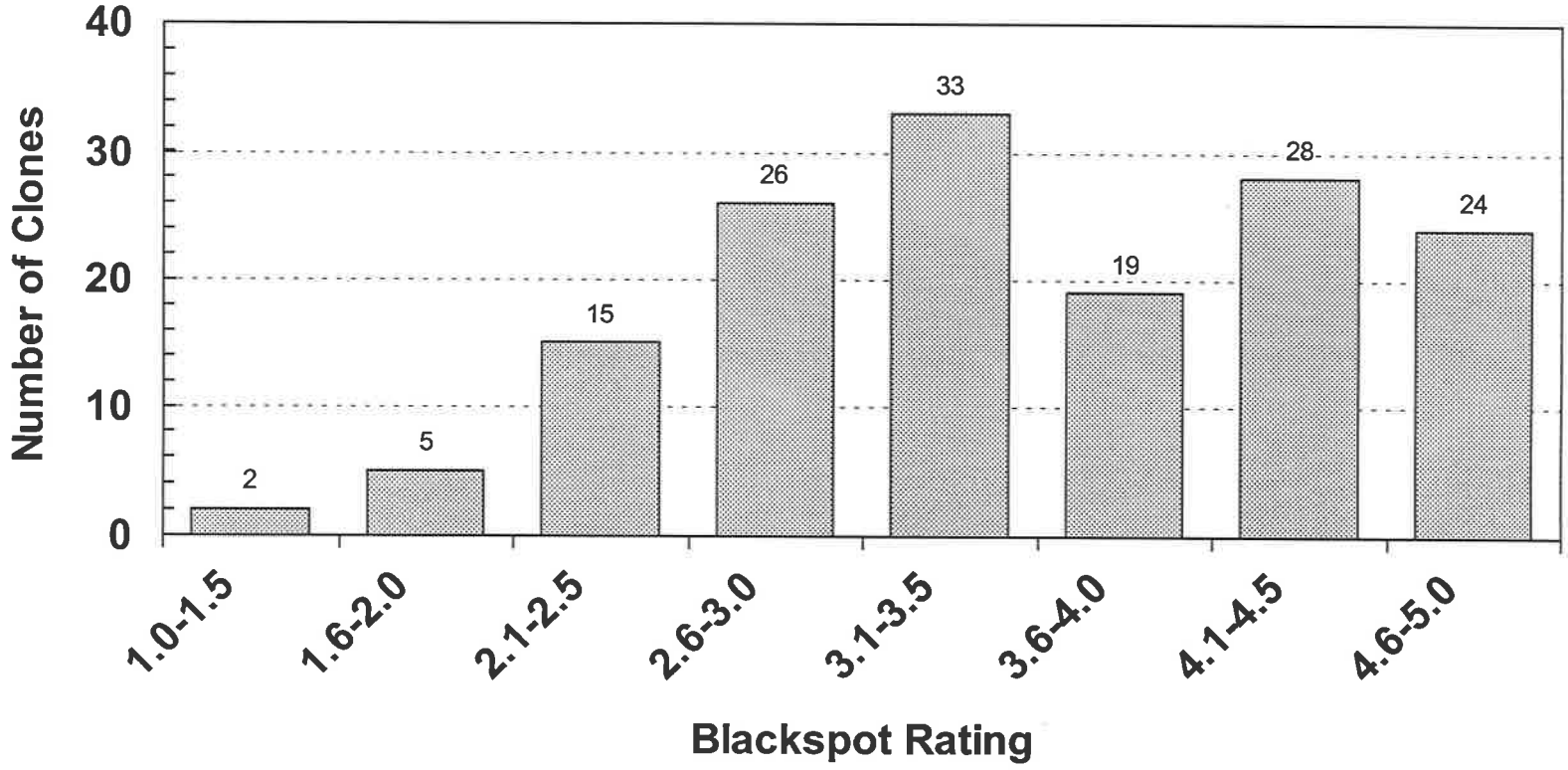
Enzymatic Browning. Five tubers of each clone are cut in half lengthwise and rated for degree of darkening 60 minutes later. Degree of darkening is rated on a 1 to 5 scale, with 5 indicating no discoloration.

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.

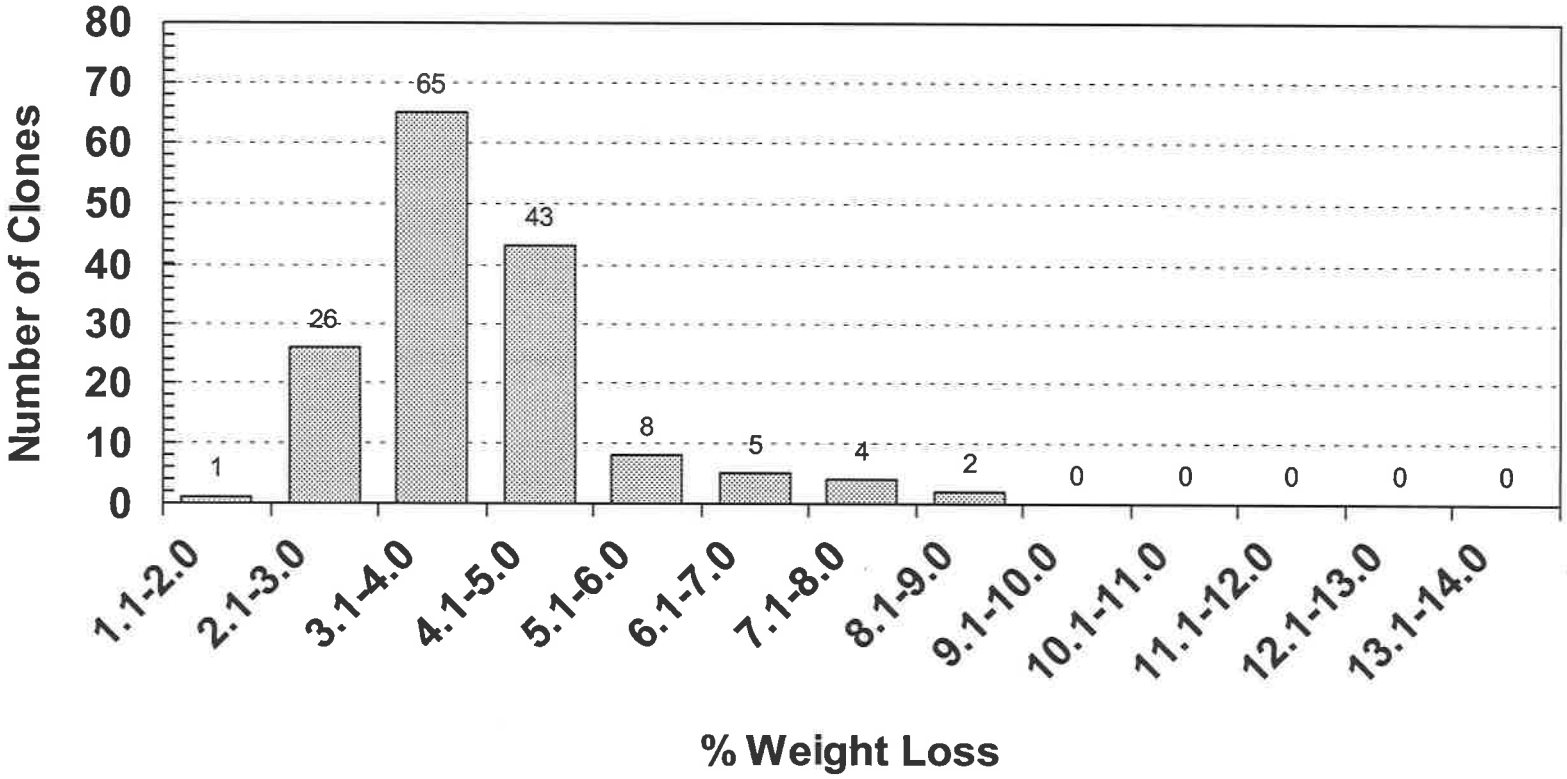
Chip Color. Chip color is determined after an interval of storage at 40 and 50F and after reconditioning for three weeks at 60F. Chips are cooked at 365F until bubbling slows. Chip color is rated using the Snack Food Association 1-5 scale. Ratings $\leq$2.0 are acceptable.

Appendix 3. Blackspot Distribution (152 Samples) - 2000

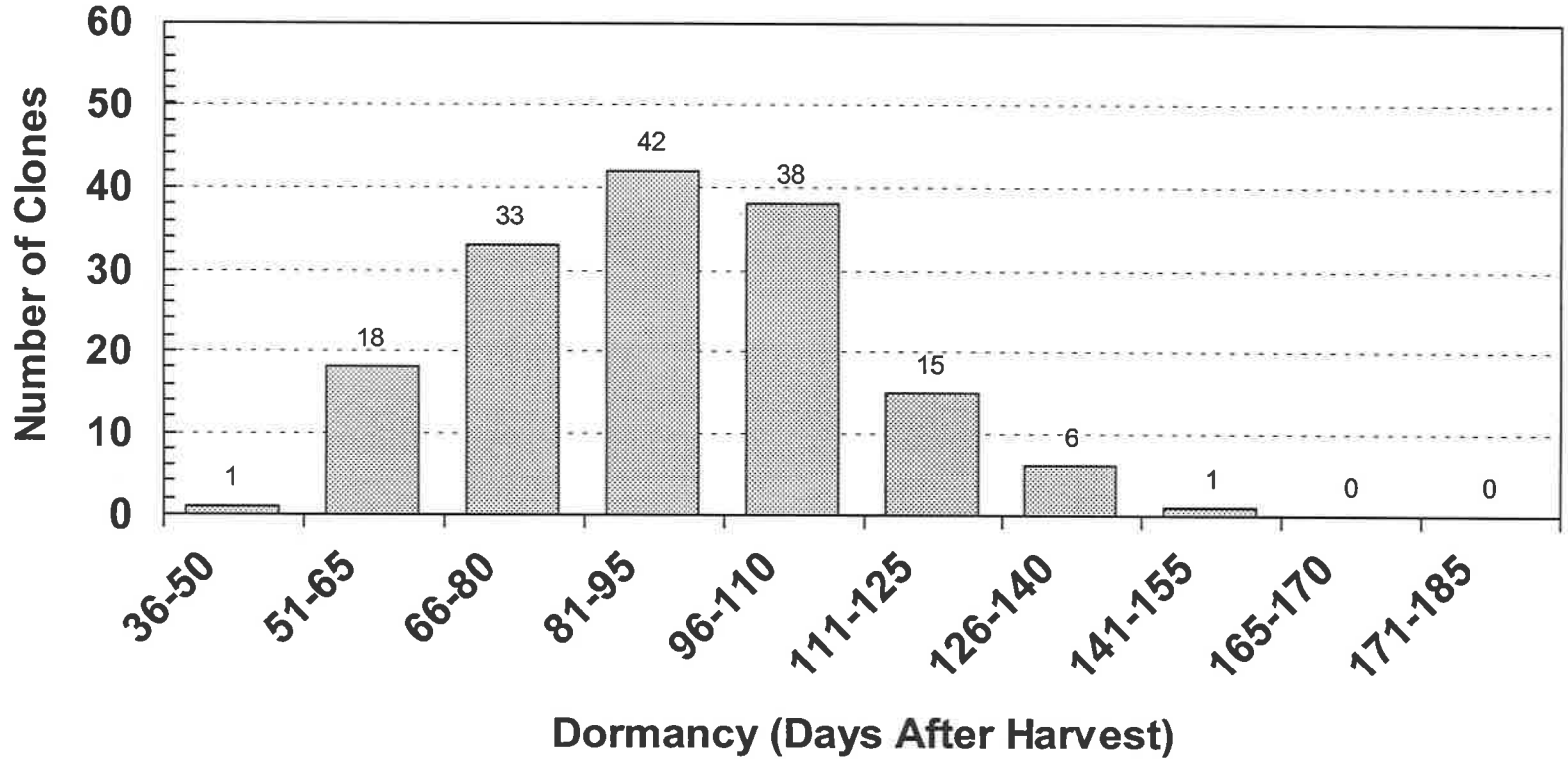


5=No Discoloration

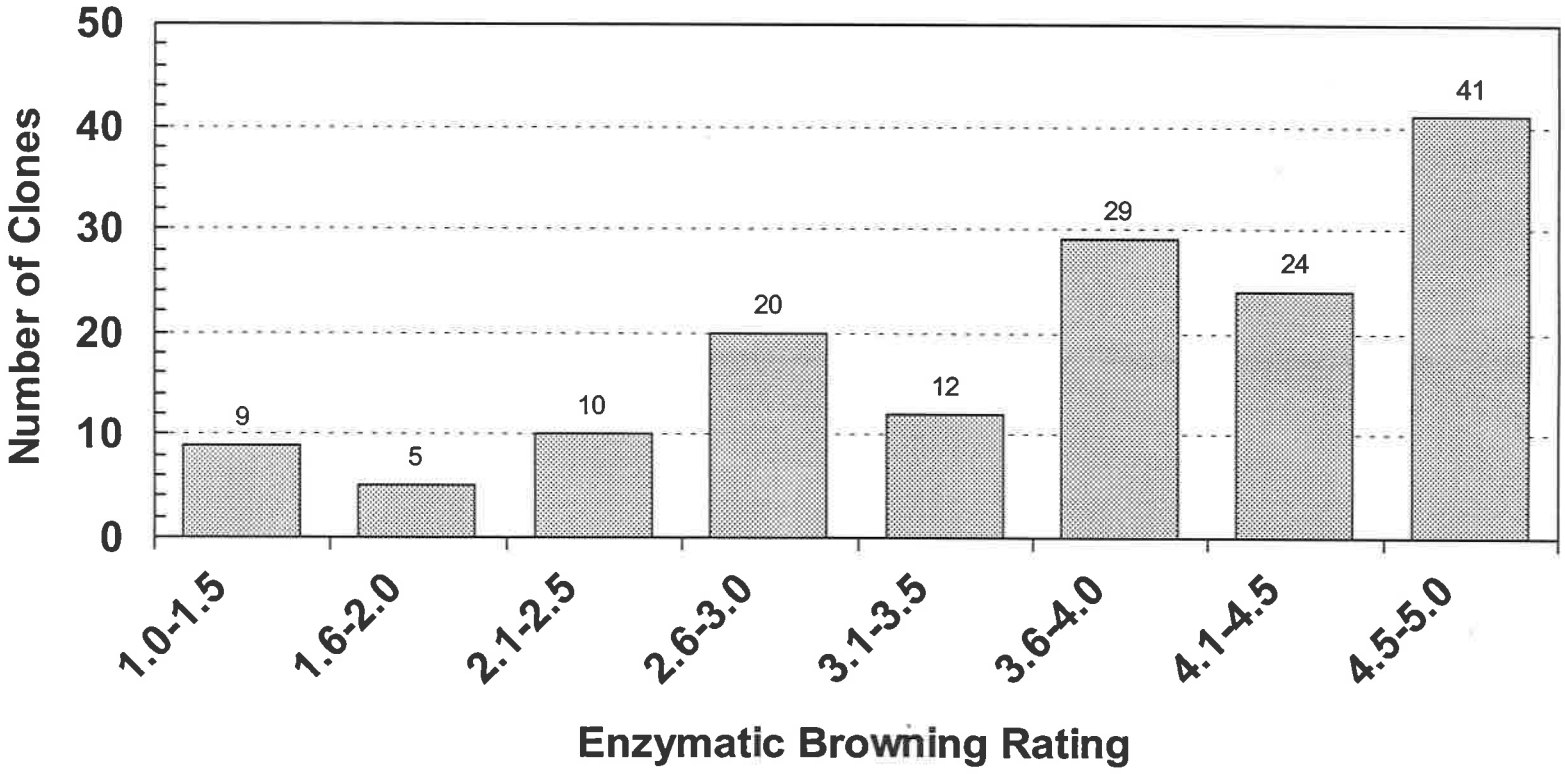
Appendix 4. % Weight Loss Distribution (154 Clones) - 2000



Appendix 5. Dormancy Distribution (154 Clones) - 2000

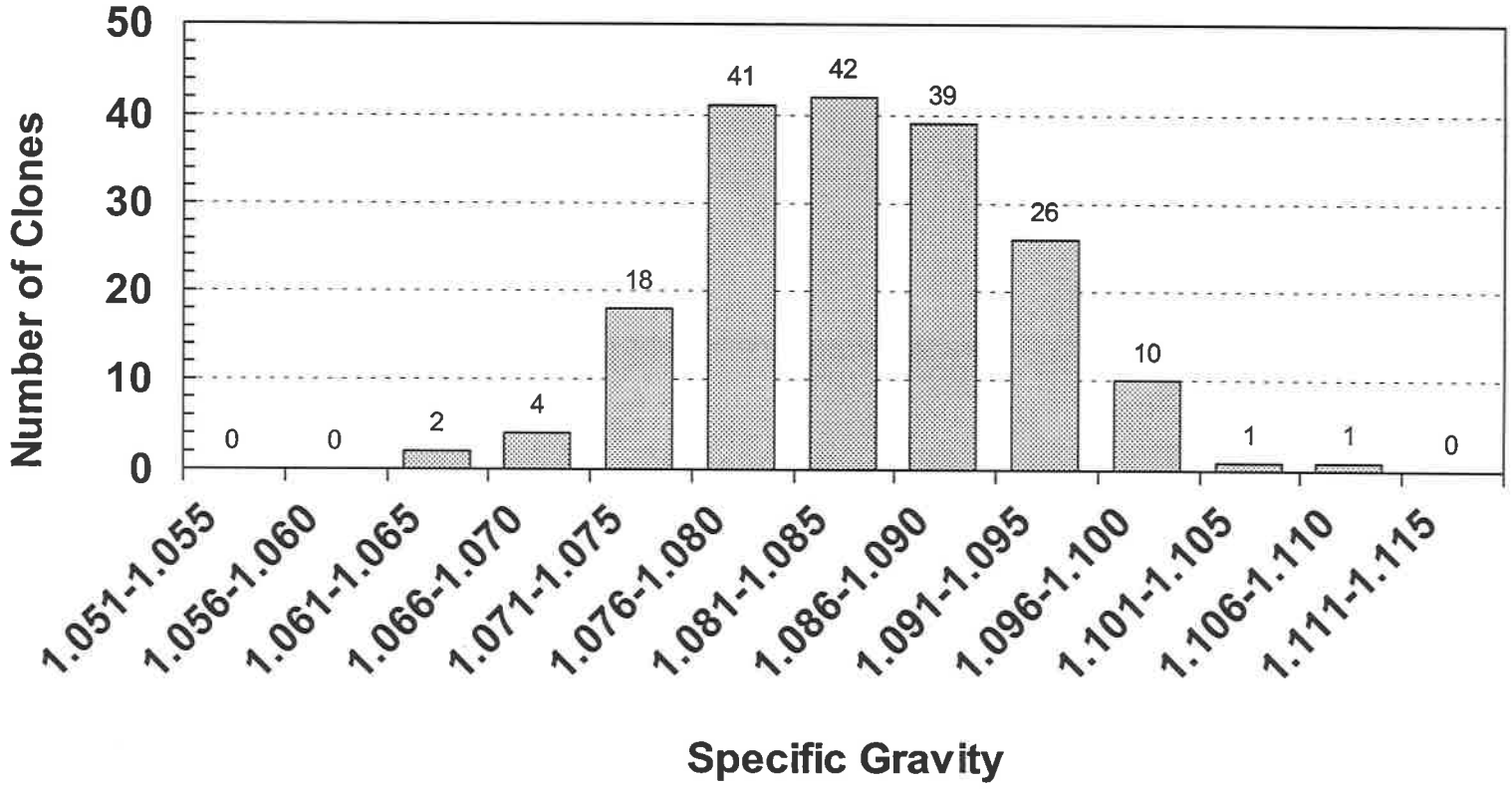


Appendix 6. Enzymatic Browning Distribution (150 Clones) - 2000

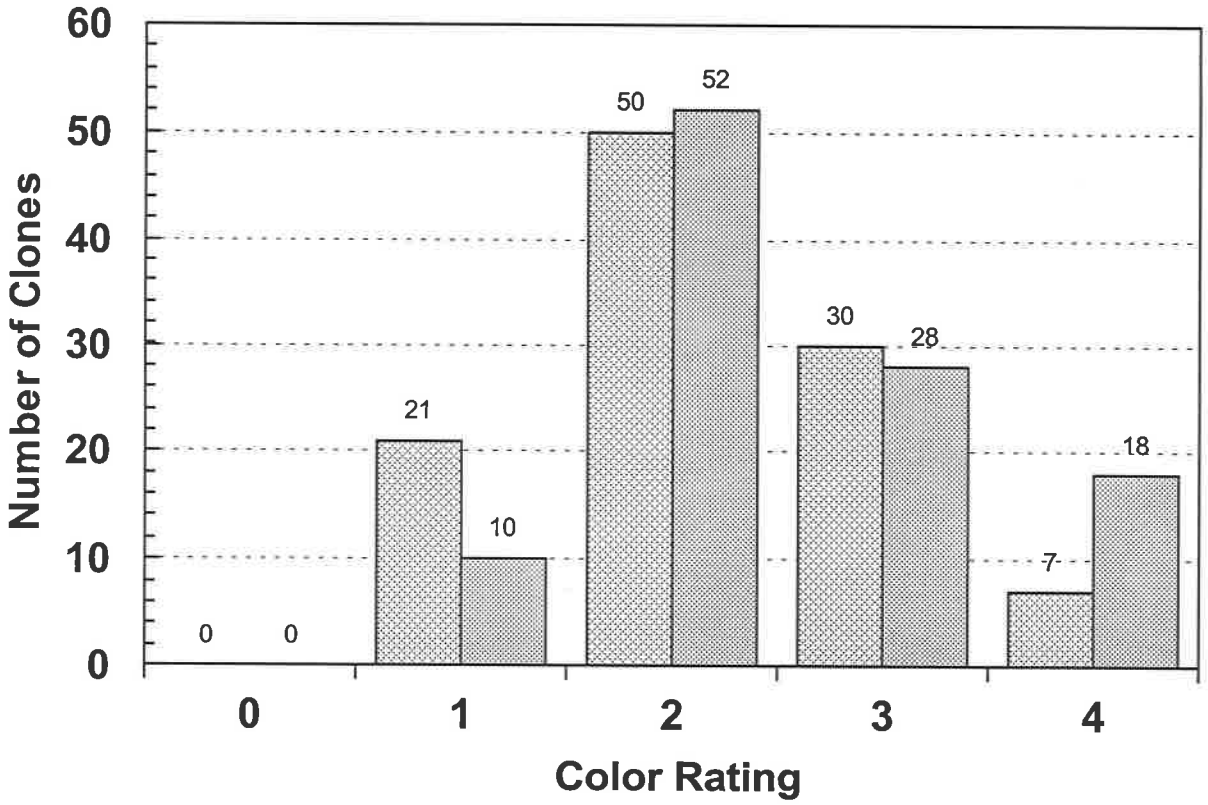


5=No Discoloration

Appendix 7. Specific Gravity Distribution (184 Clones) - 2000



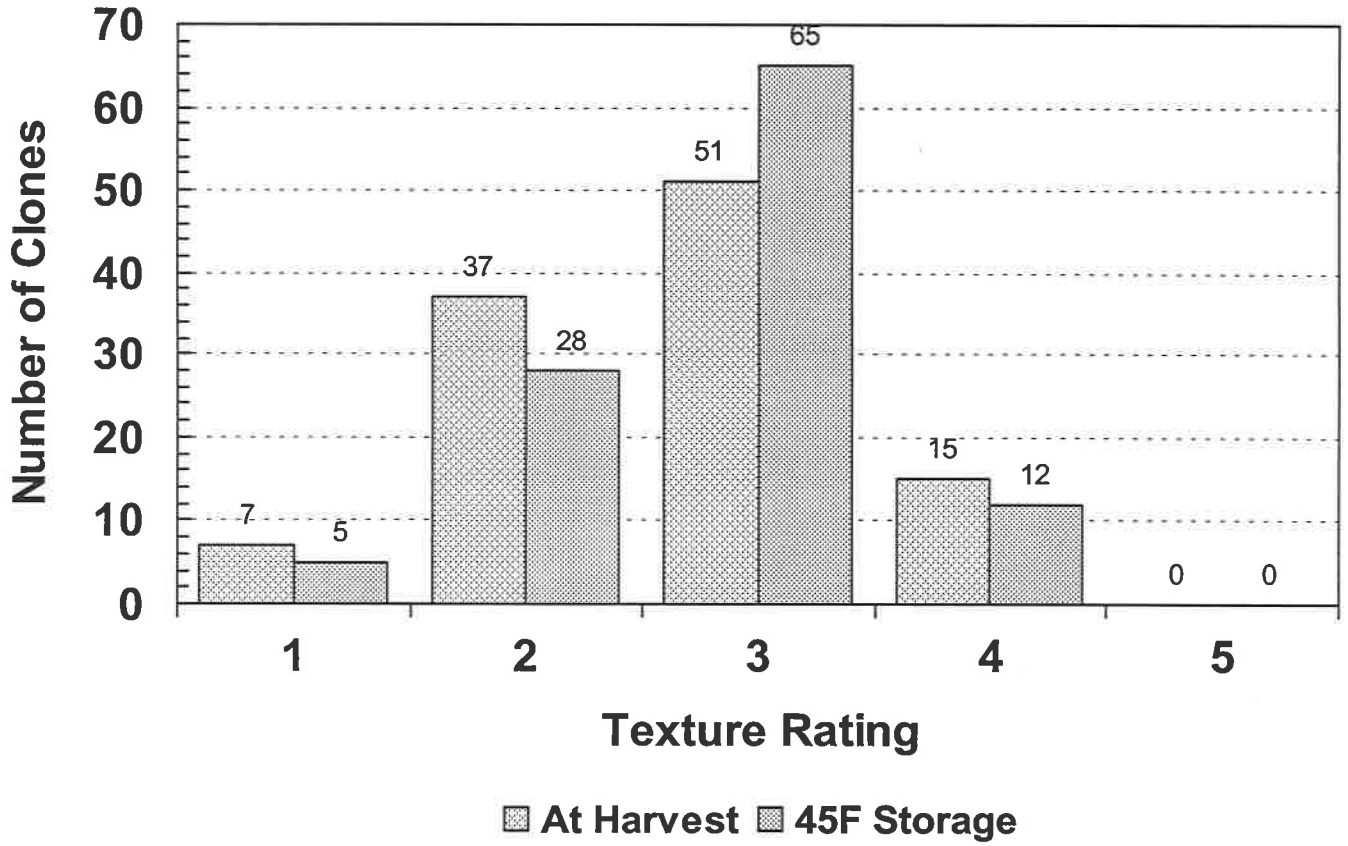
Appendix 8. Fry Color Distribution (108 Clones) - 2000



0=Lightest (values ≤2 acceptable)

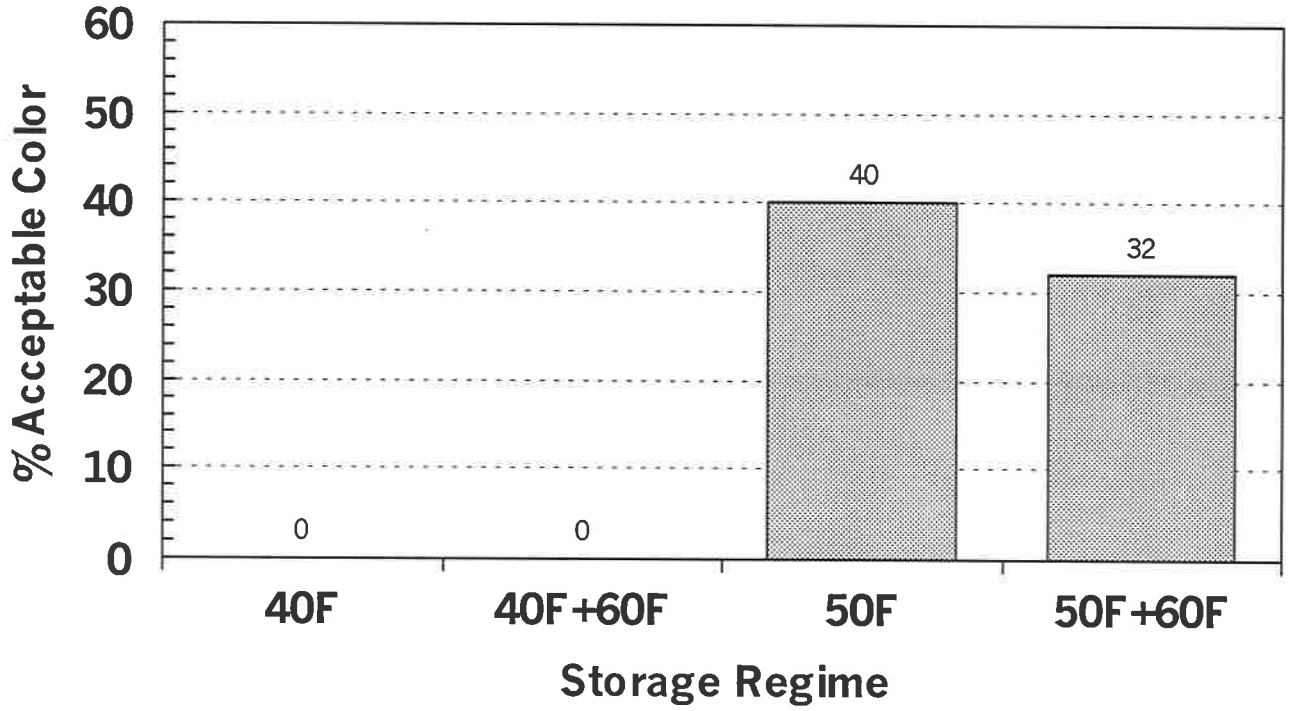
At Harvest 45F Storage

Appendix 9. Fry Texture Distribution (110 Clones) - 2000



5=Dry Texture

Appendix 10. % Acceptable Chip Color (72 Clones) - 2000



Values ≤2 acceptable (SFA 1-5 Scale)

Appendix 11.

COLORADO AGRICULTURAL EXPERIMENT STATION
COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO

and

IDAHO AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF IDAHO
MOSCOW, IDAHO

and

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICES
WASHINGTON, D. C.

NOTICE OF THE NAMING AND OFFICIAL RELEASE OF **KEYSTONE RUSSET**, A VERY HIGH YIELDING, FRESH MARKET CULTIVAR

The Colorado and Idaho Agricultural Experiment Stations and the Agricultural Research Service, United States Department of Agriculture announce the release of the potato cultivar **Keystone Russet**. **Keystone Russet** was selected for fresh market use. **Keystone Russet** was named after the late 1800's historic mining town, Keystone, Colorado, so named by a man who traveled to the area in search of gold.

Keystone Russet, tested under pedigree number AC83064-1, was selected in 1985 at the San Luis Valley Research Center, Center Colorado. It resulted from a cross of CalWhite (A76147-2) and A7875-5 made by the USDA-ARS at the University of Idaho Research and Extension Center, Aberdeen, Idaho in 1983 under the direction of J. J. Pavek. Pioneer and Targhee are in the parentage on the maternal side. Paternal ancestry includes Nooksack. **Keystone Russet** is a full-sib to Silverton Russet (AC83064-6).

Selection and early testing was done by D. G. Holm, Colorado State University, Center, Colorado. Colorado State University personnel conducting cultural management trials and disease evaluations/observations were A. L. Thompson and R. D. Davidson, respectively. Additional disease evaluations were performed by D. L. Corsini, USDA-ARS, as part of Western Regional Coordinating Committee No. 27 (WCC-27). Advanced testing, seed increase, and commercial evaluation was assisted by WCC No. 27 participants, several seed and commercial growers, and other private cooperators in the Western United States.

Keystone Russet was evaluated in the Western Regional Trials in 1993-1995. Seed was released in Colorado for controlled increase and commercial trials in 1993. In 2000, 402 acres of certified seed were planted in Colorado.

Keystone Russet produces a semi-erect, medium-large sized vine with white flowers. Vine maturity is medium. Field trials have shown that **Keystone Russet** is sensitive to metribuzin. Results of disease tests and other observations indicate that **Keystone Russet** is susceptible to most common diseases.

Keystone Russet tubers are moderately susceptible to *Alternaria* dry rot and susceptible to soft rot and *Fusarium sambucinum* dry rot. Results of field tests and other observations indicate that leafroll expression is good with suitable color change and whole plant symptom expression. Leafroll spread is low. Tubers are moderately resistant to leafroll net necrosis and resistant to common scab. **Keystone Russet** is resistant to *Verticillium* wilt, moderately susceptible to foliar early blight, and susceptible to foliar late blight and PVY.

Foliar and tuber ring rot expression is typical. Foliar expression occurs within 90 days in the San Luis Valley. Tuber symptoms are readily evident at harvest.

Tubers of **Keystone Russet** are oblong to long with a medium russet skin and white flesh. Eyes are shallow and distributed more heavily near the apical end. Tubers have a short dormancy with good storability and few internal problems. Adequate skin set at harvest is important to ensure good storage quality. Tubers are resistant to hollow heart, second growth, blackspot bruise, and shatter bruise.

Keystone Russet has a very high yield potential (Table 1). Total and US No. 1 yields are greater than Russet Norkotah and Russet Nugget in Colorado. Similar results have been observed in Idaho. The medium maturity of **Keystone Russet** makes it better suited to a limited growing season than Russet Nugget.

Table 1. Performance of **Keystone Russet** compared with standard cultivars in trials in Colorado and Idaho.

Location/ Cultivar	Location Years	Yield		% US No. 1	Vine Maturity[1]	Specific Gravity
		Total	US No. 1			
Colorado						
Keystone Russet	10	467	416	89	3.2	1.077
Russet Norkotah	10	341	292	85	1.8	1.075
Russet Nugget	10	420	350	83	3.9	1.095
Idaho[2]						
Keystone Russet	3	399	343	86	---	1.070
Russet Norkotah	3	311	249	80	---	1.075
Keystone Russet	6	561	511	91	3.6	1.078
Russet Burbank	6	506	334	66	3.1	1.083

[1]Vine maturity: 1=very early; 5=very late.

[2]Comparison with Russet Norkotah and Russet Burbank is for early and late harvests respectively.

Plant Variety Protection will be applied for. Ownership of **Keystone Russet** has been assigned to the Colorado Certified Potato Growers' Association (CCPGA). This assignment is based on an agreement between CCPGA and the Colorado State Board of Agriculture acting by and through Colorado State University.

Seed is available from growers listed in the Colorado seed directory. Limited amounts for research purposes are available from D. G. Holm, San Luis Valley Research Center, Colorado State University, 0249 East Road 9 North, Center, CO 81125 (Telephone: 719-754-3594, ext. 14; Fax: 719-754-2619; E-mail: spudmkr@coop.ext.colostate.edu).

A cultivar specific management profile for **Keystone Russet** is available from A. L. Thompson at the address cited above (Telephone: 719-754-3594, ext. 13; Fax: 719-754-2619; E-mail: athompso@coop.ext.colostate.edu).

Director, Colorado Agricultural Experiment Station	Date
Director, Idaho Agricultural Experiment Station	Date
Administrator, USDA-Agricultural Research Service	Date

Appendix 12.

COLORADO AGRICULTURAL EXPERIMENT STATION
COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO

and

IDAHO AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF IDAHO
MOSCOW, IDAHO

and

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICES
WASHINGTON, D. C.

NOTICE OF THE NAMING AND OFFICIAL RELEASE OF **SILVERTON RUSSET**, A HIGH YIELDING, DUAL-PURPOSE CULTIVAR

The Colorado and Idaho Agricultural Experiment Stations and the Agricultural Research Service, United States Department of Agriculture announce the release of the potato cultivar **Silverton Russet**. **Silverton Russet** was primarily selected for fresh market use. **Silverton Russet** was named after the 1874 historic mining town, Silverton, Colorado, so named for the abundant supplies of silver mined in the area.

Silverton Russet, tested under pedigree number AC83064-6, was selected in 1985 at the San Luis Valley Research Center-Colorado State University, Center Colorado. It resulted from a cross of CalWhite (A76147-2) and A7875-5 made by the USDA-ARS at the University of Idaho Research and Extension Center, Aberdeen, Idaho in 1983 under the direction of J. J. Pavek. Pioneer and Targhee are in the parentage on the maternal side. Paternal ancestry includes Nooksack. **Silverton Russet** is a full-sib to Keystone Russet (AC83064-1).

Selection and early testing was done by D. G. Holm, San Luis Valley Research Center-Colorado State University, Center, Colorado. Colorado State University personnel conducting cultural management trials and disease evaluations/observations were A. L. Thompson and R. D. Davidson, respectively. Additional disease evaluations were performed by D. L. Corsini, USDA-ARS, as part of Western Regional Coordinating Committee No. 27 (WCC-27). Advanced testing, seed increase, and commercial evaluation was assisted by WCC No. 27 participants, several seed and commercial growers, and other private cooperators in the Western United States.

Silverton Russet was evaluated in the Western Regional Trials in 1993-1995. Seed was released in Colorado for controlled increase and commercial trials in 1993. In 2000, 503 acres of certified seed were planted in Colorado.

Silverton Russet emerges rapidly and produces an erect, medium-large sized vine with white flowers. Vine maturity is medium. Field trials have shown that **Silverton Russet** is sensitive to metribuzin. Results of disease tests and other observations indicate that **Silverton Russet** is susceptible to most common diseases.

Silverton Russet is very susceptible to PVY with potentially high levels of spread. Early season mosaic symptom expression of PVY may be latent. Tubers are moderately susceptible to soft rot, *Alternaria* dry rot, and susceptible to *Fusarium sambucinum* dry rot. Results of field tests and other observations indicate that leafroll expression is good with suitable color change and whole plant symptom expression.

Leafroll spread is moderate. Tubers are resistant to leafroll net necrosis and common scab. **Silverton Russet** is moderately susceptible to *Verticillium* wilt and susceptible to foliar early blight and late blight. Foliar and tuber ring rot expression is typical. Foliar expression occurs within 90 days in the San Luis Valley. Tuber symptoms are readily evident at harvest.

Tubers of **Silverton Russet** are oblong to long with a medium russet skin and white flesh. Tuber type is attractive. Eyes are shallow and distributed more heavily near the apical end. Tubers have a short dormancy with good storability and few internal problems. Adequate skin set at harvest is important to ensure good storage quality. Tubers are resistant to hollow heart, second growth, growth crack, blackspot bruise, and shatter bruise.

Silverton Russet has high yield potential (Table 1). US No. 1 yields are 16 and 10% greater than Russet Norkotah in Colorado and Idaho respectively. Compared with Russet Burbank in Idaho, US No. 1 yields of Silverton Russet were 11% greater. The medium maturity of **Silverton Russet** makes it better suited to a limited growing season than Russet Nugget.

Table 1. Performance of **Silverton Russet** compared with standard cultivars in trials in Colorado and Idaho.

Location/ Cultivar	Location Years	Yield		% US No. 1	Vine Maturity[1]	Specific Gravity
		Total	US No. 1			
Colorado						
Silverton Russet	10	396	339	86	3.1	1.078
Russet Norkotah	10	341	292	85	1.8	1.075
Russet Nugget	10	420	350	83	3.9	1.095
Idaho[2]						
Silverton Russet	3	335	275	82	---	1.077
Russet Norkotah	3	311	249	80	---	1.075
Silverton Russet	8	391	336	86	3.3	1.077
Russet Burbank	8	451	302	67	2.8	1.082

[1]Vine maturity: 1=very early; 5=very late.

[2]Comparison with Russet Norkotah and Russet Burbank is for early and late harvests respectively.

Fry color of **Silverton Russet** is similar to Russet Nugget at harvest and after 45°F storage. While french fry color is suitable for processing, specific gravity may be marginal in some production conditions.

Silverton Russet has been grown on a commercial scale in Colorado, California, and Wisconsin with notable success. It appears to have wide adaptability in irrigated areas of the West and Midwest.

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Seed is available from growers listed in the Colorado seed directory. Limited amounts for research purposes are available from D. G. Holm, San Luis Valley Research Center, Colorado State University, 0249 East Road 9 North, Center, CO 81125 (Telephone: 719-754-3594, ext. 14; Fax: 719-754-2619; E-mail: spudmkr@coop.ext.colostate.edu).

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