

SUMMARY RESEARCH PROGRESS REPORT FOR 1989  
AND RESEARCH PROPOSAL FOR 1990

Submitted to:

SLV Research Center Committee

and the

Area II Potato Administrative Committee

TITLE: Potato Breeding and Selection

PROJECT LEADER: David G. Holm

PROJECT JUSTIFICATION:

Development of new potato cultivars will help assure that the potato industry in Colorado remains productive and in a competitive position. New cultivars with increased yield, improved qualities and resistance to various physiological disorders, diseases and pests can provide long-term, cost-effective benefits to the potato industry.

PROJECT STATUS: This is an ongoing project.

SIGNIFICANT ACCOMPLISHMENTS FOR 1989:

Thirty parental clones were intercrossed in 1989. Seeds from 122 combinations were obtained. Sixty seedling families were grown in the greenhouse producing 14,044 tubers for initial selection in 1990.

A total of 71,215 first-year seedlings were planted, with 781 being selected for further observation. Another 578 clones were in various stages of preliminary and intermediate testing. One hundred seventy-nine of these clones were saved for further evaluation. Twenty-one advanced selections (18 russets, 2 chippers, and 1 long white) were saved and will be increased.

Eight selections were evaluated in the Western Regional Chipping Trial. Top rated clones were A80559-2, AC80545-1, NDA2031-2, and NDO1496-1.

Thirteen selections were compared in the Western Regional Trial. Top rated clones for fresh market were AC77101-1, AC78069-17, AO82283-1, BC0038-1, NDTX9-1068-11R, and TXND329-1. Top rated clones for processing were AC78069-17, AO82283-1, BC0038-1, and TXND329-1.

Grower evaluations were conducted on three russets (A74212-1, AC77101-1, and CO8011-5), two chippers (AC80545-1 and BR7093-24), and one long white (BC0038-1). Grower testing will continue on all of these selections in 1990.

Gemchip (BR7093-24) was named in 1989 jointly by the Colorado, Idaho, Washington, and Oregon Experiment Stations and the USDA-ARS. Gemchip will chip from the field and storage. Frontier Russet (A74114-4) will be named in 1990 by the same cooperating agencies. Frontier Russet is a dual purpose potato with fresh market and processing qualities. Century Russet (A74212-1) will also be named cooperatively with Oregon in 1990.

AC80545-1 will be named by early 1991 pending processing tests by commercial chippers.

Two leaf mutations were compared to the standard Centennial Russet for yield, grade, vine maturity, and virus content for a third year. Average total and US #1 yields for the flat leaf mutation were greater (36 and 14 cwt respectively) than the standard. Average total and US #1 yields of the pebble leaf mutation were less (25 and 45 cwt respectively) than the standard. No virus X was found over the three year period. PVS infection averaged 30, 18, and 100% respectively for the standard, flat leaf, and pebble leaf mutations. Percent PVS infection was negatively correlated with total yield, US #1 yield, and yield >10 oz.

#### OBJECTIVES FOR 1990:

1. The potato breeding and selection program will be continued. Advanced clones will be tested in yield trials, out-of-state trials, and by growers.
2. The Colorado Western Regional and Regional Chip Trial will be conducted again.
3. The study comparing the Centennial Russet mutations will be continued. Emphasis will be placed on generating virus tested seed stocks for further studies to determine if the supposed pebble leaf mutation is genetic or due to PVS infection. With clean seed stocks potential differences in PVS susceptibility will be evaluated.

FUNDING REQUEST:                    1989 Allocation:    \$8,700.00

#### 1990 Budget Request

Labor	\$7,450.00
Travel	700.00
Supplies	<u>2,650.00</u>
Total	\$10,800.00

**RESEARCH PROGRESS REPORT FOR 1989**  
**"POTATO BREEDING AND SELECTION"**

**SUBMITTED TO THE**  
**SLV RESEARCH CENTER COMMITTEE**  
**AND THE**  
**COLORADO POTATO ADMINISTRATIVE**  
**COMMITTEE (AREA II)**

**BY**  
**DAVID G. HOLM**  
**SAN LUIS VALLEY RESEARCH CENTER**

## RESEARCH PROGRESS REPORT FOR 1989

### "Potato Breeding and Selection"

Submitted by

David G. Holm

San Luis Valley Research Center

Research was conducted in the following areas in 1989:

- A) Potato Breeding
- B) Seedling Selection and Clonal Development
  - Advanced Yield Trial
  - Chipping Studies
  - Western Regional Trial
  - Western Regional Chipping Trial
  - Out-of-State Trials
  - Grower Evaluations
- C) Centennial Russet Mutation Studies

#### POTATO BREEDING

Thirty parental clones were intercrossed in 1989. Seeds from 122 combinations were obtained. Sixty seedling families were grown in the greenhouse producing 14,044 tubers for initial selection in 1990. Surplus tubers will be distributed to Idaho, Oregon, Texas, and Alberta, Canada.

Seedling tubers were obtained from Dr. J. J. Pavek, Aberdeen, Idaho, Dr. J. Creighton Miller, Lubbock, Texas, and Dr. Kathleen Haynes, Beltsville, Maryland.

#### SEEDLING SELECTION AND CLONAL DEVELOPMENT

A total of 71,215 first-year seedlings were planted, with 781 being selected for further observation. Another 578 clones were in various stages of preliminary and intermediate testing. One hundred seventy-nine of these clones were saved for further evaluation. Twenty-one advanced selections (18 russets, 2 chippers, and 1 long white) were saved and will be increased. Another 119 clones were maintained for breeding and other experimental purposes.

Advanced Yield Trial. Twenty-six clones, 22 advanced selections and four cultivars, were evaluated in the advanced yield trial. Results on yield, grade, and other characteristics are summarized in Table 1. Data on grade defects are presented in Table 2.

Several clones had acceptable yields (total and US #1). Clone C082142-1 will be entered in the 1990 Western Regional Trials.

Chipping Studies. Thirty clones, 27 selections and 3 cultivars, were tested for chipping potential at harvest and after various storage regimes. This information is presented in Table 3.

Overall chip color was very good in 1989. None of the clones produced acceptable chips after 10 weeks of 40°F storage. However, several of these clones after reconditioning did produce acceptable chips. Thirteen selections had color ratings better than Norchip (<2.0) after 10 weeks of 50°F storage and three weeks of 60°F reconditioning.

Results of chipping tests by Borden, Inc. are given in Table 4. Ten selections had color ratings better than Norchip.

Western Regional Trial. Thirteen selections and six cultivars were grown in the Western Regional Trial. Six clones were entered by Colorado in this cooperative trial conducted at 13 locations in the Western United States. Tables 5 and 6 present the data collected on these selections.

Top rated clones for fresh market were AC77101-1, AC78069-17, A082283-1, BC0038-1, NDTX9-1068-11R, and TXND329-1. Top rated clones for processing were AC78069-17, A082283-1, BC0038-1, and TXND329-1.

Western Regional Chipping Trial. Eight selections and two cultivars were compared in the Western Regional Chipping Trial at five locations in the Western United States. Results of this trial are presented in Tables 7, 8 and 9.

All but one selection produced acceptable chips after 10 weeks of 50°F storage and three weeks of 60°F reconditioning. Top rated clones were A80559-2, AC80545-1, NDA2031-2, and NDO1496-1.

Selections A80559-2 and AC80545-1 were graduated from the regional trials because they have been entered for three years.

Selection AC83306-1 will be formally entered in the Western Regional Chipping Trials in 1990.

Out-of-State Trials. Testing of advanced clones in other states is an ongoing part of the breeding and selection project. California is the primary out-of-state testing area. Selections are evaluated in both observational and yield trials.

Twenty-three selections (18 russets, 4 chippers, and 1 long white) and the Sangre selections were tested in California in 1989. Clones showing promise and being tested in 1990 in large lots in California are: AC77101-1, AC80545-1, BC0038-1, and C08011-5.

The Sangre selections continue to do well in California.

Grower Tests. Grower evaluations were conducted on three russets (A74212-1, AC77101-1, and C08011-5), two chippers (AC80545-1 and

BR7093-24), and one long white (BC0038-1). Grower testing will continue on all of these selections in 1990.

Data on these selections and recently named and standard cultivars are summarized in Table 10.

AC80545-1 will be named by early 1991 pending processing tests by commercial chippers.

Grower response to the Sangre selections remains positive with more acreage being produced.

No new selections will be released in 1990 for grower evaluation.

Clones with potential for release to growers in 1991 are AC78069-17, AC81198-11, C079018-11, C081082-1 and C081095-4. All of these clones are russets. AC78069-17, C079018-11, and C081095-4 are all dual purpose potatoes with fresh market and processing qualities. The other clones are strictly fresh market potatoes.

Cultivar Releases. Gemchip (BR7093-24) was named in 1989 jointly by the Colorado, Idaho, Washington, and Oregon Experiment Stations and the USDA-ARS. Gemchip will chip from the field and storage. Frontier Russet (A74114-4) will be named in 1990 by the same cooperating agencies. Frontier Russet is an early maturing, dual purpose potato with fresh market and processing qualities. Release notices for both of these cultivars are attached to the back of this report.

Century Russet (A74212-1) will also be named cooperatively with Oregon in 1990.

#### CENTENNIAL RUSSET MUTATION STUDIES

Two leaf mutations were compared to the standard Centennial Russet for yield, grade, vine maturity, and virus content for a third year. Results are summarized in Table 11.

Average total and US #1 yields for the flat leaf mutation were greater (36 and 14 cwt respectively) than the standard. Average total and US #1 yields of the pebble leaf mutation were less (25 and 45 cwt respectively) than the standard. No virus X was found over the three year period. PVS infection averaged 30, 18, and 100% respectively for the standard, flat leaf, and pebble leaf mutations. Percent PVS infection was negatively correlated with total yield, US #1 yield, and yield >10 oz.

Table 1. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for advanced yield trial clones - 1989.

Clone	Yield (Cwt./A)				% Stand	Vine Maturity <sup>1</sup>	Specific Gravity	Stems/Plant	Tuber Shape & Skin Type <sup>2</sup>
	Total	US #1		Total					
		>10 oz	<4 oz						
AC75430-1	399	340	85.0	47	99	3.0	1.101	3.7	Ob, R
AC80369-1	391	292	75.0	68	100	3.2	1.099	5.7	L, R
AC81240-2	357	244	68.2	97	99	2.0	1.084	6.7	L, R
AC82263-1	337	244	72.5	70	98	3.0	1.093	4.3	L, R
AC83044-1	363	302	82.8	35	97	3.0	1.092	2.6	Ob, R
AC83044-2	355	252	71.2	97	99	2.5	1.086	5.4	Ob, R
AC83064-1	441	370	83.9	68	99	3.0	1.087	4.9	Ob, R
AC83064-6	343	283	82.5	59	94	2.8	1.086	3.7	L, R
AC83068-1	491	401	81.4	79	99	3.2	1.088	5.4	L, R
AC83172-1	371	288	77.4	81	98	3.0	1.106	4.4	L, R
BC0224-3	350	228	65.2	118	95	3.0	1.097	3.3	L, R
CO81018-2	329	226	68.6	96	98	3.8	1.092	7.0	Ob, R
CO81038-6	276	178	64.3	93	87	2.0	1.087	6.8	Ob, R
CO81082-1	352	284	80.5	66	98	2.0	1.078	4.4	Ob, R
CO81095-4	312	213	68.3	98	100	3.2	1.102	6.6	Ob, R
CO82142-4	402	360	89.4	40	98	4.0	1.093	4.1	L, R
CO83027-2	389	326	83.6	56	99	3.0	1.094	5.5	Ob, R
CO83027-3	412	333	81.2	52	99	3.0	1.082	4.4	Ob, W
CO83029-2	350	273	78.2	66	98	3.2	1.091	4.0	Ob, R
CO83054-4	337	244	72.2	80	97	2.2	1.095	2.8	Ob, R
CO83120-3	356	280	78.2	72	98	3.0	1.089	4.9	L, R
MN10874	377	287	76.2	87	98	3.0	1.086	5.2	Ob, R
Norgold Russet	351	249	70.7	100	98	1.5	1.078	5.1	Ob, R
Centennial Russet	319	257	80.5	62	97	3.0	1.087	3.0	Ob, R
Russet Burbank	401	290	72.5	87	99	3.5	1.085	3.3	L, R
Russet Nugget	384	323	84.1	60	98	4.0	1.097	3.7	Ob, R
Mean	367	283	76.7	74	98	2.9	1.091	4.6	-----
LSD <sup>3</sup> (0.05)	46	47	6.8	22	4	0.5	-----	1.1	-----

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

<sup>2</sup>Tuber shape: Ob=oblong; L=long. Skin type: R=russet; W=white.

<sup>3</sup>Least significant difference.

Table 2. Grade defects for advanced yield trial clones - 1989.

Clone	% External Defects <sup>1</sup>	External Defects Observed <sup>2</sup>	% Hollow Heart <sup>3</sup>
AC75430-1	3.0	SG*,GC,MS*	2.5
AC80369-1	7.7	SG,GC*,MS	0.0
AC81240-2	4.7	SG,GC*,MS*	1.9
AC82263-1	6.9	SG,GC,MS*	0.0
AC83044-1	7.2	SG,GC*,MS	0.0
AC83044-2	1.5	SG,MS*	0.0
AC83064-1	0.6	GC,MS*	0.0
AC83064-6	0.3	MS*	0.0
AC83068-1	2.2	GC*,GR	0.2
AC83172-1	0.4	MS*	0.0
BC0224-3	1.2	SG,MS*	0.7
CO81018-2	2.2	GC*,MS	0.8
CO81038-6	1.9	GC*,MS,GR	0.0
CO81082-1	0.6	MS*	1.0
CO81095-4	0.3	GC*	1.8
CO82142-4	0.7	GC*,MS*	1.0
CO83027-2	1.7	GC*,MS	0.4
CO83027-3	6.4	GC*,MS,GR	0.6
CO83029-2	3.2	GC*,MS*,GR	1.3
CO83054-4	4.0	GC*,MS	0.0
CO83120-3	1.0	GC*	0.0
MN10874	0.6	MS*	0.0
Norgold Russet	0.4	MS*	1.6
Centennial Russet	0.2	GC*	1.0
Russet Burbank	6.0	SG*,GC,MS	0.5
Russet Nugget	0.4	GC,MS*	1.2

<sup>1</sup>Percent external defects based on the proportion of the total sample weight with significant defects.

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

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



Table 3. Chip color<sup>1</sup> and specific gravity of San Luis Valley chipping study entries - 1989.

Clone	At Harvest	3 wks 70°F	10 wks 40°F	10 wks 50°F	10 wks/40°F +3 wks/60°F	10 wks/50°F +3 wks/60°F	Specific Gravity
A80559-2	2.5	3.0	4.0	2.0	2.0	1.5	1.131
AC80545-1	1.0	2.5	5.0	2.5	4.0	1.0	1.102
AC83282-2	3.5	3.0	3.5	3.0	2.0	1.5	1.112
AC83306-1	2.5	2.5	4.0	2.5	2.0	1.5	1.114
AC83311-1	3.0	3.5	4.5	3.0	3.5	2.0	1.105
AC83311-2	3.0	3.0	4.5	3.5	3.0	1.5	1.105
AC83311-5	1.5	3.0	4.5	2.0	3.0	1.5	1.080
AC83368-3	2.0	3.0	5.0	2.5	4.0	2.0	1.086
AC84545-2	4.0	3.5	4.0	2.5	4.0	1.5	1.093
AC84545-5	2.0	2.0	3.5	2.5	2.5	2.0	1.103
AC84552-2	1.0	1.0	5.0	2.0	4.5	2.0	1.083
AC84552-3	2.0	1.5	4.5	2.5	3.0	2.0	1.111
AC84601-1	2.5	2.5	3.5	2.0	2.0	1.5	1.088
AC84610-2	2.5	1.5	4.5	2.0	3.0	2.0	1.082
AC84610-5	3.0	1.5	5.0	1.5	2.0	1.5	1.100
AC85403-5	2.0	2.0	4.0	1.5	3.0	2.0	1.096
AC85403-12	4.0	4.0	5.0	4.0	4.5	2.5	1.079
AC85438-4	1.0	1.0	3.0	1.0	2.0	1.5	1.094
AC85438-5	4.0	2.5	5.0	2.5	3.0	2.5	1.094
AC85439-3	4.0	4.0	4.5	4.0	4.0	3.0	1.092
AC85461-1	2.5	1.0	5.0	2.5	3.5	2.0	1.078
AC85461-4	1.5	1.0	4.0	1.0	3.0	1.5	1.087
AC85548-1	3.5	1.5	5.0	2.5	4.5	2.5	1.079
AV77531-1	4.0	3.5	4.5	3.0	3.0	2.0	1.090
ND2008-2	1.5	1.5	4.0	1.0	2.5	1.5	1.088
ND2109-7	1.5	1.5	5.0	1.5	3.0	1.5	1.092
ND651-9	3.5	3.0	4.5	3.5	3.0	2.0	1.093
Atlantic	2.5	2.5	5.0	2.0	2.0	1.5	1.111
Gemchip	1.0	2.5	5.0	2.0	4.0	2.0	1.088
Norchip	2.0	1.0	4.0	2.0	3.0	2.0	1.088

<sup>1</sup>Chip color was rated using the Potato Chip/Snack Food Association 1-5 scale. Ratings of 2.5 or less are acceptable.

Table 4. Chipping evaluations by  
Borden, Inc.<sup>1</sup> - 1989.

Clone	Specific Gravity	Color <sup>2,3</sup> Jan. 19
A80559-2	1.104	1.0
AC80545-1	1.082	2.5
AC83282-2	1.089	3.5
AC83306-1	1.087	2.5
AC83311-1	1.096	1.5
AC83311-2	1.101	1.5
AC83311-5	1.077	1.0
AC83368-3	1.084	3.5
AC84545-2	1.093	6.0
AC84545-5	1.098	1.5
AC84552-2	1.081	2.0
AC84552-3	1.104	7.0
AC84601-1	1.082	2.5
AC84610-2	1.080	3.0
AC84610-5	1.095	2.0
AC85403-5	1.084	2.0
AC85403-12	1.082	2.0
AC85438-4	1.100	4.0
AC85438-5	1.093	5.0
AC85439-3	1.085	6.0
AC85461-1	1.076	3.5
AC85461-4	1.082	1.0
AC85548-1	1.077	3.0
AV77531-1	1.084	4.0
Atlantic	1.098	1.5
Gemchip	1.083	2.5
Norchip	1.079	2.5

<sup>1</sup>Data collected by Mr. Larry Anderson.

<sup>2</sup>Color was rated using the PCII 1-10 scale.  
Ratings of 1-4 acceptable, 5 marginal.

<sup>3</sup>Potatoes were harvested September 1-5  
and held at approximately 55-60°F prior to  
shipping September 29. Gradually cooled  
to 48-52°F by December 1.

Table 5. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for Western Regional Trial clones - 1989.

Clone	Yield (Cwt/A)				% Stand	Vine Maturity <sup>1</sup>	Specific Gravity	Stems/Plant	Tuber Shape & Skin Type <sup>2</sup>	
	Total	Total	US #1	%						
	>10 oz	<4 oz								
A7816-14	397	297	74.8	41	79	98	3.2	1.099	3.7	L, R
A7961-1	338	307	90.9	132	20	99	3.0	1.099	2.1	Ob, R
AC77101-1	412	317	76.4	77	82	100	2.0	1.089	5.7	Ob, R
AC78069-17	387	331	85.9	163	29	99	2.8	1.097	3.4	Ob, R
AC81198-11	444	286	65.5	95	75	99	3.0	1.094	5.6	Ob, R
A081216-1	366	267	72.2	61	93	97	3.0	1.098	4.0	L, R
A082283-1	466	337	72.3	90	104	96	3.5	1.104	4.0	L, R
A082611-7	358	260	72.9	60	77	96	2.8	1.096	2.8	L, R
BC0038-1	393	322	82.0	93	63	99	3.2	1.094	6.4	Ob, W
CO79018-11	341	281	82.6	52	45	99	3.0	1.091	3.4	Ob, R
CO8011-5	326	266	81.8	72	44	93	2.5	1.078	2.4	Ob, R
NDTX9-1068-11R	394	342	87.2	132	37	95	3.5	1.079	2.8	R, Re
TXND329-1	394	349	88.8	97	36	99	3.0	1.080	2.1	L, R
Centennial Russet	314	230	73.0	32	82	98	2.5	1.089	2.6	Ob, R
Lemhi Russet	388	306	78.9	98	70	97	3.0	1.102	3.0	L, R
Norgold Russet	299	231	77.1	18	64	95	1.0	1.081	3.6	Ob, R
Red LaSoda	458	372	81.3	78	51	100	1.8	1.083	2.6	R, Re
Russet Burbank	411	276	67.8	40	101	97	3.0	1.098	3.3	L, R
Sangre	419	354	84.6	38	62	99	2.2	1.080	3.5	R, Re
Mean	384	302	78.7	77	64	98	2.7	1.091	3.5	---
LSD <sup>3</sup> (0.05)	47	48	7.4	38	22	4	0.5	---	1.0	---

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

<sup>2</sup>Tuber shape: R=round; Ob=oblong; L=long. Skin type: R=russet; Re=red.

<sup>3</sup>Least significant difference.

Table 6. Grade defects for Western Regional Trial clones - 1989.

Clone	% External Defects <sup>1</sup>	External Defects Observed <sup>2</sup>	% Hollow Heart <sup>3</sup>
A7816-14	5.3	GC,MS*	0.0
A7961-1	3.1	GC,MS*,GR	2.7
AC77101-1	3.2	GC,MS*	2.6
AC78069-17	6.8	GC,MS*	0.2
AC81198-11	18.8	GC*,MS,GR	0.0
AO81216-1	1.5	SG,GC,MS*	0.8
AO82283-1	5.4	GC,MS*	0.8
AO82611-7	5.7	SG*,MS	0.3
BC0038-1	2.1	SG*,MS,GR	1.3
CO79018-11	4.4	GC*,MS	0.4
CO8011-5	4.7	SG,GC*,MS*	0.4
NDTX9-1068-11R	3.8	GC*,MS,GR	2.5
TXND329-1	2.1	GC,MS*	0.0
Centennial Russet	0.6	GC*	1.0
Lemhi Russet	3.0	SG,GC*,MS	1.0
Norgold Russet	1.2	SG*,MS*	3.5
Red LaSoda	7.7	GC*,MS,GR	5.7
Russet Burbank	8.4	SG*,GC,MS	0.6
Sangre	0.6	GC*,MS	0.0

<sup>1</sup>Percent external defects based on the proportion of the total sample weight with significant defects.

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

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

Table 7. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for Western Regional Chipping Trial clones - 1989.

Clone	Yield (Cwt/A)				% Stand	Vine Maturity <sup>1</sup>	Specific Gravity	Stems/Plant	Tuber Shape & Skin Type <sup>2</sup>
	Total	US #1		< 4 oz					
		Total	%						
A80559-2	408	331	81.0	86	99	3.8	1.123	3.1	R, W
AC80545-1	425	372	87.4	104	97	3.5	1.100	3.3	Ov, W
AC81592-2	387	344	88.9	126	99	2.0	1.082	4.1	R, W
AC83306-1	360	258	72.0	23	100	3.2	1.101	4.6	Ov, W
NDA2031-2	431	289	66.6	35	98	3.5	1.097	5.7	R, W
NDA2126-6	370	207	55.8	33	90	2.8	1.097	5.3	R, W
NDO1496-1	360	265	73.4	36	100	2.5	1.105	3.8	R, W
Atlantic	399	324	81.3	62	97	3.5	1.115	3.9	R, W
Gemchip	404	314	77.5	35	98	3.2	1.105	5.5	Ov, W
Norchip	284	219	77.1	20	99	2.2	1.090	3.0	R, W
Mean	383	292	76.1	56	98	3.0	1.102	4.2	---
LSD <sup>3</sup> (0.05)	53	56	6.5	32	5	0.5	---	1.2	---

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

<sup>2</sup>Tuber shape: R=round; Ov=oval. Skin type: W=white.

<sup>3</sup>Least significant difference.

Table 8. Grade defects for Western Regional Chipping Trial clones - 1989.

Clone	% External Defects <sup>1</sup>	External Defects Observed <sup>2</sup>	% Hollow Heart <sup>3</sup>
A80559-2	3.1	MS,GR*	0.0
AC80545-1	1.4	GC,MS*,GR*	0.0
AC81592-2	3.7	GC*,MS,GR	2.8
AC83306-1	5.5	GC*,MS,GR	0.4
NDA2031-2	0.7	GC,MS*,GR*	0.0
NDA2126-6	1.5	MS,GR*	1.2
NDO1496-1	0.2	GC*	0.0
Atlantic	0.7	GC*,MS	5.5
Gemchip	0.3	GC*,MS*	3.3
Norchip	5.4	GC*,MS	0.4

<sup>1</sup>Percent external defects based on the proportion of the total sample weight with significant defects.

<sup>2</sup>GC=growth crack; MS=misshapen; GR=green. Most prevalent defects for each clone are asterisked.

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

Table 9. Chip color<sup>1</sup> and specific gravity of Western Regional Chipping Trial entries - 1989.

Clone	4 wks/50°F		4 wks/50°F		Specific Gravity
	+6 wks/40°F	10 wks/50°F	+6 wks/40°F	+3 wks/60°F	
A80559-2	3.0	1.0	2.0	1.5	1.123
AC80545-1	3.0	1.5	2.0	1.0	1.100
AC81592-2	4.0	2.5	3.5	2.0	1.082
AC83306-1	2.5	2.0	2.0	1.0	1.101
NDA2031-2	2.5	1.5	2.0	1.0	1.097
NDA2126-6	4.0	2.5	3.5	3.0	1.097
NDO1496-1	1.5	1.5	1.5	1.0	1.105
Atlantic	2.0	2.0	1.5	1.5	1.115
Gemchip	3.0	2.5	3.0	2.0	1.105
Norchip	3.5	2.0	2.5	1.0	1.090

<sup>1</sup>Chip color was rated using the Potato Chip/Snack Food Assoc. 1-5 scale. Ratings of 2.5 or less are acceptable.

Table 10. Comparison of advanced selections with recently named and standard cultivars for yield, grade, specific gravity, and grade defects.

Clone	Usage	Total Yield (Cwt/A)	% US #1	Specific Gravity	% External Defects <sup>1</sup>	% Hollow Heart <sup>2</sup>
<b>*** Russets ***</b>						
AC77101-1	FM	381	83.5	1.084	2.6	0.8
CO8011-5	FM	342	82.8	1.074	2.9	0.1
Centennial Russet	FM	285	77.3	1.086	1.3	0.7
Century Russet	FM	399	83.9	1.085	3.3	0.0
Frontier Russet	FM/FRY	271	84.2	1.094	2.8	0.3
Norgold Russet	FM	296	75.5	1.079	0.4	0.9
Russet Burbank	FM/FRY	354	65.1	1.087	8.6	0.8
Russet Nugget	FM/FRY	346	78.3	1.098	2.0	0.5
<b>*** Whites ***</b>						
AC80545-1	CHIP	435	85.2	1.091	3.9	0.1
BC0038-1	FM/FRY/CHIP	355	75.8	1.089	8.4	0.3
Atlantic	CHIP	367	86.7	1.101	0.9	2.4
Gemchip	CHIP	382	82.3	1.092	2.0	0.7
Norchip	CHIP	331	73.9	1.085	5.4	0.3

<sup>1</sup>Includes defects such as growth crack, second growth, misshapen, and green.

<sup>2</sup>Based on tubers greater than 10 ounces.



Table 11. Yield, grade, stand, vine maturity, and PVS content of Centennial Russet mutations and the standard - 1989.

Clone	Yield (Cwt/A)					% Stand	Vine Maturity <sup>1</sup>	% Virus S
	Total	US #1			<4 oz			
		Total	%	>10 oz				
Standard	290	232	80.0	22	54	97	3.0	40
Flat Leaf	340	248	72.9	39	81	95	3.0	35
Pebble Leaf	291	203	69.5	15	87	98	3.0	99
LSD <sup>2</sup>	35 <sup>+</sup>	NS	7.4 <sup>+</sup>	18 <sup>*</sup>	23 <sup>*</sup>	NS	NS	30 <sup>*</sup>

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

<sup>2</sup>Least significant difference, NS=not significant, <sup>+</sup>P=0.10, \*P=0.05.