RESEARCH PROGRESS REPORT FOR 1987

"Potato Breeding and Selection"

Submitted to the

SLV Research Center Committee

and the

Area II Potato Administrative Committee

by

David G. Holm

San Luis Valley Research Center

RESEARCH PROGRESS REPORT FOR 1987

"Potato Breeding and Selection"

Submitted by

David G. Holm

San Luis Valley Research Center

Research was conducted in the following areas in 1987:

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) Sangre Selection Studies
d) Centennial Russet Mutation Studies

POTATO BREEDING

Thirty parental clones were intercrossed in 1987. Seeds from 155 combinations were obtained. Sixty seedling families were grown in the greenhouse, producing 6,088 tubers for initial selection in 1988. Surplus tubers were distributed to Idaho, Oregon, and Texas.

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

SEEDLING SELECTION AND CLONAL DEVELOPMENT

A total of 36,359 first-year seedlings were planted, with 357 being selected for further observation. Another 562 clones were in various stages of preliminary and intermediate testing. One hundred twenty-two of these clones were saved for further evaluation. Twenty-three advanced selections (18 russets, 4 chippers, and 1 long white) were saved and will be increased. Another 75 clones were maintained for breeding and other experimental purposes.

Advanced Yield Trial. Twenty-four clones, 21 advanced selections and three cultivars, were evaluated in the advanced yield trial. Results on

yield, grade, and other characteristics are summarized in Table 1. Information on grade defects is presented in Table 2.

Eight selections had greater total and US #1 yields than Russet Burbank. Of these, three are in final stages of seed increase prior to releasing to growers in 1989 for evaluation. These selections are: AC77101-1, BC0038-1, and CO8011-5. BC0038-1 is a long white with processing potential. AC77101-1 and CO8011-5 are both fresh market russets. Another selection, AC77226-13, may also be released for grower trials in 1988. It has excellent processing potential, but specific gravity may be low. These clones have been entered into the Western Regional Trials for 1988.

Chipping Studies. Twelve selections and two cultivars were evaluated for chipping potential at harvest and after various storage regimes. Specific gravity was determined at harvest. This data is presented in Table 3.

None of the selections produced acceptable chips after storage at 40°F or with reconditioning out of 40°F storage. Most clones produced acceptable chips out of the field and after most storage regimes except: AC81592-1, CO8286-1, MN12823, WNC521-12, and WNC672-2.

Borden, Inc. cooperated in testing many of our materials for chip color. Results are summarized in Table 4. Clones with color better than Norchip were: A80559-2, AC80369-1, AC80545-1, BR7093-24, and W842. AC80369-1 has a russet skin.

Western Regional Trial. This trial was grown at 12 locations in the Western United States. Eight selections and six cultivars were compared. Two clones, AC79100-1 and AC80369-1, were entered by Colorado.

Tables 5 and 6 present the data collected on the clones in the regional trial. Top rated clones for fresh market were: A76147-2, AC79100-1, CO08014-1, and NDTX9-1068-11R. Top rated clones for processing were AC80369-1 and CO08014-1.

Western Regional Chipping Trial. This was the second year for the regional chipping trial. This trial was grown at four locations. Six selections and two cultivars were compared.

Results of this trial are presented in Tables 7, 8, and 9. Overall top rated clones were: AC80545-1, CO81103-1, NDA1725-1, and BR7093-24. Chip color of all selections was equal to or better than one or both of the standards, Atlantic and Norchip.

Out-of-State Trials. Several clones are tested in other states each year. California continues to be the primary out-of-state testing location. Selections are evaluated in both observational and yield trials.

Twenty-four clones (20 russets, 3 chippers, and 1 long white) and the Sangre selections were tested in California in 1987. Advanced selections showing the most potential were: BC0038-1, CO8011-5, AC80545-1, AC79100-1,

and TC582-1. The yield potential of the Sangre selections was 57 cwt greater than the standard.

Several clones have already been sent to California and other areas for testing in 1988.

Grower Tests. Five potato clones were evaluated by growers in 1987. Three russets (AC77513-1, AC77652-1, and WNC567-1) were discarded after undergoing at least two years of evaluation. AC79100-1 was grower tested for the first time in 1987. It will be retested in 1988. TC582-1 was tested for the third year.

Data collected on the performance of AC79100-1 and TC582-1 is summarized in Table 11. Both of these selections have a greater total and US #1 yield potential than Centennial Russet. Percent US #1 yield and solids are better than Centennial Russet and Russet Burbank.

Grower evaluations of AC79100-1 and TC582-1 are presented in Tables 12 and 13. Characteristics rated were: Stand, emergence uniformity, vine vigor, tuber type, tuber size, uniformity of tuber size, grade defects, and skin set at harvest. Yield was estimated by each grower. The rating scale used was: 1 = poor; 2 = fair; 3 = equivalent to Centennial Russet or Russet Burbank; 4 = good; and 5 = excellent. Both of these clones were rated better than Centennial Russet and Russet Burbank overall.

Based on grower response and overall performance, TC582-1 will be named in early 1988. Currently the naming and release notice is being prepared. The name selected for TC582-1 was Russet Nugget because the tubers have a high solids content and their flesh is a light golden color with a high concentration of vitamin C and protein. Russet Nugget is a dual purpose potato because it can be used in the fresh market and also processed into french fries.

A chipper, AC80545-1, will be released for initial grower testing in 1988.

SANGRE SELECTION STUDIES

Work continued with the Sangre selections in 1987. Results are summarized in Table 10.

Overall yields were greater in 1987. Several clones yielded as well as selections 10, 11, and 14. However, none of these clones have performed as consistently as selections 10, 11, and 14 over four years of testing.

Additional data was collected on virus content of the 17 selections and the standard. As in 1987, none of the Sangre selections or the standard were infected with PVX. PVS infection ranged from 4 to 99%. PVS infection was not correlated with yield. Sangre-4 has had 0 and 4% PVS infection in 1986 and 1987 respectively. Perhaps this selection has some resistance to this virus.

Replicated yield comparisons with Sangre selections 10, 11, and 14 have been conducted in Weld County, Washington, Idaho, Texas, and California. Generally, the selections have performed better than the standard in these locations. Data will be summarized and reported on after one more year of testing in these locations.

Seed of selections 10, 11, and 14 was released to growers for planting in 1987. Grower response was very positive.

CENTENNIAL RUSSET MUTATION STUDIES

A study was initiated in 1987 to compare the performance of flat leaf and pebble leaf mutations with standard Centennial Russet. Results are presented in Table 14.

Total and US #1 yield of the pebble leaf plants was less than that of the standard and the flat leaf mutation. Percent PVX infection was significantly lower for the mutations. Percent PVS infection was lowest for flat leaf plants and greatest for pebble leaf plants.

PVX infection level was not correlated with total or US #1 yield. However, % PVS infection was positively correlated with total and US #1 yield.

Table 1. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for advanced yield trial clones - 1987.

Clone	Yield (Cwt/A)					%	Vine	Specific	Stems/	Tuber Shape
		US #1								
	Total	Total	%	>10 oz	<4 oz	Stand	Maturity[1]	Gravity	Plant	& Skin Type[2]
AC77101-1	428	379	88.6	101	41	96	2.0	1.080	3.2	L, R
AC77226-10	268	243	90.6	85	19	88	3.8	1.067	2.8	L, R
AC77226-13	309	277	89.6	100	28	90	3.5	1.069	3.8	L, R
AC77513-1	325	272	83.6	74	45	84	3.2	1.078	2.6	L, R
AC77652-1	298	240	80.3	39	58	93	3.0	1.071	4.6	Ob, R
AC7869-17	339	305	89.6	138	21	98	3.2	1.076	3.3	Ob, R
AC8024-5	527	440	83.4	128	66	99	3.2	1.085	3.9	Ob, R
AC81198-11	428	360	84.3	181	19	98	3.0	1.070	2.9	Ob, R
BC0038-1	411	327	79.9	86	37	97	3.2	1.085	4.2	L, W
BC0169-12	404	363	90.1	150	33	95	3.0	1.074	3.2	Ob, R
BC0224-3	365	291	79.8	41	72	97	3.0	1.087	4.2	L, R
C07918-11	375	330	88.0	109	28	94	3.8	1.075	2.1	Ob, R
C08011-5	401	366	91.4	90	34	97	3.0	1.070	2.8	Ob, R
C08138-6	339	291	85.9	83	45	98	2.2	1.079	4.5	L, R
C08182-1	308	272	88.4	71	32	94	2.0	1.079	3.0	L, R
C08190-1	418	377	90.1	86	35	98	2.2	1.078	3.4	Ob, R
C08195-4	333	286	86.0	70	40	100	2.5	1.091	3.6	Ob, R
MN10874	380	328	86.3	60	49	99	3.0	1.089	3.3	Ob, R
NDTX-1069-4RU	374	328	87.8	136	27	100	1.5	-----	2.5	Ob, R
TC582-1	328	270	81.8	57	53	96	4.0	1.089	2.8	Ob, R
WNC567-1	343	298	87.0	90	39	95	3.2	1.076	2.5	L, R
Centennial Russet	297	246	82.9	49	44	91	3.2	1.086	2.6	Ob, R
Russet Burbank	375	269	71.6	52	81	98	2.2	1.089	3.4	L, R
White Rose	499	410	82.3	157	70	99	2.2	1.083	3.2	L, W
Mean	370	315	85.4	93	42	96	2.9	1.079	3.3	-----
LSD (0.05)	43	43	5.7	38	15	7	0.5	-----	0.6	-----

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

[2]Tuber shape: Ob = oblong; L = long.
Skin type: R = russet; W = white.

Table 2. Grade defects for advanced yield trial clones - 1987.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC77101-1	1.9	MS*, GR	0.5
AC77226-10	2.4	GC, MS*	2.4
AC77226-13	1.6	GC*, MS	0.0
AC77513-1	2.6	GC, MS*	3.7
AC77652-1	0.3	MS*	0.0
AC7869-17	4.1	GC*, MS	0.0
AC8024-5	4.2	GC*, MS, GR	0.0
AC81198-11	10.9	GC*,MS	0.0
BC0038-1	11.2	MS, GR*	0.0
BC0169-12	1.8	MS*, GR	0.6
BC0224-3	0.5	MS*, GR	0.0
C07918-11	4.4	GC*, MS*,GR	0.0
C08011-5	0.2	MS*	0.0
C08138-6	0.6	SG, GR*	0.0
C08182-1	1.2	MS*, GR*	0.0
C08190-1	1.5	MS*	0.0
C08195-4	2.0	SG, GC*, MS	1.7
MN10874	0.6	GC*,MS	0.0
NDTX-1069-4RU	5.0	SG, GC*, MS	0.0
TC582-1	1.6	GC, MS*	0.0
WNC567-1	1.6	GC*, MS*	0.0
Centennial Russet	2.2	GC*, MS	0.0
Russet Burbank	6.7	SG*, GC, MS	1.9
White Rose	3.7	SG, GC, MS*, GR	0.0

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

[2]SG = second growth; GC = growth crack; MS = misshapen; 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 3. Chip color[1] and specific gravity of San Luis Valley chipping study entries - 1987.

Clone	At Harvest	3 wks 70°F	10 wks 40°F	10 wks 50°F	Reconditioned 3 wks/60°F 10 wks/40°F	Reconditioned 3 wks/60°F 10 wks/50°F	Specific Gravity
A80503-1	2.5	1.0	4.5	1.5	3.0	1.5	1.097
A80559-2	2.0	2.5	4.5	2.5	3.5	4.0	1.095
AC80545-1	2.0	2.0	5.0	3.0	4.0	2.5	1.073
AC81592-1	3.0	2.0	5.0	2.5	4.5	2.5	1.085
BR7093-24	1.0	1.0	5.0	3.0	4.5	2.0	1.082
CO81103-1	2.5	2.5	5.0	2.0	3.0	3.0	1.087
CO8286-1	3.0	2.0	5.0	3.5	4.0	2.5	1.087
MN12823	2.5	3.0	4.5	3.0	4.0	2.5	1.079
NDA1725-1	2.0	2.0	4.0	3.0	3.5	1.0	1.084
W842	1.0	1.5	4.5	1.5	3.0	1.0	1.098
WNC521-12	3.0	3.5	5.0	4.0	5.0	3.5	1.095
WNC672-2	3.5	3.0	5.0	2.5	4.0	2.5	1.088
Atlantic	2.0	2.5	5.0	4.0	4.0	2.0	1.093
Norchip	2.5	1.5	5.0	2.0	4.5	1.5	1.082

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

Table 4. Chip color evaluations by Borden, Inc.[1] - 1987.

Clone	Specific Gravity	Color[2] Sept. 7[3]	Color[2] Jan. 28[4]
W842	1.097	2.0	1.5
AC80369-1	1.085	1.5	2.0
BR7093-24	1.084	1.5	2.5
A80559-2	1.097	2.5	2.0
AC80545-1	1.077	2.0	2.5
Norchip	1.079	2.5	2.5
NDA1725-1	1.085	2.0	3.0
AC81592-2	1.088	3.5	2.5
C081103-1	1.088	2.0	4.0
AC83306-1	1.083	3.5	3.0
AC83305-2	1.074	3.0	3.5
A80503-1	1.098	3.0	4.0
C08286-1	1.087	3.5	4.0
Atlantic	1.096	3.0	5.5
C083122-1	1.090	4.0	5.0
AC83250-1	1.072	4.5	5.0
MN12823	1.078	4.0	6.0
C08398-1	1.093	5.0	7.0
C08343-1	1.079	7.0	—

[1]Data collected by Mr. Larry Anderson.

[2]Color was rated using the PCII 1-10 scale. Ratings of 1-4 acceptable, 5 marginal.

[3]Potatoes were harvested September 1.

[4]Stored at 60-70°F until October 1, then gradually cooled to 48-50°F by November 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 - 1987.

Clone	Yield (Cwt/A)					% Stand	Vine Maturity[1]	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type[2]
	Total	US #1								
		Total	%	>10 oz	<4 oz					
A76147-2	455	414	91.0	223	17	93	3.8	1.093	3.5	L, W
A7816-14	336	299	88.8	89	32	98	2.2	1.091	2.6	L, R
A7961-1	331	298	89.0	107	27	96	2.2	1.091	2.7	L, R
A79141-3	328	237	72.1	13	88	90	2.8	1.099	4.2	Ob, R
AC79100-1	427	390	91.5	142	33	93	4.0	1.094	4.6	L, R
AC80369-1	345	309	89.7	130	23	96	3.8	1.099	3.9	Ob, R
C008014-1	378	351	92.6	136	20	96	3.0	1.092	2.7	Ob, R
NDTX9-1068-11R	389	335	86.2	101	41	95	3.5	1.079	2.4	R, Re
Centennial Russet	254	216	85.0	29	36	91	3.0	1.086	2.6	Ob, R
Lemhi Russet	343	312	91.1	119	21	99	2.8	1.094	3.6	L, R
Norgold Russet	351	278	79.0	28	73	97	1.0	1.079	5.2	Ob, R
Red LaSoda	383	343	89.4	79	36	95	2.0	1.083	2.5	Ov, Re
Russet Burbank	356	254	71.5	31	83	96	3.0	1.089	3.6	L, R
Sangre	383	352	91.8	93	31	97	3.2	1.081	2.8	Ov, Re
Mean	361	313	86.3	94	40	95	2.9	1.089	3.3	------
LSD (0.05)	53	55	4.6	43	13	4	0.6	------	0.7	------

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

[2]Tuber shape: R = round; Ov = oval; Ob = oblong; L = long.
Skin type: R = russet; W = white; Re = red.

Table 6. Grade defects for Western Regional Trial clones - 1987.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
A76147-2	5.3	GC, MS*, GR*	0.0
A7816-14	1.4	GC*, MS*	0.0
A7961-1	1.9	SG, GC, MS*	0.0
A79141-3	0.7	GC*	0.0
AC79100-1	0.8	GC, MS*	0.0
AC80369-1	3.7	GC*, MS	0.0
C008014-1	1.9	MS*	0.0
NDTX9-1068-11R	3.2	GC*, MS	0.0
Centennial Russet	0.7	GC*	0.5
Lemhi Russet	2.7	GC*,MS	0.0
Norgold Russet	0.0		0.0
Red LaSoda	1.3	GC*, MS, GR	1.8
Russet Burbank	5.1	SG*, GC, MS	0.0
Sangre	0.0		0.0

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

[2]SG = second growth; GC = growth crack; MS = misshapen; 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 7. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for Western Regional Chipping Trial clones - 1987.

Clone	Yield (Cwt/A)					% Stand	Vine Maturity[1]	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type[2]
	Total	US #1								
		Total	%	>10 oz	<4 oz					
AC80545-1	476	423	89.0	163	39	96	3.2	1.100	2.8	R, W
BR7093-24	396	341	86.0	123	45	96	4.0	1.100	3.2	Ov, W
CO7918-15	312	297	95.2	126	13	99	2.5	1.081	2.2	Ob, W
CO81103-1	381	332	87.0	89	45	98	3.5	1.102	4.6	Ob, W
NDA1725-1	408	315	76.9	104	70	95	3.0	1.096	2.4	R, W
W842	268	209	78.1	24	54	98	3.0	1.101	2.6	Ov, W
Atlantic	395	366	92.4	135	22	96	3.8	1.104	2.8	R, W
Norchip	308	251	81.3	35	46	97	2.5	1.083	2.8	R, W
Mean	368	317	85.7	100	42	97	3.2	1.096	2.9	-----
LSD (0.05)	47	46	4.4	32	15	NS[3]	0.6	-----	0.5	-----

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

[2]Tuber shape: R = round; Ov = oval; Ob = oblong.
Skin type: W = white.

[3]Not significant.

Table 8. Grade defects for Western Regional Chipping Trial clones - 1987.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC80545-1	3.0	GC*, MS, GR	0.0
BR7093-24	2.6	GC, MS, GR*	0.0
CO7918-15	0.5	GR*	0.0
CO81103-1	1.1	MS*, GR	0.0
NDA1725-1	5.7	MS, GR*	0.0
W842	1.8	GC, MS*	0.0
Atlantic	1.8	GC, MS, GR*	0.9
Norchip	3.7	GC*, MS*, GR*	0.0

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

[2]GC = growth crack; MS = misshapen; 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 9. Chip color[1] and specific gravity of Western Regional Chipping Trial entries - 1987.

Clone	7 wks 40°F[2]	7 wks 50°F	Reconditioned 3 wks/60°F 7 wks/40°F	Reconditioned 3 wks/60°F 7 wks/50°F	Specific Gravity
AC80545-1	5.0	2.5	3.5	1.0	1.100
BR7093-24	4.5	3.0	4.0	1.5	1.100
C07918-15	4.5	1.5	4.5	2.5	1.081
C081103-1	4.5	2.5	4.0	2.0	1.102
NDA1725-1	4.0	2.0	3.5	2.0	1.096
W842	4.5	1.5	3.5	1.0	1.101
Atlantic	5.0	3.0	4.0	2.5	1.104
Norchip	5.0	2.5	4.5	2.5	1.083

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

[2]Samples were stored for 11 days at approximately 50°F prior to placing the samples in the various storage regimes.

Table 10. Yield, grade, stand, vine maturity, PVS content, and stem number per plant for 17 Sangre selections and the standard - 1987.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	% Stand	Vine Maturity[1]	% Virus S	Stems/ Plant
1	424	398	93.7	131	26	99	3.0	42	2.5
2	478	438	91.4	179	41	95	3.0	35	3.0
3	444	411	92.5	163	31	97	3.0	95	2.8
4	421	391	92.9	137	29	97	2.8	4	2.8
5	452	415	91.7	177	34	97	2.5	28	2.6
6	451	405	89.7	162	40	98	4.5	99	2.6
7	462	422	91.4	210	35	96	4.0	19	2.5
8	404	370	91.6	193	26	98	3.8	84	2.1
9	468	426	91.2	185	38	99	4.2	10	2.5
10	482	445	92.4	207	36	99	3.8	10	2.6
11	476	431	90.6	170	41	100	3.5	44	2.6
12	451	421	93.4	198	26	98	3.5	92	2.4
13	487	459	94.0	249	29	98	4.0	39	2.4
14	463	430	93.0	220	29	97	3.2	74	2.5
15	477	432	90.8	182	43	98	3.5	99	3.2
16	432	389	89.9	155	42	97	3.0	66	2.9
17	411	374	90.9	171	35	98	2.8	35	2.6
S[2]	371	336	90.6	158	34	95	3.0	25	2.8
Mean	448	411	91.8	180	34	98	3.4	50	2.6
LSD (0.05)	52	49	2.5	38	9	NS[3]	0.6	21	0.4

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

[2]Standard Sangre grown at the San Luis Valley Research Center.

[3]Not significant.

Table 11. Comparison of advanced numbered selections with Centennial Russet and Russet Burbank for yield, grade, specific gravity, maturity, and grade defects.

Clone	No. of Tests	Yield (Cwt/A) Total	Yield (Cwt/A) US #1	% US #1	Specific Gravity	Vine Maturity[1]	% External Defects[2]	% Hollow Heart[3]
AC79100-1	3	389	329	84.4	1.094	3.7	4.0	0.3
TC582-1	5	346	269	78.0	1.101	4.0	2.3	0.4
Centennial Russet	10	279	217	76.7	1.087	3.1	1.6	0.7
Russet Burbank	11	355	233	65.1	1.089	2.7	9.3	1.3

[1]Vine maturity: 1 = Very Early; 2 = Early; 3 = Medium; 4 = Late; 5 = Very Late.

[2]Includes defects such as growth crack, second growth, misshapen, and alligator hide.

[3]Based on tubers greater than 10 ounces.

Table 12. TC582-1 grower evaluation - 1986-87.

Characteristic	Compared to CR	Compared to RB
Stand	4.6	3.7
Emergence Uniformity	4.6	3.8
Vine Vigor	4.9	4.4
Tuber Type	4.4	4.5
Tuber Size	3.9	4.2
Uniformity of Tuber Size	4.0	4.2
Grade Defects	3.8	4.5
Skin Set at Harvest	2.6	3.2
Yield = 371 Cwt/A		
Mean	4.1	4.1

Table 13. AC79100-1 grower evaluation - 1987.

Characteristic	Compared to CR	Compared to RB
Stand	4.5	3.4
Emergence Uniformity	4.5	3.0
Vine Vigor	4.8	4.0
Tuber Type	4.8	4.6
Tuber Size	4.5	4.8
Uniformity of Tuber Size	4.5	4.0
Grade Defects	2.3	3.8
Skin Set at Harvest	3.5	3.2
Yield = 372 Cwt/A		
Mean	4.2	3.8

Table 14. Yield, grade, stand, vine maturity, and virus content of Centennial Russet mutations and the standard - 1987.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	% Stand	Vine Maturity[1]	% PVX	% PVS
Standard	298	270	90.6	59	28	95	3.0	62.5	31.2
Flat Leaf	313	266	85.3	58	46	98	3.5	0.0	7.5
Pebble Leaf	263	212	80.4	41	52	99	3.0	2.5	100
LSD (0.05)	33	23	5.6	NS[2]	19	3	NS	26.0	13.6

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

[2]Not significant.