

Research Progress Report for 2003
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



Mission Statement

"The mission of the Colorado Potato Breeding and Selection Program is to develop cultivars with characteristics that will help assure that the Colorado potato industry remains productive and competitive."

Nugget); Reds (CO89097-2R, NDC5281-1R, CO93037-6R, Sangre); Specialty (CO94165-3P/P, CO94183-1R/R, VC0967-2R/Y, VC1002-3W/Y, All Blue, and Yukon Gold).

14. Late blight foliar and tuber infection levels for Colorado selections planted in twelve-hills non-replicated plots in Corvallis, Oregon: 2003 79
15. Late blight foliar and tuber infection levels for Colorado selections planted in twelve-hills non-replicated plots in Corvallis, Oregon: 2002-2003 81

Figures

1. Primary SLV cultivars planted, 1983-2003 8
2. Primary SLV potato cultivars planted, 1997-2003 comparison 9
3. Colorado Russet Norkotah acreage breakdown, 2001-2003 comparison 10
4. Tuber Greening Study: Russet Selections/Cultivars 53
5. Tuber Greening Study: Red Selections/Cultivars 54
6. Photographs of advanced selections 56

Appendices

1. Cultural management information for the Potato Breeding and Selection Program's trials at the San Luis Valley Research Center 82
2. General procedures used for postharvest evaluations 83
3. Blackspot distribution 84
4. Percent weight loss distribution 85
5. Dormancy distribution 86
6. Enzymatic browning distribution 87
7. Specific gravity distribution 88
8. Fry color distribution 89
9. Fry texture distribution 90
10. Percent acceptable chip color distribution 91

Notes 92

Brochure

- The Colorado Potato Breeding and Selection Program - 2003 Review 93

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- ✓ The Colorado Potato Breeding and Selection Program relies on the cooperation of several growers, shippers, processors, and research personnel to assess the adaptability, marketability, and other characteristics of advanced selections from our program. We sincerely appreciate their support and the valuable feedback they provide. We thank many cooperating breeding and selection programs throughout the United States and Canada who have provided breeding material and opportunities to screen our germplasm under various growing conditions and disease pressures not available in Colorado.

characteristics. Third, a profile of cultivar specific management criteria - production and postharvest - are developed, which a grower, shipper, or processor, and/or marketer may fine tune for his/her operation. Finally, market development takes place to determine consumer acceptance and recognition in the market. Each of these integrated steps is critical in the development and commercialization of new cultivars and provides the base for a successful cultivar release.

The process of cultivar development takes 14+ years. Years 1 and 2 are the potato breeding phase of the development process. Parents are selected and crossed to produce 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 remaining 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

Tables 2A-B and Figure 1 present statistics on the primary cultivars grown in the San Luis Valley during 1983-2003. Figure 2 presents a comparison of the production levels of the primary potato cultivars from 1997-2003.

The top five cultivars grown in the San Luis Valley in 2003, based on acreage planted, were Russet Norkotah, Russet Nugget, Centennial Russet, Yukon Gold, and Silverton Russet. They were followed, in order, by Molli, Durango Red, and Keyston Russet. Since 2001 total acreage of yellow fleshed cultivars has exceeded that combined for reds and white cultivars.

Russet Nugget, released by Colorado in 1988, was the primary cultivar grown on fall planted acreage in Colorado in 1997. Russet Nugget acreage has continued to decline since the occurrence of late blight in 1998. This decline has leveled off but continues slightly. Much of this acreage has been replaced by Russet Norkotah (including the clonal selections). Of the Russet Norkotah fall potato acreage in Colorado, 54% was planted to Colorado Russet Norkotah Selections 3 and 8. Figure 3 shows the breakdown of the Russet Norkotah acreage in the San Luis Valley.

Since 1975, there have been 12 potato cultivars and 5 clonal selections released by Colorado State University or in cooperation with other agencies. These materials accounted for 39% of the Colorado certified seed acreage accepted for certification. Advanced Colorado selections accounted for another 7% of the seed acreage. Colorado State University releases accounted for 57% of the 2003 fall potato acreage planted in Colorado. Conservative estimates indicate that new potato cultivars and clonal selections increase the value of the Colorado fall potato crop by \$11-\$12 million annually due to improved yield and quality.

Potato Breeding

Germplasm Accession and Introgression. Germplasm is continually being acquired with late blight resistance and virus resistance (PXY, PVY, and leafroll) from various sources. Primary sources are the USDA-ARS in Aberdeen, Idaho; Prosser, Washington; and Madison, Wisconsin

AC93026-9RU, CO85026-4RU, CO93001-11RU, CO93016-3RU, CO94035-15RU, CO94084-12RU, and TC1675-1RU), 6 reds (CO86218-2R, CO89097-2R, CO93037-6R, CO94019-1R, NDC5281-2R, and VC1075-1R), 5 chippers (AC87340-2W, AC94296-5W, BC0894-2W, CO95051-7W, and CO95070-7W), and 8 specialty selections (CO94165-3P/P, CO94183-1R/R, VC0967-2R/Y, VC0967-5R/Y, VC1002-3W/Y, VC1009-1W/Y, VC1015-1R/Y, and VC1015-7R/Y).

Advanced selections that were discarded from further evaluation are AC87084-3RU, CO93016-3RU, CO94084-12RU, CO94019-1R, AC87340-2W, AC94296-5W, CO95070-7W, VC0967-5R/Y, VC1015-1R/Y. Based on initial San Luis Valley grower results in 2003 a decision was made to discard CO93037-6R. However, this selection had the highest merit score in the Western Regional Red Trials and will be retained for further regional evaluation.

Figure 4 includes photographs of advanced selections and recently named cultivars produced by growers in 2003 and that have not been discarded. Included are three selections (CO94035-15RU, VC0967-2R/Y, and VC1002-3W/Y) scheduled for initial grower evaluations in 2003. Table 12 summarizes the performance of these selections and others currently undergoing grower evaluation.

Advanced selections undergoing commercialization include AC89536-5RU, and CO89097-2R. Exclusive release or public release for BC0894-2W, CO85026-4RU (Fremont Russet), and CO86218-2R (Durango Red) will be evaluated.

Collaborative Studies

The following collaborative studies were conducted in 2003:

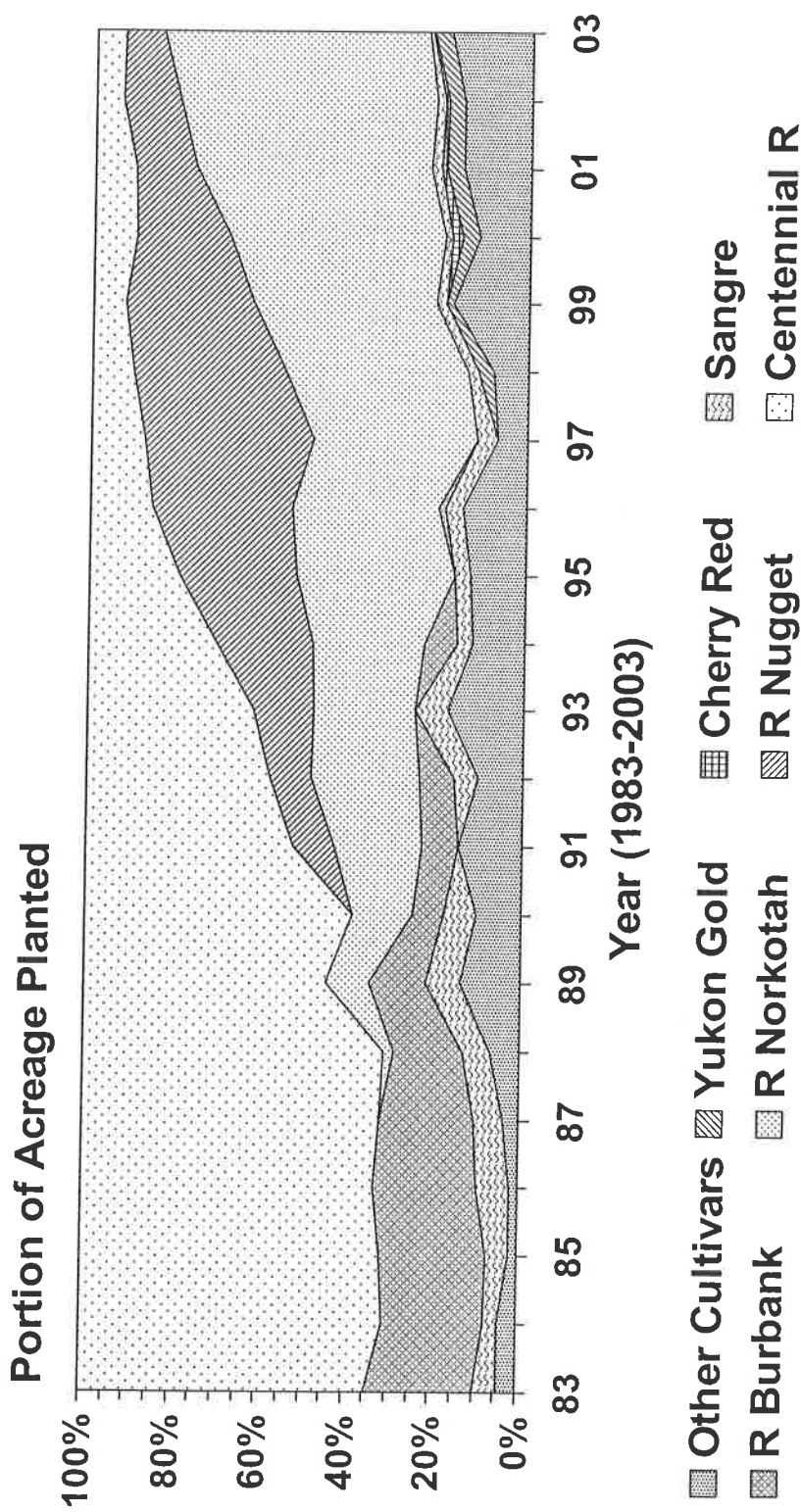
- 87 selections and named cultivars from 2003 are being screened for antioxidant activity and vitamin C in cooperation with Cecil Stushnoff. Twelve advanced selections and named cultivars are being screened for root exudates for a potential new source of antibiotics in cooperation with Jorge Vivanco.
- Twenty-seven advanced selections were evaluated in cultural management trials in collaboration with Samuel Essah.
- Several advanced selections were evaluated for disease symptom expression in cooperation with Rob Davidson and Rick Zink. Included were: bacterial ring rot (30), potato leafroll virus (18), and powdery scab (9) in Colorado.
- Fifty-three Colorado selections were screened for late blight resistance by Oregon State University (Table 14). An additional 22 selections were evaluated in 2003 following initial evaluation in 2002 (Table 15). Selections showing significant levels of resistance will be retested in 2004.
- Several advanced selections were sent to Michigan, Minnesota, Oregon, and Wisconsin for additional disease evaluations.

Table 2A. Colorado fall potatoes: Production of primary potato cultivars, 1983-1990¹.

Cultivar	%Acreage	Year											
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	
Centennial Russet	%	62.7	68.0	66.9	66.0	67.3	68.8	55.3	61.2	47.5	44.4	38.3	
	Acreage	29,469	36,380	37,799	37,620	41,053	41,280	34,286	40,086	32,300	29,304	27,768	
Ranger Russet	%	---	---	---	---	---	---	---	---	---	---	---	
	Acreage	---	---	---	---	---	---	---	---	---	---	---	
Russet Burbank	%	23.9	22.9	24.3	23.7	21.7	16.0	13.2	7.1	8.3	8.7	---	
	Acreage	11,233	12,252	13,730	13,509	13,237	9,600	8,184	4,651	5,644	5,742	---	
Russet Norkotah	%	---	---	---	---	---	2.2	9.9	14.0	20.1	26.1	23.5	
	Acreage	---	---	---	---	---	1,320	6,138	9,170	13,668	17,226	17,038	
Russet Nugget	%	---	---	---	---	---	---	---	---	9.6	10.1	13.7	
	Acreage	---	---	---	---	---	---	---	---	6,528	6,666	9,933	
Cherry Red	%	---	---	---	---	---	---	---	---	---	---	---	
	Acreage	---	---	---	---	---	---	---	---	---	---	---	
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	
	Acreage	2,679	1,659	2,882	4,104	3,843	3,780	4,898	4,978	---	3,894	5,438	
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	

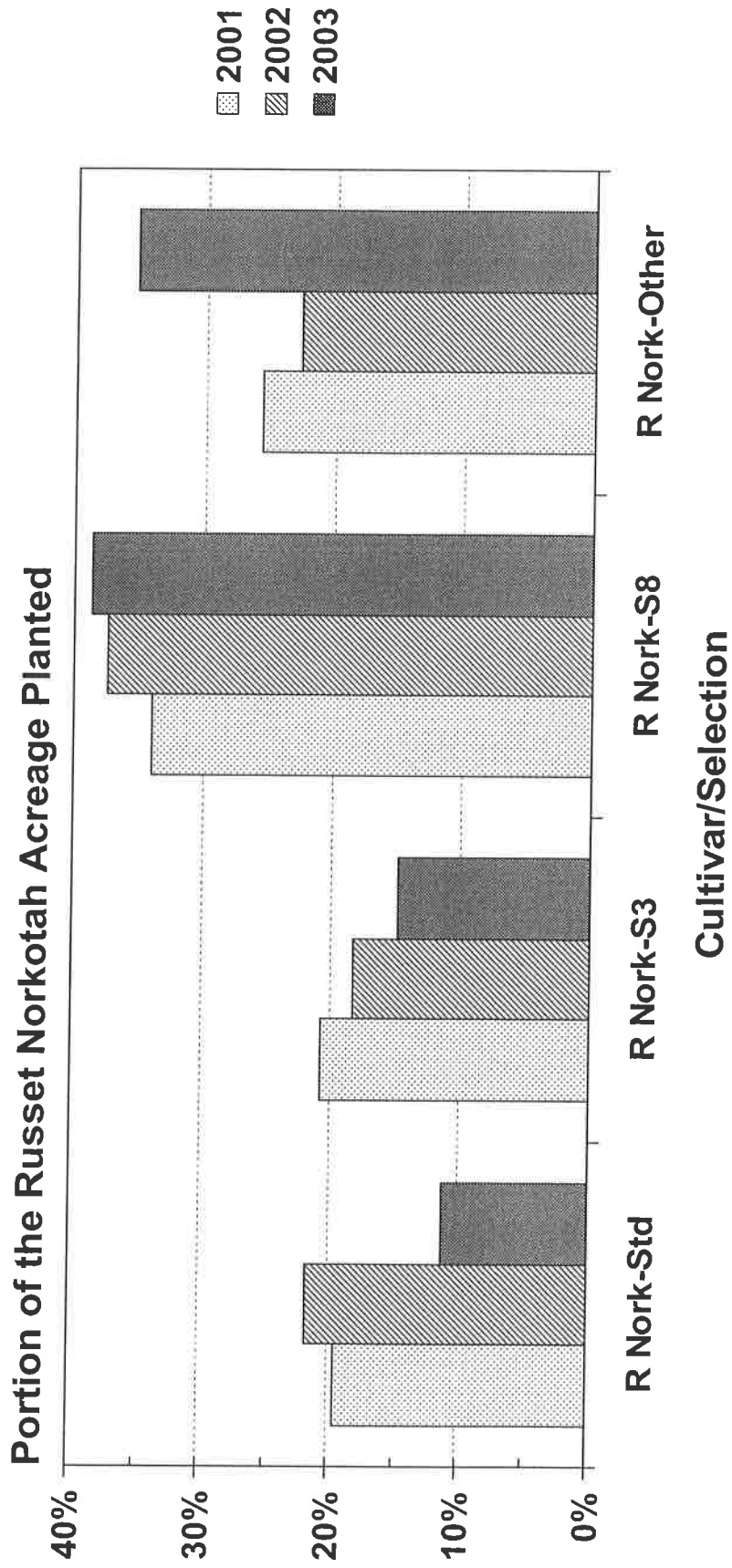
¹Data provided by the Colorado Agricultural Statistics Service.

**Figure 1. Primary SLV Potato Cultivars Planted
1983–2003**



Data Source: Colorado Agricultural Statistics Service

**Figure 3. Colorado Russet Norkotah
Acreage Breakdown (2001-2003)**



Data Source: Colorado Agricultural Statistics Service

Table 3B. Specific gravity, french fry color, and texture for Preliminary Trial clones - 2003.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	2 wks 55F+ 9 wks 45F	At Harvest	2 wks 55F+ 9 wks 45F
AC97019-1RU	1.077	3	4	3	3
AC97069-1W	1.083	4	4	4	4
AC98350-2RU	1.080	4	4	4	4
ATC98444-1R/Y	1.080	2	3	3	3
ATC98495-1W/Y	1.081	2	2	4	4
ATC98509-1R/Y	1.082	3	3	3	2
ATC98515-1R/Y	1.074	4	4	1	1
CO97274-2W/Y	1.078	1	1	3	3
CO98009-3RU	1.083	1	2	3	3
CO98012-5R	1.073	2	3	2	2
CO98067-7RU	1.075	2	3	3	3
CO98368-2RU	1.082	2	4	4	3
Centennial Russet	1.080	3	3	1	2
Russet Burbank	1.079	2	2	3	3
Russet Norkotah-S3	1.070	3	3	2	3
Russet Nugget	1.079	2	2	3	4
Sangre-S10	1.066	4	4	2	2
Shepody	1.085	2	3	3	3
Yukon Gold	1.079	2	3	3	3

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

²Fry 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 4B. Grade defects for Intermediate Yield Trial entries - 2003.

Clone	% External Defects ¹	External Defects Observed ²	% Hollow Heart ³
AC97068-1RU	3.1	GR*,MS	10.9
AC97068-2RU	0.7	GR*	5.1
AC97070-3RU	0.8	MS*	6.5
CO97030-1RU	0.7	MS*,GR*	2.3
CO97036-5RU	1.2	MS,GR*	0.0
CO97078-5R	0.0		0.0
CO97087-2RU	2.4	MS*,GR	0.7
CO97090-4RU	1.8	MS*,GR	0.0
CO97094-2RU	4.9	MS*,GC,GR	0.0
CO97137-1W	0.6	GR*	0.0
CO97138-3RU	0.6	MS*	2.8
CO97138-7RU	0.0		0.0
Russet Norkotah	4.0	MS,GR*	0.0
Russet Nugget	1.7	MS,GR*	0.0

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

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

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

Table 4D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Intermediate Yield Trial entries - 2003.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴
	Bud End	Stem End	Average			
AC97068-1RU	4.2	3.5	3.9	7.2	62	1.095
AC97068-2RU	2.9	2.3	2.6	6.7	83	1.091
AC97070-3RU	3.3	3.3	3.3	8.1	69	1.086
CO97030-1RU	4.7	4.6	4.7	5.4	83	1.082
CO97036-5RU	4.4	4.6	4.5	5.0	62	1.092
CO97078-5R	3.9	3.7	3.8	9.1	97	1.087
CO97087-2RU	4.5	4.6	4.6	5.8	76	1.089
CO97090-4RU	4.6	4.3	4.5	4.4	97	1.080
CO97094-2RU	4.5	3.8	4.2	3.8	69	1.067
CO97137-1W	3.4	3.4	3.4	6.9	76	1.084
CO97138-3RU	4.6	3.8	4.2	5.0	76	1.081
CO97138-7RU	3.8	3.7	3.8	6.8	83	1.073
Russet Norkotah	4.8	4.3	4.6	5.2	90	1.079
Russet Nugget	4.8	4.3	4.6	4.0	83	1.095

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

²Tubers were stored at 45F for 107 days.

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

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

Table 5A. Yield, grade and tuber shape for Advanced Yield Trial entries - 2003.

Clone	Yield (Cwt/A)					Tuber Shape ¹
	Total	US #1			Tuber Shape ¹	
		Total	%	>10 oz		
AC87084-3RU	565	526	93.1	287	32	Ob
AC89536-5RU	567	484	85.4	187	70	Ob
AC95405-2RU	474	361	76.0	69	109	Ob
AC96010-3RU	402	313	77.7	74	72	Ob
AC96052-1RU	436	368	84.2	92	66	Ob
CO85026-4RU	386	361	93.6	164	19	Ob
CO95007-1RU	406	327	80.3	46	79	Ob
CO95086-8RU	355	307	86.2	87	47	Ob
CO95172-3RU	530	446	84.2	116	80	Ob
CO96043-5RU	492	467	95.0	247	18	Ob
CO96045-1RU	354	271	76.5	78	70	L
CO96047-7RU	422	385	91.3	190	28	Ob
CO96109-7RU	376	326	86.8	100	46	Ob
CO96133-11RU	295	197	66.5	12	98	Ob
Russet Norkotah	345	290	84.2	106	45	L
Russet Nugget	519	459	88.4	118	58	Ob
Mean	433	368	84.3	123	59	----
LSD ² (0.05)	38	41	4.5	34	13	----

¹Tuber shape: Ob=oblong; L=long.

²LSD=least significant difference.

Table 5C. Growth characteristics of Advanced Yield Trial entries- 2003.

Clone	% Stand	Emergence Uniformity ¹	Vine Vigor ²	Stems/ Plant	Vine Size ³	Vine Type ⁴	Vine Maturity ⁵
AC87084-3RU	96	3.5	4.0	4.9	4.0	3.0	4.0
AC89536-5RU	100	4.0	4.0	3.4	3.8	3.0	3.0
AC95405-2RU	99	3.8	3.3	3.7	3.0	3.0	3.0
AC96010-3RU	100	3.0	3.0	2.5	3.0	2.5	3.3
AC96052-1RU	99	2.8	3.0	3.3	3.8	2.3	3.3
CO85026-4RU	97	3.5	2.0	2.4	3.0	3.0	3.5
CO95007-1RU	97	3.3	3.0	2.4	3.0	3.8	3.0
CO95086-8RU	98	3.5	2.8	2.8	2.8	3.0	2.5
CO95172-3RU	94	3.3	3.3	2.9	4.0	3.3	3.5
CO96043-5RU	95	3.0	3.8	2.8	3.8	3.0	3.0
CO96045-1RU	100	3.0	2.0	3.6	2.3	3.0	2.3
CO96047-7RU	100	3.0	3.3	2.7	2.5	2.0	2.0
CO96109-7RU	99	3.3	2.5	3.2	2.8	2.8	3.0
CO96133-11RU	100	3.8	2.0	3.4	2.0	3.0	2.3
Russet Norkotah	99	3.5	2.0	3.1	2.0	2.8	2.0
Russet Nugget	100	4.0	3.8	3.3	4.0	3.0	4.0
Mean	98	3.4	2.9	3.1	3.1	2.9	3.0
LSD ⁶ (0.05)	4	0.7	0.5	0.5	0.4	0.4	0.5

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

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

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

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

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

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

Table 5E. Specific gravity, french fry color, and texture for Advanced Yield Trial Entries - 2003.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	2 wks 55F+ 9 wks 45F	At Harvest	2 wks 55F+ 9 wks 45F
AC87084-3RU	1.095	2	3	4	4
AC89536-5RU	1.083	2	3	4	3
AC95405-2RU	1.085	1	3	3	3
AC96010-3RU	1.080	1	2	3	3
AC96052-1RU	1.082	1	1	4	3
CO85026-4RU	1.083	2	4	3	3
CO95007-1RU	1.081	1	1	3	3
CO95086-8RU	1.082	1	1	3	3
CO95172-3RU	1.083	2	3	3	3
CO96043-5RU	1.077	2	3	3	3
CO96045-1RU	1.083	1	2	3	3
CO96047-7RU	1.079	2	4	2	2
CO96109-7RU	1.081	1	1	3	3
CO96133-11RU	1.082	3	3	3	3
Russet Norkotah	1.078	2	3	3	3
Russet Nugget	1.091	2	3	2	4

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

²Fry 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 6B. Grade defects for Southwest Regional Trial entries - 2003.

Clone	% External Defects ¹	External Defects Observed ²	% Hollow Heart ³
AC94296-5W	1.5	MS,GR*	2.1
ATX82539-4R	2.8	MS*,SG,GC,GR	0.0
ATX91137-1RU	1.6	MS,GR*	0.0
CO94035-15RU	2.3	MS,GC*,GR*	1.4
CO94084-12RU	2.0	MS*,GC	0.0
CO95051-7W	1.2	MS,GR*	0.0
CO95070-7W	1.8	GR*	0.5
VC1009-1W/Y	1.2	MS*,GR*	2.4
VC1015-1R/Y	1.5	MS*,SG,GR	3.9
VC1015-7R/Y	1.7	MS*	0.0
VC1075-1R	0.5	MS*	0.0
Atlantic	0.8	GC,GR*	6.0
Chipeta	3.8	MS,SG,GR*	1.0
Red LaSoda	4.1	MS,GC*,GR	7.3
Russet Norkotah	1.6	MS*,GC,GR	0.4
Russet Nugget	0.4	MS*,GR*	0.2
Sangre-S10	0.6	MS,GR*	1.7
Yukon Gold	0.8	MS*,GR	1.9

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

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

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

Table 6D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Southwest Regional Trial entries - 2003.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy ³ (Days)	Enzymatic Browning ⁴
	Bud End	Stem End	Average			
AC94296-5W	3.5	3.2	3.4	6.4	90	3.8
ATX82539-4R	3.4	2.8	3.1	12.5	55	4.2
ATX91137-1RU	5.0	5.0	5.0	5.2	118	4.0
CO94035-15RU	3.1	3.1	3.1	6.8	83	4.8
CO94084-12RU	3.6	3.8	3.7	4.9	62	5.0
CO95051-7W	3.5	1.6	2.6	11.0	62	4.4
CO95070-7W	3.8	2.4	3.1	8.3	69	3.6
VC1009-1W/Y	4.6	3.6	4.1	6.8	90	4.4
VC1015-1R/Y	1.6	1.0	1.3	6.6	69	4.4
VC1015-7R/Y	3.3	2.7	3.0	6.9	76	4.8
VC1075-1R	2.0	2.2	2.1	8.9	69	4.0
Atlantic	2.5	1.8	2.2	7.1	62	4.8
Chipeta	2.9	3.1	3.0	4.4	97	4.4
Red LaSoda	3.7	3.3	3.5	6.2	83	2.0
Russet Norkotah	4.7	4.4	4.6	5.2	90	4.0
Russet Nugget	4.7	4.1	4.4	4.3	83	4.8
Sangre-S10	2.0	2.5	2.3	4.5	69	3.4
Yukon Gold	3.1	2.4	2.8	3.7	69	4.6

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

²Tubers were stored at 45F for 107 days.

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

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

Table 6F. Chip color¹ after various storage regimes and specific gravity of Southwest Regional Trial entries - 2003.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
AC94296-5W	1.096	4.0	4.0	2.5	2.0
CO95051-7W	1.099	4.0	3.0	3.5	3.0
CO95070-7W	1.089	3.0	3.0	2.0	1.5
Atlantic	1.094	4.5	4.0	3.5	3.5
Chipeta	1.089	4.5	5.0	4.0	3.0

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

Table 7B. Grade defects for Western Regional Main Trial entries - 2003.

Clone	% External Defects ¹	External Defects Observed ²	% Hollow Heart ³
A91186-2	0.6	GR*	0.0
A91814-5	7.3	MS,GC,GR*	0.0
A92030-5	5.1	GR	2.7
A92294-6	3.2	MS,GC,GR*	0.0
A9304-3	6.3	MS,SG,GR*	0.0
A9305-10	3.1	GR*	0.0
A93157-6LS	4.8	MS*,GC,GR*	2.4
AC92009-4RU	1.8	MS,GR*	0.0
AC93026-9RU	3.5	MS*,SG,GC,GR*	0.0
ATX9202-1RU	4.1	SG,GC,GR*	0.4
ATX92230-1RU	3.3	GC*,GR	0.0
CO93001-11RU	3.8	MS*,GR	0.0
CO93016-3RU	1.8	MS*,GR*	3.7
PA95A11-14	4.3	MS*,GR	0.0
TC1675-1RU	2.9	MS*,SG,GC,GR	0.0
Ranger Russet	3.0	MS*,GR	0.0
Russet Burbank	2.2	MS,SG,GC*,GR*	0.0
Russet Norkotah	2.5	MS,SG,GR*	1.5
Russet Nugget	1.7	MS*,GR*	1.9
Shepody	6.6	MS,SG,GR*	3.8

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 7D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Western Regional Main Trial entries - 2003.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy ³ (Days)	Enzymatic Browning ⁴
	Bud End	Stem End	Average			
A91186-2	3.6	3.9	3.8	6.2	104	4.6
A91814-5	4.8	4.2	4.5	18.1	83	3.6
A92030-5	4.4	3.5	4.0	5.6	97	4.0
A92294-6	4.0	2.9	3.5	5.7	90	5.0
A9304-3	4.8	4.6	4.7	6.8	97	4.8
A9305-10	4.5	4.1	4.3	5.4	118	4.4
A93157-6LS	4.9	3.2	4.1	7.6	62	4.2
AC92009-4RU	4.4	3.9	4.2	7.0	146	5.0
AC93026-9RU	3.0	2.3	2.7	6.3	111	4.4
ATX9202-1RU	4.4	4.3	4.4	5.9	90	4.6
ATX92230-1RU	4.0	4.1	4.1	7.7	90	4.6
CO93001-11RU	4.2	4.4	4.3	6.2	62	4.4
CO93016-3RU	3.4	2.7	3.1	6.5	62	3.0
PA95A11-14	3.8	4.1	4.0	5.1	83	4.4
TC1675-1RU	4.7	3.0	3.9	3.6	97	3.6
Ranger Russet	4.3	2.3	3.3	5.6	69	4.4
Russet Burbank	4.1	3.1	3.6	4.0	125	4.0
Russet Norkotah	4.2	3.1	3.7	5.6	83	4.0
Russet Nugget	4.8	4.6	4.7	4.7	83	4.6
Shepody	3.8	3.2	3.5	5.4	83	3.6

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

²Tubers were stored at 45F for 107 days.

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

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

Table 8A. Yield, grade and tuber shape for Advanced and Western Regional Red Trial entries - 2003.

Clone	Yield (Cwt/A)					Tuber Shape ¹
	Total	US #1			<4 oz	
		Total	%	>10 oz		
AO93487-2R	465	368	79.2	54	94	R
AO96747-1R	457	354	77.1	60	99	R
CO86218-2R	359	287	79.4	67	71	R
CO89097-2R	544	484	89.0	194	54	Ov
CO93037-6R	640	559	87.2	235	73	R
CO94019-1R	481	430	89.3	108	51	Ov
DT6063-1R	484	435	90.0	195	44	Ov
NDC5281-2R	360	222	61.3	6	138	R
NDTX4271-5R	452	388	85.8	137	57	R
NDTX4304-1R	396	342	86.3	142	52	R
Norland (DR)	345	297	85.9	91	45	Ov
Red LaSoda	622	555	89.2	333	32	R
Sangre-S10	567	507	89.4	230	57	Ov
Mean	474	402	83.8	142	67	----
LSD ² (0.05)	57	61	5.5	54	17	----

¹Tuber shape: R=round; Ov=oval.

²LSD=least significant difference.

Table 8C. Growth characteristics of Advanced and Western Regional Red Trial entries - 2003.

Clone	% Stand	Emergence Uniformity ¹	Vine Vigor ²	Stems/ Plant	Vine Size ³	Vine Type ⁴	Vine Maturity ⁵
AO93487-2R	100	3.8	2.8	5.9	2.8	2.5	2.3
AO96747-1R	99	3.3	3.0	4.0	2.8	2.0	3.0
CO86218-2R	95	3.3	2.5	2.7	2.5	3.3	3.0
CO89097-2R	93	2.8	3.0	3.6	3.0	3.0	3.0
CO93037-6R	98	3.5	3.3	5.0	4.0	3.3	3.0
CO94019-1R	89	2.5	3.0	3.3	3.0	3.8	3.5
DT6063-1R	99	3.5	3.3	3.3	3.3	3.3	3.0
NDC5281-2R	98	3.5	2.8	4.6	2.5	2.8	2.0
NDTX4271-5R	98	3.3	3.0	3.6	2.8	3.0	3.0
NDTX4304-1R	100	3.8	2.5	3.2	2.0	3.0	2.8
Norland (DR)	98	2.8	2.3	4.9	2.0	2.3	2.0
Red LaSoda	95	3.0	3.3	3.1	3.5	3.0	3.0
Sangre-S10	100	3.3	3.0	3.1	3.8	3.5	3.0
Mean	97	3.2	2.9	3.9	2.9	3.0	2.8
LSD ⁶ (0.05)	6	0.8	0.5	0.8	0.5	0.5	0.3

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

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

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

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

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

⁶LSD=least significant difference.

Table 8E. Specific gravity, french fry color, and texture for Advanced and Western Regional Red Trial entries - 2003.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	2 wks 55F+ 9 wks 45F	At Harvest	2 wks 55F+ 9 wks 45F
AO93487-2R	1.070	1	4	2	2
AO96747-1R	1.078	1	2	2	1
CO86218-2R	1.078	4	3	3	3
CO89097-2R	1.083	2	3	3	3
CO93037-6R	1.080	3	4	2	2
CO94019-1R	1.075	4	4	3	2
DT6063-1R	1.086	2	3	2	3
NDC5281-2R	1.082	1	1	2	3
NDTX4271-5R	-	-	-	-	-
NDTX4304-1R	1.066	3	3	2	2
Norland (DR)	1.069	2	2	2	2
Red LaSoda	1.080	3	3	3	3
Sangre-S10	1.079	4	4	2	3

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

²Fry 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 9B. Grade defects for Advanced and Western Regional Specialty Trial entries - 2003.

Clone	% External Defects ¹	External Defects Observed ²	% Hollow Heart ³
A92584-3BB	0.9	GR*	0.0
AC97521-1R/Y	0.0		1.0
AO96747-2R/Y	0.3	GR*	0.0
BTX1544-2W/Y	6.0	MS,GC*,GR	0.0
CO94157-2W/Y	1.4	MS,SG,GR*	0.0
CO94165-3P/P	0.0		3.2
CO94183-1R/R	1.2	GC*	0.0
CO97226-2R/R	0.7	GC*	0.0
CO97232-1R/Y	0.5	MS*,GC*,GR*	0.0
CO97232-2R/Y	0.7	MS*,GR	0.7
CO97233-3R/Y	4.7	MS,GC,GR*	3.3
NDA5507-3YF	1.2	GC*,GR	3.7
TX1674-1W/Y	0.7	MS*,GR*	0.0
VC0967-2R/Y	0.3	GR*	0.5
VC0967-5R/Y	0.3	MS*,GR	1.2
VC1002-3W/Y	0.6	MS,GC*,GR	0.7
VC1106-1RU/Y	0.0		0.0
VC1123-2W/Y	1.0	MS,GC,GR*	11.2
All Blue	0.1	MS*	0.0
Yukon Gold	0.6	MS*,GR	2.2

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

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

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

Table 9D. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for Advanced and Western Regional Specialty Trial entries - 2003.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy ³ (Days)	Enzymatic Browning ⁴
	Bud End	Stem End	Average			
A92584-3BB	3.6	3.2	3.4	8.3	69	3.6
AC97521-1R/Y	3.4	3.7	3.6	6.4	83	4.0
AO96747-2R/Y	4.2	4.1	4.2	7.8	83	2.8
BTX1544-2W/Y	3.0	3.2	3.1	5.5	69	4.0
CO94157-2W/Y	3.9	3.5	3.7	10.1	202	4.4
CO94165-3P/P	-	-	-	6.8	62	-
CO94183-1R/R	3.0	3.3	3.2	6.3	83	-
CO97226-2R/R	-	-	-	7.8	62	-
CO97232-1R/Y	4.3	3.9	4.1	8.1	55	3.8
CO97232-2R/Y	4.5	4.0	4.3	8.8	62	4.6
CO97233-3R/Y	4.4	3.2	3.8	6.0	69	4.4
NDA5507-3YF	4.5	4.3	4.4	4.5	83	4.0
TX1674-1W/Y	3.9	4.1	4.0	6.1	62	4.2
VC0967-2R/Y	3.7	3.2	3.5	6.3	62	4.4
VC0967-5R/Y	4.8	4.3	4.6	5.5	111	4.6
VC1002-3W/Y	4.1	3.7	3.9	5.6	97	3.8
VC1106-1RU/Y	3.8	3.8	3.8	5.6	76	4.6
VC1123-2W/Y	4.0	3.6	3.8	5.6	69	4.4
All Blue	-	-	-	3.9	83	-
Yukon Gold	4.6	3.9	4.3	3.8	76	4.2

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

²Tubers were stored at 45F for 107 days.

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

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

Table 10A. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for San Luis Valley chipping study entries - 2003.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy ³ (Days)	Enzymatic Browning ⁴
	Bud End	Stem End	Average			
AC87340-2W	4.0	4.2	4.1	5.7	62	5.0
AC94296-5W	4.7	4.5	4.6	5.5	104	5.0
AC96897-3W/Y	3.9	3.6	3.8	4.7	90	4.4
AC96897-4W/Y	4.6	4.3	4.5	6.8	69	4.4
AC96897-5W/Y	3.9	2.5	3.2	4.9	90	4.8
AC97097-14W	4.4	4.4	4.4	3.8	83	4.8
AC97097-19W	4.3	4.4	4.4	3.8	76	3.4
AC98016-5W	3.2	2.4	2.8	6.0	69	2.0
AC98016-6W	3.9	3.8	3.9	4.8	83	4.2
AC98030-1W	4.6	4.4	4.5	5.6	69	5.0
ATDC9801-3P	4.6	3.8	4.2	4.4	76	5.0
BC0894-2W	4.9	4.6	4.8	4.9	69	4.8
CO95051-7W	4.8	3.2	4.0	6.9	69	4.0
CO95070-7W	4.3	3.9	4.1	4.6	69	4.8
CO96076-7W	4.0	4.1	4.1	5.4	69	4.6
CO96141-4W	4.8	4.3	4.6	6.4	83	4.8
CO96142-4W	4.8	4.3	4.6	5.1	97	3.6
CO96293-4RU	4.7	3.6	4.2	6.5	69	4.8
CO97043-14W	4.4	4.4	4.4	5.4	90	4.8
CO97043-15W	3.7	3.3	3.5	4.2	76	4.2
CO97065-7W	4.3	3.9	4.1	4.5	111	5.0
CO97071-1W	4.1	3.8	4.0	4.3	83	4.8
CO97215-2P/P	-	-	-	5.6	83	-
CO97216-3P/P	-	-	-	5.0	69	-
CO97222-1P/R	-	-	-	4.7	83	-
CO97227-2P/P	-	-	-	5.0	83	-

Table 10A continued on the next page.

Table 10B. Chip color¹ after various storage regimes and specific gravity of San Luis Valley chipping study entries - 2003.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
AC87340-2W	1.074	4.0	3.0	2.0	3.0
AC94296-5W	1.088	4.0	4.0	2.5	2.5
AC96897-3W/Y	1.084	4.0	4.0	3.5	3.0
AC96897-4W/Y	1.090	4.0	3.0	2.5	3.0
AC96897-5W/Y	1.085	5.0	4.5	3.0	3.0
AC97097-14W	1.088	3.5	3.0	2.5	3.5
AC97097-19W	1.085	4.5	3.5	2.5	3.5
AC98016-5W	1.086	4.5	4.0	3.0	4.0
AC98016-6W	1.089	4.0	3.0	3.5	3.5
AC98030-1W	1.077	5.0	4.0	3.5	3.0
AC99213-8W	1.086	3.5	2.0	2.0	1.5
AC99221-4W	1.084	4.0	4.5	3.0	3.5
AC99481-1P	1.094	3.0	2.5	2.5	2.5
AC99481-2P	1.090	3.0	2.5	1.5	3.0
AC99481-5P	1.089	3.0	2.0	1.5	2.5
AC99481-6P	1.096	3.0	1.5	1.5	2.5
AC99481-7P	1.084	3.0	2.0	2.0	3.0
AC99481-8P	1.105	3.0	2.0	2.0	2.0
ATDC9801-3P	1.093	3.0	3.0	1.5	1.5
BC0894-2W	1.076	3.5	3.5	1.5	2.0
CO00011-3W	1.090	4.5	3.5	3.5	3.0
CO00042-1W	1.084	3.5	3.5	2.0	3.5
CO00042-4W	1.088	4.5	4.0	3.5	3.0
CO00042-5W	1.080	3.5	3.5	2.0	2.0
CO00069-4W	1.076	4.5	4.0	3.0	3.0
CO00074-2W	1.075	5.0	4.0	4.0	3.5
CO00102-2W	1.099	5.0	4.0	4.0	3.5
CO00130-1W	1.081	3.5	3.5	2.5	2.5
CO00132-6RU	1.091	4.0	4.0	3.5	2.5
CO00135-1W	1.100	4.5	3.5	3.0	1.5
CO00163-2RU	1.091	4.5	3.0	3.5	3.0
CO00163-4W	1.101	4.5	4.0	3.0	3.5
CO00182-9W	1.081	5.0	4.5	4.0	4.0
CO00182-10W	1.090	4.5	3.5	3.0	2.5

Table 10B continued on the next page.

Table 11A. Yield, grade and tuber shape for Advanced and Western Regional Chipping Trial entries - 2003.

Clone	Yield (Cwt/A)					Tuber Shape ¹
	Total	US #1			<4 oz	
		Total	%	>10 oz		
A91814-5	603	482	80.2	146	76	R
AC87340-2W	531	433	81.6	90	89	R
AC97097-10W	466	411	88.3	158	45	R
AC97097-14W	437	391	88.9	119	45	Ov
AC97097-19W	515	454	88.3	189	47	Ov
B0766-3	442	403	91.3	209	36	Ov
BC0894-2W	366	294	79.7	68	56	R
CO96076-7W	545	446	81.9	116	92	R
CO96083-7RU	318	269	84.7	82	48	R
CO96141-4W	399	361	90.3	176	30	Ov
CO96142-4W	448	343	76.1	70	96	R
CO96293-4RU	465	421	90.5	94	41	Ov
CO97043-14W	483	428	88.5	187	44	R
CO97043-15W	526	441	83.8	210	50	R
CO97065-7W	399	353	88.2	120	41	R
CO97071-1W	446	370	82.7	78	61	Ov
NDA5507-3YF	547	483	88.1	143	57	Ov
NY112	573	529	92.3	265	30	R
Atlantic	477	441	92.4	243	19	Ov
Chipeta	580	523	90.0	270	32	Ov
Mean	478	414	86.4	152	52	----
LSD ² (0.05)	65	65	5.0	58	20	----

¹Tuber shape: R=round; Ov=oval.

²LSD=least significant difference.

Table 11C. Growth characteristics of Advanced and Western Regional Chip Trial entries - 2003.

Clone	% Stand	Emergence Uniformity ¹	Vine Vigor ²	Stems/Plant	Vine Size ³	Vine Type ⁴	Vine Maturity ⁵
A91814-5	99	3.8	4.0	3.5	4.0	3.0	3.3
AC87340-2W	95	3.5	3.0	3.1	3.0	3.0	3.0
AC97097-10W	89	3.0	3.3	3.1	3.5	2.5	3.0
AC97097-14W	92	3.0	3.3	3.0	3.0	2.3	3.0
AC97097-19W	84	3.3	3.0	2.3	4.0	3.3	3.5
B0766-3	98	3.8	3.0	2.3	3.3	3.0	4.0
BC0894-2W	96	3.0	3.0	2.2	2.8	3.3	3.0
CO96076-7W	91	3.5	3.0	3.7	3.3	2.8	3.5
CO96083-7RU	97	3.0	2.0	2.4	2.0	3.0	3.0
CO96141-4W	93	3.3	2.3	2.1	2.8	2.8	3.0
CO96142-4W	95	4.0	4.0	3.5	3.3	2.3	3.3
CO96293-4RU	99	3.8	3.8	3.7	3.3	3.0	2.8
CO97043-14W	97	3.5	3.0	2.5	3.0	3.0	3.0
CO97043-15W	82	3.3	3.3	2.9	3.8	2.8	3.5
CO97065-7W	96	3.0	3.5	2.5	3.0	2.3	3.0
CO97071-1W	91	3.5	3.0	3.0	3.0	2.5	3.0
NDA5507-3YF	93	3.5	4.0	2.9	4.0	3.0	2.5
NY112	99	3.8	3.3	2.1	4.0	3.0	3.8
Atlantic	98	3.8	3.0	2.7	3.0	3.0	3.0
Chipeta	99	4.0	4.0	3.6	4.5	3.0	3.0
Mean	94	3.5	3.2	2.8	3.3	2.8	3.2
LSD ⁶ (0.05)	7.7	0.6	0.4	0.7	0.5	0.6	0.5

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

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

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

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

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

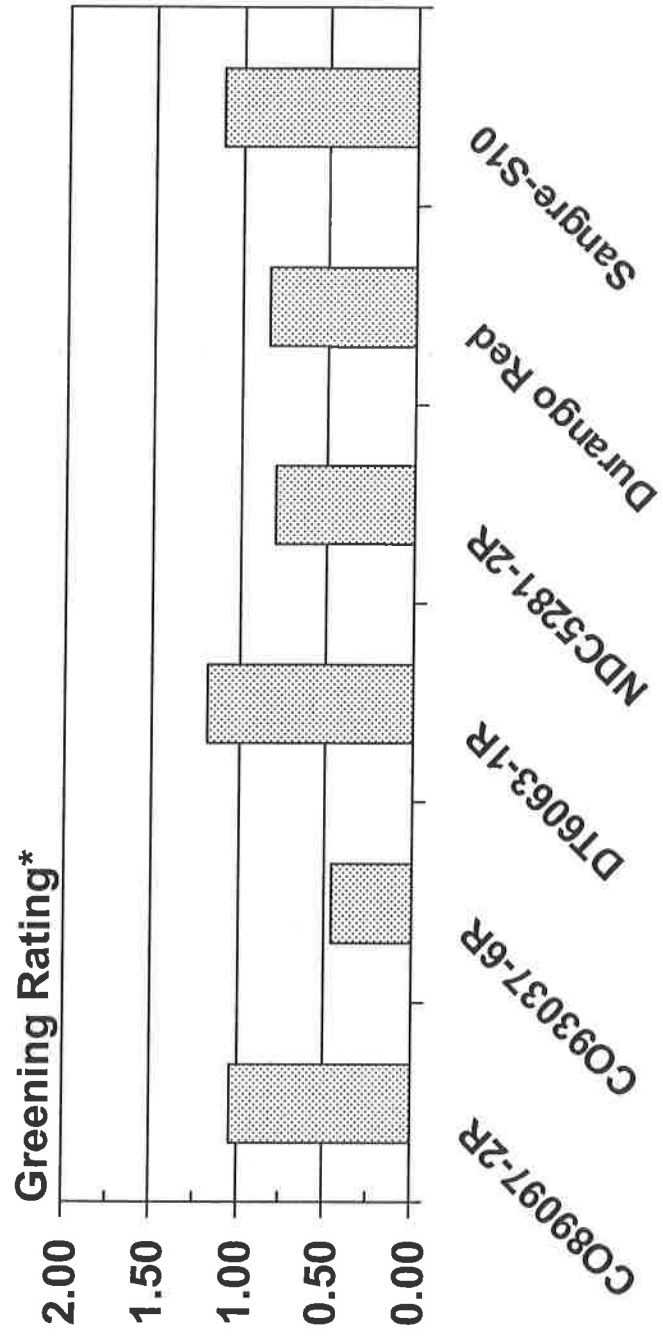
⁶LSD=least significant difference; NS=not significant.

Table 11E. Chip color¹ after various storage regimes and specific gravity of Advanced and Western Regional Chip Trial entries - 2003.

Clone	Specific Gravity	6 wks 40F	6 wks/40F +3 wks/60F	6 wks 50F	6 wks/50F +3 wks/60F
A91814-5	1.088	4.5	4.0	3.5	2.5
AC87340-2W	1.085	3.0	2.5	2.5	3.0
AC97097-10W	1.088	4.0	4.0	3.5	3.0
AC97097-14W	1.098	3.5	3.5	2.5	1.5
AC97097-19W	1.095	4.0	3.5	3.5	2.5
B0766-3	1.088	4.5	4.0	3.0	3.0
BC0894-2W	1.085	2.0	2.0	2.5	2.0
CO96076-7W	1.085	4.5	3.0	3.5	2.5
CO96083-7RU	1.082	3.5	2.5	2.5	2.0
CO96141-4W	1.084	3.5	3.0	2.5	2.0
CO96142-4W	1.088	3.5	2.5	2.5	2.0
CO96293-4RU	1.092	4.0	2.5	2.5	2.0
CO97043-14W	1.086	4.0	2.5	2.5	1.5
CO97043-15W	1.081	4.5	3.5	3.5	3.0
CO97065-7W	1.095	3.5	3.0	3.0	2.0
CO97071-1W	1.093	4.0	4.0	2.5	3.0
NDA5507-3YF	1.080	3.5	3.0	3.5	2.0
NY112	1.086	4.0	3.5	3.0	3.5
Atlantic	1.095	4.0	4.0	4.0	3.5
Chipeta	1.091	4.0	4.0	3.0	2.5

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

**Figure 5. Tuber Greening Study:
Red Selections and Cultivars - 2003**



*Greater values indicate more greening

Figure 6. Photographs of advanced selections - 2003.



Figure 6 (cont'd). Photographs of advanced selections - 2003.



Figure 6 (cont'd). Photographs of advanced selections - 2003.



Table 13A. Detailed data summary for AC89536-5RU.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	10	518	367-683	
Yield US #1 (Cwt/A)	10	426	255-603	
% US #1	10	81.7	69.2-89.5	
Yield >10 oz (Cwt/A)	10	134	14-246	
Yield <4 oz (Cwt/A)	10	75	50-111	
% External Defects ¹	10	3.4	0.7-8.7	
% Hollow Heart ²	10	0.5	0.0-1.6	
% Stand	10	99	97-100	
Emergence Uniformity	10	3.7	3.0-4.0	
Vine Vigor ³	10	3.5	2.0-4.5	
Stems/Plant	10	3.1	2.0-3.6	
Vine Size ⁴	10	3.9	3.5-4.5	
Vine Maturity ⁵	10	3.1	2.5 -3.5	
Blackspot ⁶	Bud End	11	4.7	4.2-5.0
	Stem End	11	4.4	3.0-5.0
	Average	11	4.5	
Weight Loss ⁷	11	5.4	3.6-7.1	
Dormancy ⁸	11	85	76-106	
Enzymatic Browning ⁹	11	3.9	3.2-5.0	
Specific Gravity	11	1.086	1.079-1.094	
Fry Color ¹⁰	Harvest	11	2.4	1.0-4.0
	Storage	11	3.2	3.0-4.0
Fry Texture ¹¹	Harvest	11	3.1	2.0-4.0
	Storage	11	2.9	2.0-4.0

Refer to footnotes on page 78.

Table 13C. Detailed data summary for TC1675-1RU.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	6	447	409-533	
Yield US #1 (Cwt/A)	6	340	275-420	
% US #1	6	75.6	64.5-82.8	
Yield >10 oz (Cwt/A)	6	86	35-155	
Yield <4 oz (Cwt/A)	6	89	67-136	
% External Defects ¹	6	3.9	2.7-5.7	
% Hollow Heart ²	6	0.1	0.0-0.7	
% Stand	6	98	95-100	
Emergence Uniformity	6	3.2	2.8-3.5	
Vine Vigor ³	6	3.1	2.8-3.5	
Stems/Plant	6	3.3	2.4-4.9	
Vine Size ⁴	6	3.4	3.0-4.0	
Vine Maturity ⁵	6	3.2	3.0-3.5	
Blackspot ⁶	Bud End	7	4.4	3.6-4.9
	Stem End	7	3.4	2.4-4.9
	Average	7	3.9	
Weight Loss ⁷	7	2.8	1.6-3.6	
Dormancy ⁸	7	102	70-115	
Enzymatic Browning ⁹	7	3.2	2.2-3.6	
Specific Gravity	7	1.090	1.080-1.101	
Fry Color ¹⁰	Harvest	7	1.0	1.0-1.0
	Storage	7	1.6	1.0-2.0
Fry Texture ¹¹	Harvest	7	3.6	2.0-4.0
	Storage	7	3.6	2.0-4.0

Refer to footnotes on page 78.

Table 13E. Detailed data summary for CO93001-11RU.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	5	423	373-518	
Yield US #1 (Cwt/A)	5	345	283-436	
% US #1	5	81	75.7-84.2	
Yield >10 oz (Cwt/A)	5	78	59-104	
Yield <4 oz (Cwt/A)	5	62	44-76	
% External Defects ¹	5	3.7	2.0-6.1	
% Hollow Heart ²	5	0.4	0.0-1.3	
% Stand	5	99	97-100	
Emergence Uniformity	5	3.6	3.0-3.8	
Vine Vigor ³	5	3.4	2.5-4.0	
Stems/Plant	5	4.1	2.8-5.7	
Vine Size ⁴	5	3.0	2.3-4.0	
Vine Maturity ⁵	5	2.4	2.0-3.0	
Blackspot ⁶	Bud End	6	4.3	3.3-5.0
	Stem End	6	4.0	3.4-4.8
	Average	6	4.2	
Weight Loss ⁷	6	6.1	3.9-8.1	
Dormancy ⁸	6	63	51-71	
Enzymatic Browning ⁹	6	2.9	1.6-4.4	
Specific Gravity	6	1.077	1.071-1.086	
Fry Color ¹⁰	Harvest	6	1.0	1.0-1.0
	Storage	6	1.2	1.0-2.0
Fry Texture ¹¹	Harvest	6	2.7	2.0-3.0
	Storage	6	3.2	3.0-4.0

Refer to footnotes on page 78.

Table 13G. Detailed data summary for Centennial Russet.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	35	294	177-392	
Yield US #1 (Cwt/A)	35	229	129-320	
% US #1	35	77.4	61.9-89.0	
Yield >10 oz (Cwt/A)	35	26	4-72	
Yield <4 oz (Cwt/A)	35	62	32-102	
% External Defects ¹	35	0.8	0.0-3.3	
% Hollow Heart ²	35	0.3	0.0-3.3	
% Stand	35	97	90-99	
Emergence Uniformity	15	3.2	3.0-3.5	
Vine Vigor ³	15	2.2	1.0-3.0	
Stems/Plant	27	3.0	2.2-3.6	
Vine Size ⁴	15	2.6	2.0-3.0	
Vine Maturity ⁵	15	3.0	2.5-3.5	
Blackspot ⁶	Bud End	36	4.8	3.7-5.0
	Stem End	36	4.8	4.2-5.0
	Average	39	4.8	
Weight Loss ⁷	39	6.6	2.7-9.0	
Dormancy ⁸	32	87	57-123	
Enzymatic Browning ⁹	34	4.0	3.2-5.0	
Specific Gravity	46	1.080	1.069-1.092	
Fry Color ¹⁰	Harvest	38	3.7	3.0-4.0
	Storage	38	3.9	3.0-5.0
Fry Texture ¹¹	Harvest	38	2.3	1.0-4.0
	Storage	38	2.2	1.0-3.0

Refer to footnotes on page 78.

Table 13I. Detailed data summary for Russet Nugget.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	48	423	284-585	
Yield US #1 (Cwt/A)	48	342	225-518	
% US #1	48	80.4	68.0-93.0	
Yield >10 oz (Cwt/A)	48	88	11-258	
Yield <4 oz (Cwt/A)	48	74	30-133	
% External Defects ¹	48	1.6	0.1-4.3	
% Hollow Heart ²	48	0.2	0.0-1.9	
% Stand	48	98	90-100	
Emergence Uniformity	38	3.3	3.0-4.0	
Vine Vigor ³	38	3.3	3.0-4.0	
Stems/Plant	44	3.3	2.1-5.1	
Vine Size ⁴	38	4.2	3.3-5.0	
Vine Maturity ⁵	48	3.7	1.8-4.3	
Blackspot ⁶	Bud End	54	4.7	3.0-5.0
	Stem End	54	4.4	2.1-5.0
	Average	57	4.6	
Weight Loss ⁷	57	3.6	1.7-5.5	
Dormancy ⁸	52	92	57-116	
Enzymatic Browning ⁹	53	4.0	3.2-4.6	
Specific Gravity	59	1.092	1.072-1.110	
Fry Color ¹⁰	Harvest	57	1.7	0.5-3.0
	Storage	57	2.1	1.0-3.0
Fry Texture ¹¹	Harvest	57	3.9	2.0-5.0
	Storage	57	3.8	2.0-5.0

Refer to footnotes on page 78.

Table 13K. Detailed data summary for NDC5281-2R.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	6	396	321-474	
Yield US #1 (Cwt/A)	6	192	115-272	
% US #1	6	48.6	28.4-61.3	
Yield >10 oz (Cwt/A)	6	5	0-14	
Yield <4 oz (Cwt/A)	6	201	123-289	
% External Defects ¹	6	0.7	0.0-1.8	
% Hollow Heart ²	6	0.0	0.0-0.0	
% Stand	6	97	96-99	
Emergence Uniformity	6	3.5	3.3-4.0	
Vine Vigor ³	6	3.1	2.8-3.5	
Stems/Plant	6	4.6	2.9-6.4	
Vine Size ⁴	6	3.1	2.5-3.8	
Vine Maturity ⁵	6	1.9	1.0-3.0	
Blackspot ⁶	Bud End	7	3.2	2.1-4.7
	Stem End	7	2.9	1.8-4.2
	Average	7	3.1	
Weight Loss ⁷	7	8.2	5.2-10.2	
Dormancy ⁸	7	81	70-101	
Enzymatic Browning ⁹	7	1.4	1.0-2.4	
Specific Gravity	7	1.086	1.080-1.096	
Fry Color ¹⁰	Harvest	7	1.7	1.0-3.0
	Storage	7	2.0	1.0-4.0
Fry Texture ¹¹	Harvest	7	2.9	2.0-4.0
	Storage	7	2.6	1.0-3.0

Refer to footnotes on page 78.

Table 13M. Detailed data summary for Sangre.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	25	478	364-616	
Yield US #1 (Cwt/A)	25	413	305-548	
% US #1	25	86.1	72.2-92.8	
Yield >10 oz (Cwt/A)	25	144	35-319	
Yield <4 oz (Cwt/A)	25	57	30-117	
% External Defects ¹	25	1.6	0.0-5.7	
% Hollow Heart ²	25	1.3	0.0-8.2	
% Stand	25	97	92-100	
Emergence Uniformity	15	3.2	2.5-4.3	
Vine Vigor ³	15	2.8	1.8-4.8	
Stems/Plant	25	3.1	1.9-4.7	
Vine Size ⁴	15	3.8	3.0-4.0	
Vine Maturity ⁵	25	2.9	1.5-4.0	
Blackspot ⁶	Bud End	35	4.0	2.0-5.0
	Stem End	35	4.3	2.5-5.0
	Average	36	4.1	
Weight Loss ⁷	36	3.6	1.6-5.1	
Dormancy ⁸	32	90	69-109	
Enzymatic Browning ⁹	33	3.2	1.8-4.8	
Specific Gravity	36	1.073	1.059-1.085	
Fry Color ¹⁰	Harvest	35	3.3	1.0-4.0
	Storage	35	3.3	1.0-4.0
Fry Texture ¹¹	Harvest	35	2.5	1.0-4.0
	Storage	35	2.4	1.0-3.0

Refer to footnotes on page 78.

Table 130. Detailed data summary for CO94183-1R/R.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	4	407	385-449	
Yield US #1 (Cwt/A)	4	302	261-354	
% US #1	4	73.8	67.2-78.8	
Yield >10 oz (Cwt/A)	4	31	9-63	
Yield <4 oz (Cwt/A)	4	99	91-116	
% External Defects ¹	4	1.5	0.9-2.4	
% Hollow Heart ²	4	0.0	0.0-0.0	
% Stand	4	98	96-100	
Emergence Uniformity	4	3.8	3.0-4.3	
Vine Vigor ³	4	2.6	2.0-3.0	
Stems/Plant	4	3.4	2.7-4.2	
Vine Size ⁴	4	3.0	2.5-4.0	
Vine Maturity ⁵	4	2.6	1.5-3.5	
Blackspot ⁶	Bud End	7	2.4	1.8-3.1
	Stem End	7	2.2	1.5-3.3
	Average	7	2.3	
Weight Loss ⁷	7	5.1	3.7-6.3	
Dormancy ⁸	7	92	77-105	
Enzymatic Browning ⁹	---			
Specific Gravity	7	1.079	1.074-1.084	
Chip Color ¹⁰	40	---		
	40R	---		
	50	---		
	50R	---		

Refer to footnotes on page 78.

Table 13Q. Detailed data summary for VC1002-3W/Y.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	4	472	416-522	
Yield US #1 (Cwt/A)	4	234	163-355	
% US #1	4	49.2	39.0-68.0	
Yield >10 oz (Cwt/A)	4	23	10-33	
Yield <4 oz (Cwt/A)	4	233	164-297	
% External Defects ¹	4	0.8	0.0-2.2	
% Hollow Heart ²	4	0.2	0.0-0.7	
% Stand	4	93	86-98	
Emergence Uniformity	4	3.1	2.5-3.3	
Vine Vigor ³	4	3.5	2.5-4.0	
Stems/Plant	4	4.2	3.3-4.6	
Vine Size ⁴	4	3.8	3.3-4.0	
Vine Maturity ⁵	4	2.7	2.3-3.0	
Blackspot ⁶	Bud End	9	4.4	4.1-4.9
	Stem End	9	4.4	3.7-4.9
	Average	9	4.4	
Weight Loss ⁷	9	3.6	1.7-5.6	
Dormancy ⁸	9	94	83-105	
Enzymatic Browning ⁹	9	4.4	3.8 5.0	
Specific Gravity	10	1.090	1.080-1.098	
Fry Color ¹⁰	Harvest	3	1.0	1.0-1.0
	Storage	3	1.0	1.0-1.0
Chip Color ¹⁰	40	7	5.0	5.0 5.0
	40R	7	4.3	3.0 5.0
	50	7	2.6	2.0 3.5
	50R	7	2.8	2.0 3.5

Refer to footnotes on page 78.

Table 13S. Detailed data summary for Yukon Gold.

Variable	# Trials	Mean	Range	
Total Yield (Cwt/A)	12	404	321-513	
Yield US #1 (Cwt/A)	12	354	293-439	
% US #1	12	87.6	81.6-94.3	
Yield >10 oz (Cwt/A)	12	160	93-248	
Yield <4 oz (Cwt/A)	12	41	22-66	
% External Defects ¹	12	2.2	0.6-4.4	
% Hollow Heart ²	12	0.9	0.0-2.2	
% Stand	12	97	94-100	
Emergence Uniformity	12	3.3	2.5-3.8	
Vine Vigor ³	12	3.7	3.3-4.0	
Stems/Plant	12	2.2	1.6-2.9	
Vine Size ⁴	12	3.0	2.8-3.3	
Vine Maturity ⁵	12	1.9	1.0-2.5	
Blackspot ⁶	Bud End	16	3.7	2.0-5.0
	Stem End	16	3.4	2.4-5.0
	Average	16	3.6	
Weight Loss ⁷	16	3.0	1.3-4.3	
Dormancy ⁸	16	90	69-118	
Enzymatic Browning ⁹	16	4.4	3.8 5.0	
Specific Gravity	16	1.084	1.079-1.089	
Fry Color ¹⁰	Harvest	16	1.8	1.0-2.0
	Storage	16	2.8	2.0-4.0
Fry Texture ¹¹	Harvest	16	2.9	1.0-4.0
	Storage	16	2.8	1.0-4.0

Refer to footnotes on page 78.

Table 14. Late blight foliar and tuber infection levels for Colorado selections planted in twelve-hills non-replicated plots in Corvallis, Oregon - 2003.

Clone	Foliar Infection Rating ¹		% Tuber Infection ²	Parentage	
	9/19/03	9/25/03		Female	Male
AC96783-1RU	9	9	0	A90586-11	A9014-2
AC96783-6RU	5	9	0	A90586-11	A9014-2
AC97044-2RU ₃	8	9	0	A95053-61	A91194-4
AC97044-4RU³	7	7	0	A95053-61	A91194-4
AC99336-1RU	8	9	0	A90586-11	A93152-1
AC99336-2RU	9	8	0	A90586-11	A93152-1
AC99363-3RU	9	9	0	A9551-2	A9230-5
AC99364-5RU	8	9	0	A9551-2	Wallowa Russet
AC99375-1RU	8	7	0	AWN86514-2	A89384-10
AC99378-5RU	8	9	0	AWN86514-2	A91186-2
AC99380-4RU	6	7	0	AWN86514-2	A9324-4
AC99381-1RU	8	9	0	AWN86514-2	A9446-7
AC99381-3RU	7	9	0	AWN86514-2	A9446-7
AC99392-4RU	8	9	0	B0767-2RU	A89384-10
AC99438-2RU	6	8	40	Torridon	A88431-1
ATC98023-1RU	9	9	0	A95053-61	A92158-3
CO99135-2RU/Y	8	9	0	AWN85540-1	Silverton Russet
CO99135-4RU/Y	9	9	0	AWN85540-1	Silverton Russet
CO99140-2RU/Y	9	9	0	AWN85540-1	AC93047-1
CO00047-3RU/Y	7	7	20	AWN86514-2	Silverton Russet
CO00047-4RU/Y	8	9	0	AWN86514-2	Silverton Russet
CO00051-1RU/Y	6	8	0	AWN86514-2	Russet Nugget
CO00130-1W	8	9	20	ND6947B-20	AC87340-2
CO00132-6RU	9	9	0	ND6947B-20	Chipeta
CO00163-2W	9	9	0	Chipeta	Zarevo
CO00163-4W	9	9	0	Chipeta	Zarevo
CO99136-1W	9	9	0	AWN85540-1	AC87138-4
CO99139-1W	9	9	0	AWN85540-1	AC91014-2
CO00011-3W	8	9	0	A8961-14	AC87340-2
CO00015-2P	9	9	40	A8961-14	CO86218-2
CO00031-2W	8	9	0	Silverton Russet	AO80432-1
CO00031-3RU	9	9	0	Silverton Russet	AO80432-1
CO00031-4RU	9	9	22	Silverton Russet	AO80432-1
CO00031-5RU	9	9	0	Silverton Russet	AO80432-1
CO00031-7RU	9	9	20	Silverton Russet	AO80432-1
CO00042-1W	9	9	40	AC87340-2	ND6947B-20
CO00042-4W	9	9	14	AC87340-2	ND6947B-20

Table 14 continued on the next page.

Table 15. Late blight foliar and tuber infection levels for Colorado selections planted in twelve-hills non-replicated plots in Corvallis, Oregon: 2002-2003.

Clone	Foliar Infection Rating ¹		% Tuber Infection ²	Parentage	
	02/03	02/03		Female	Male
AC96848-2RU	1/8	4/9	0/0	COA90064-6	B0718-3
AC96897-3W/Y	2/8	3/8	30/20	PI583331	A91746-8
AC96897-4W/Y	3/7	5/7	30/0	PI583331	A91746-8
AC96897-5W/Y	1/9	5/9	0/0	PI583331	A91746-8
AC97019-1RU	2/8	6/8	0/0	A90621-4	B0718-3
AC97069-1W	1/8	5/8	10/0	AWN86514-2	A90609-6
AC98002-4RU	1/5	2/5	10/20	A90586-11	A9308-5
AC98002-5RU	2/6	4/7	0/0	A90586-11	A9308-5
AC98016-5W	4/8	6/9	10/20	A9553-55	NDA5698-8
AC98016-6W	2/7	4/7	0/20	A9553-55	NDA5698-8
AC98019-1RU	2/6	6/4	0/0	A9553-61	A90603-3
AC98029-2RU	4/7	6/8	10/0	A9553-61	NDA5698-8
AC98029-4W	1/8	6/9	0/0	A9553-61	NDA5698-8
AC98030-1W	3/7	6/8	40/0	A9553-61	NDO1496-1
AC98043-2RU	1/4	1/4	10/0	B0767-2	A9308-5
AC98049-1W	2/7	6/8	0/0	G6582-3	A91790-13
AC98051-2W	1/8	5/9	0/0	G6582-3	NDO1496-1
AC98056-1RU	4/6	5/7	0/0	J138A4	A9308-5
AC98059-2R	1/7	3/7	0/0	J138A4	A93456-6R
AC98059-4P	2/3	5/5	10/0	J138A4	A93456-6R
AC98059-6R	1/1	2/2	10/20	J138A4	A93456-6R
PAC99N15-1RU	1/8	2/8	0/0	A90586-11	A77715-6

¹Ratings: 1 = no foliar injury; 2 = 1-5% injury; 3 = 5-10% injury; 4 = 10-20%; 5 = 25-40%; 6 = 40-60%; 7 = 60-75%; 8 = 75-90%; 9 = 90-100% injury. Readings in 2002 were taken on 9/20 and 9/27. Readings in 2003 were taken on 9/19 and 9/25. Values before the slash are for 2002 and after the slash are for 2003.

²Percent of late blight infected tubers based on 10 randomly selected tubers. Values before the slash are for 2002 and after the slash are for 2003.

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.

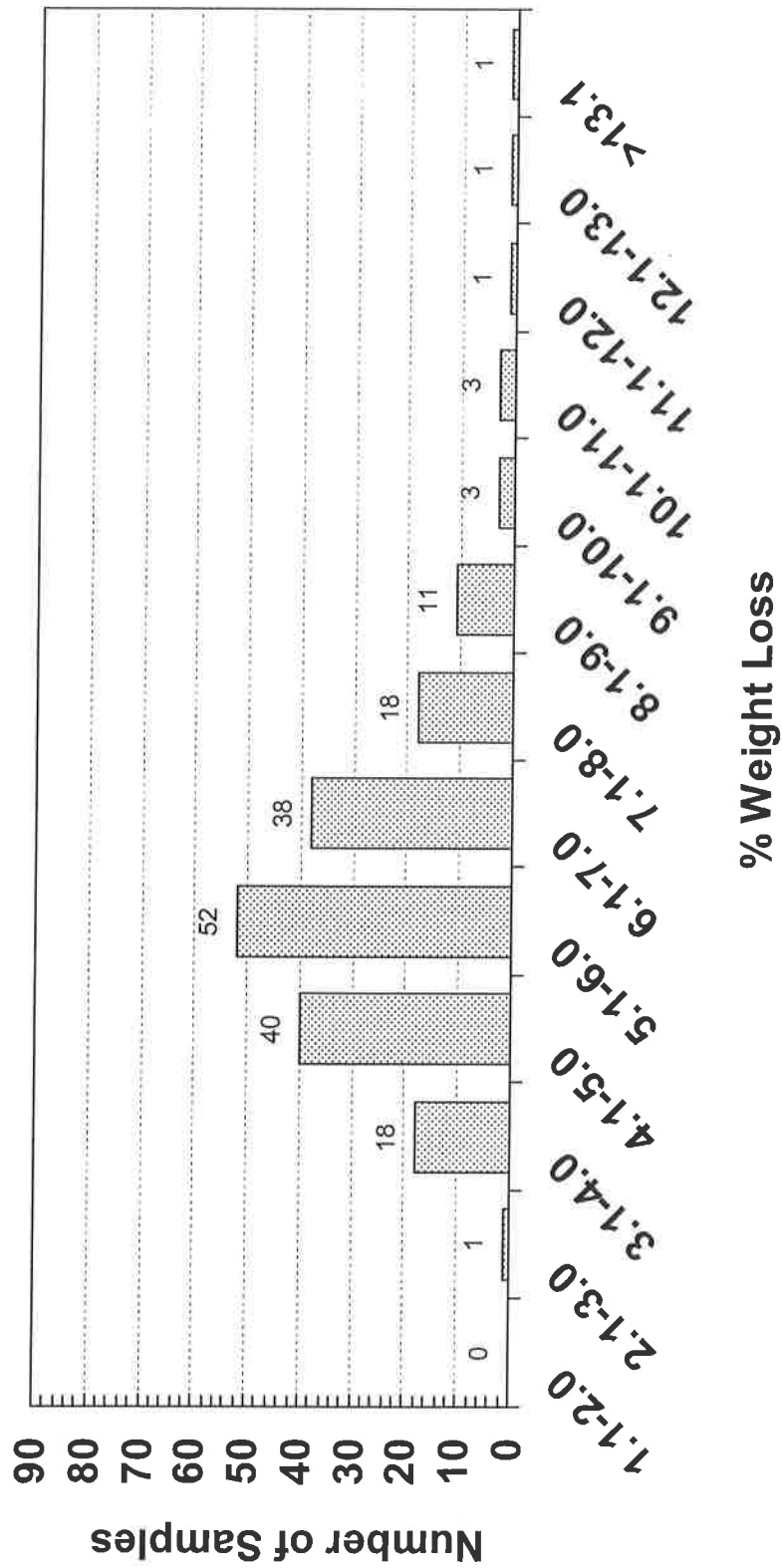
Enzymatic Browning. Five tubers of each clone are cut in half lengthwise and rated for degree of darkening 60 minutes later. Degree of darkening is rated on a 1 to 5 scale, with 5 indicating no discoloration.

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

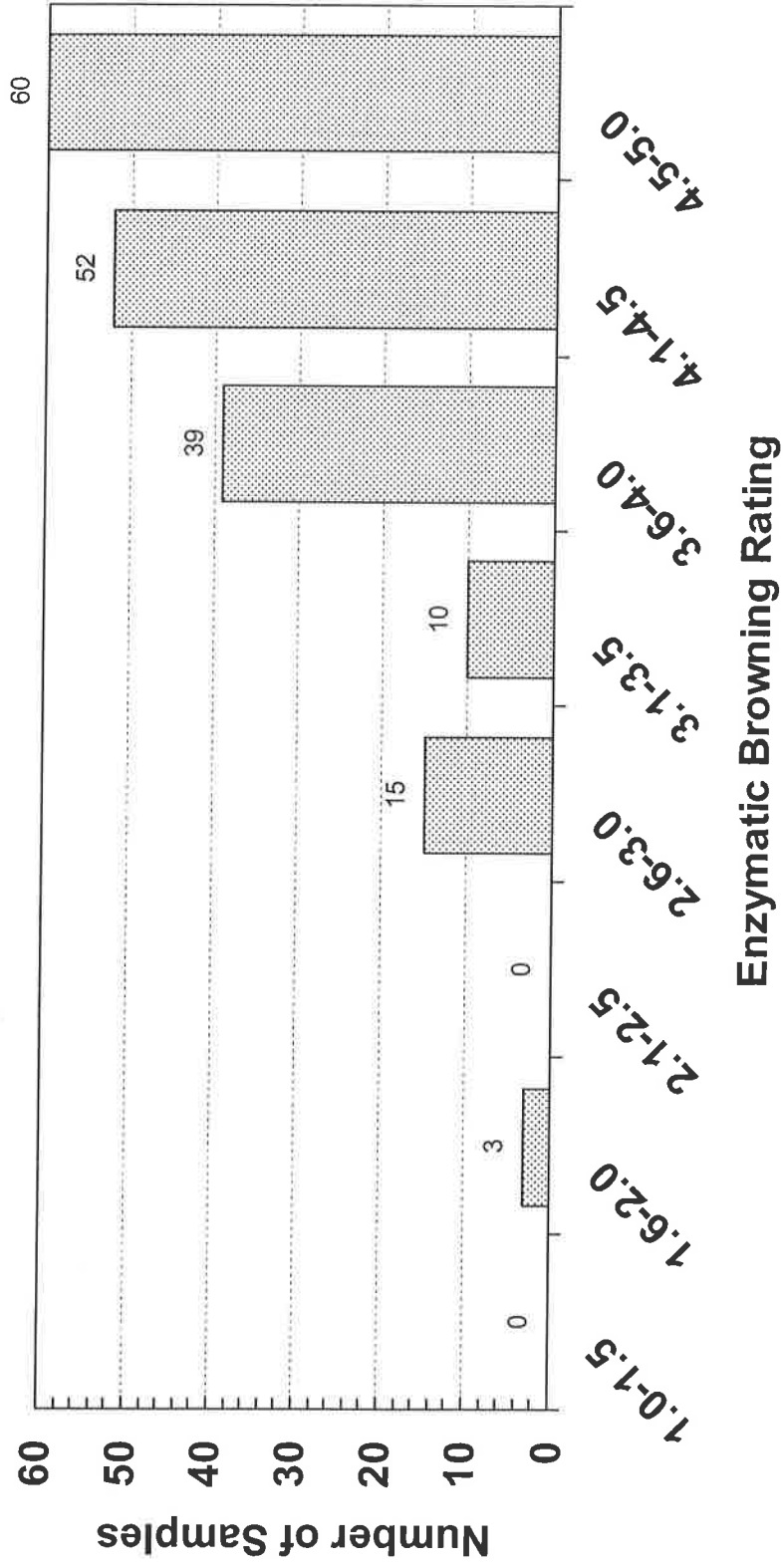
Fry Color and Texture. Fry color and texture is determined at or shortly after harvest and after a minimum of eight weeks of storage at 45F. Fries are cooked for 3 ½ minutes at 375F. Fry color is rated on a 0-4 scale using the USDA color standards. Color ratings ≤ 2 are acceptable. Fry texture is rated 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 ≤ 2.0 are acceptable.

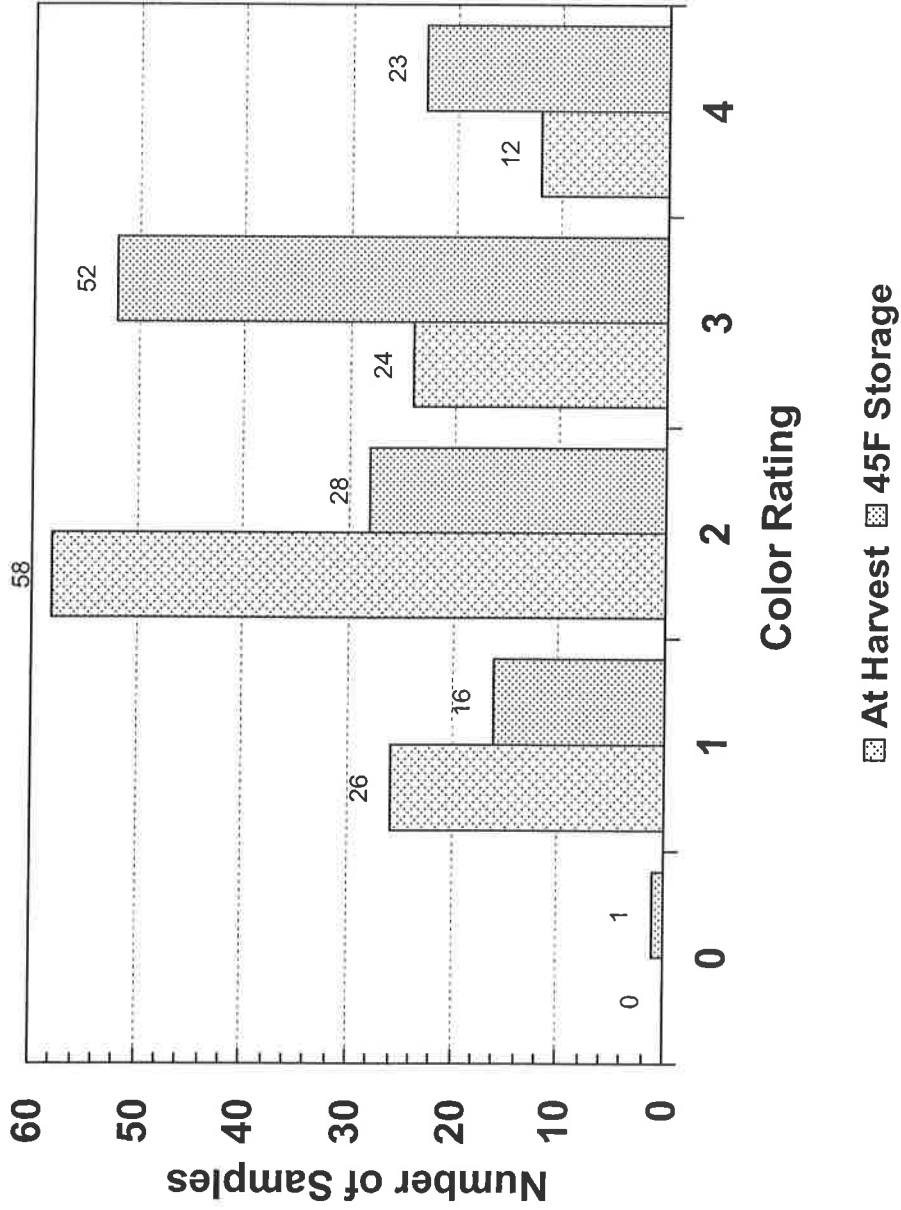
Appendix 4. % Weight Loss Distribution (187 Samples) - 2003



Appendix 6. Enzymatic Browning Distribution (179 Samples) - 2003



Appendix 8. Fry Color Distribution (120 Samples) - 2003



0=Lightest (values ≤ 2 acceptable)

Appendix 10. % Acceptable Chip Color (88 Samples) - 2003

