Research Progress Report for 1991

"Potato Breeding and Selection"

Submitted to the

SLV Research Center Committee

and the

Colorado Potato Administrative Committee (Area II)

by

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RESEARCH PROGRESS REPORT FOR 1991

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Research was conducted in the following areas in 1991:

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) Russet Norkotah Selection Studies

POTATO BREEDING

Thirty-two parental clones were intercrossed in 1991. Seeds from 64 combinations were obtained. Sixty seedling families were grown in the greenhouse producing 9,478 tubers for initial field selection in 1992. Surplus tubers will be distributed to Idaho, Oregon, Texas, and Alberta, Canada.

Seedling tubers were obtained from Dr. J. J. Pavek, USDA-ARS, Aberdeen, Idaho; Dr. J. Creighton Miller, Texas A&M, Lubbock, Texas; Dr. Dermot Lynch, Agriculture Canada, Lethbridge, Alberta; Dr. Robert Johansen, North Dakota State University, Fargo, North Dakota, and Dr. Kathleen Haynes, USDA-ARS, Beltsville, Maryland.

SEEDLING SELECTION AND CLONAL DEVELOPMENT

A total of 80,300 first-year seedlings were planted, with 884 being selected for further observation. Another 1032 clones were in various stages of preliminary and intermediate testing. Two hundred thirty-six of these clones were saved for further evaluation. Twenty-three advanced selections (16 russets and 7 whites) were saved and will be increased. Another 143 clones were saved for breeding and other experimental purposes.

Advanced Yield Trial. Twenty-eight clones, 22 advanced selections and six 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.

Russet selections that had acceptable yield and grade that will be released to growers in the next two years pending results of continued testing are AC75430-1, AC83064-1, AC83064-6, AC83068-1, AC83172-1, and CO80011-5. AC75430-1 will be evaluated in the Western Regional Trials in 1992. Selections AC75430-1, AC83064-6, and AC83172-1 have processing potential.

Chipping Studies. Forty-one clones, 38 selections and 3 cultivars, were tested for chipping potential after various storage regimes. This information is presented in Table 3.

None of the clones produced acceptable chips after 7 weeks of 40F storage. However, 14 of the selections produced acceptable chips with reconditioning after storage at 40F. These selections would be classified as cold chippers.

Seventeen selections were chipped by Borden, Inc. Results are given in Table 4. Eleven selections produced acceptable chips on both evaluation dates.

Western Regional Trial. Fifteen selections and seven cultivars were grown in the Western Regional Trial. Selections entered by Colorado were AC78069-17, AC81198-11, CO81082-1, and CO82142-4. This cooperative trial was conducted at 3 locations in the Western United States. Tables 5 and 6 present the data collected on these selections in the Colorado trial.

Selections that have graduated from the trials after three years of testing with good processing potential are AC78069-17, AO82283-1, and AO82611-7.

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

Selections that show potential for release in the future are AC83306-1 and NDA2031-2. Clones that were in these trials in previous years and are in the process of commercial testing by growers in 1992 are A80559-2, AC80545-1, and NDO1496-1.

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. Increased testing emphasis is being developed in Texas and Arizona. Generally selections are evaluated in both observational and yield trials in these areas. Our cooperators in Texas are Dr. J. Creighton Miller, Jr. and Doug Smallwood, Texas A&M. Mr. Buzz Shahan is our cooperator in Arizona.

Twenty-five advanced selections (21 russets, 3 chippers, and 1 red) were tested in California in 1991. Several of these selections showed promise and will be retested in 1992.

Five advanced selections were tested in Arizona. AC78069-17 and CO80011-5 will be retested in acre lots in 1992.

AC80545-1 continues to look good in Colorado, California, Arizona, and Idaho in large commercial trials.

Grower Tests. Grower evaluations were conducted on four russets (AC78069-17, AC81198-11, CO80011-5, and CO81082-1) and one chipper (AC80545-1). Selection AC81198-11 was discarded from further testing. Testing will continue on AC78069-17, AC80545-1, CO80011-5, and CO81082-1 during 1992.

Selections to be released for initial grower evaluation in 1992 are AC75430-1 and CO82142-4. Both of these selections are russets. AC75430-1 is a dual purpose potato with fresh market and processing qualities. CO82142-4 is a fresh market selection.

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

Cultivar Releases. Ranger Russet (A7411-2) was released in 1991 jointly by the Idaho, Washington, Oregon and Colorado Agricultural Experiments Stations and the USDA-ARS. Ranger Russet is medium-late maturing potato with processing and fresh market qualities. It is very similar to Russet Burbank in appearance. A copy of the release notice for Ranger Russet is attached to the back of this report.

Growers recommended naming CO80011-5 and AC80545-1. CO80011-5 will be released by the Colorado Agricultural Experiment Station in late 1992 after another season of seed increase as a high yielding, medium-early maturing, fresh market potato. AC80545-1 clone was selected in Colorado and will be released in early 1992 jointly by the Colorado and Idaho Agricultural Experiment Stations and the USDA-ARS. AC80545-1 will be released as a chipping potato.

Century Russet (A74212-1) should also be named cooperatively with Oregon in 1992.

RUSSET NORKOTAH SELECTION STUDIES

Forty clonal selections of Russet Norkotah were selected from two tuber-united certified seed lots in 1990. These selections were increased and evaluated for vine vigor in 1991 (Table 11). Additionally another 10 selections were made from a seed lot at the SLV Research Center in 1991.

Nine selections appear to have increased vine vigor (at least one 3 rating for vine vigor). Yield trials will be initiated in 1993 when sufficient seed stocks have been developed.

Table 1. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for advanced yield trial clones - 1991.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	% Stand	Vine Maturity[1]	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type[2]
AC75430-1	362	291	80.3	113	54	98	3.5	1.101	3.0	Ob, R
AC82052-1	386	340	87.8	102	43	98	3.0	1.093	3.5	Ob, R
AC83044-1	306	206	67.3	16	40	99	3.0	1.089	2.5	Ob, R
AC83044-2	346	246	70.6	33	100	97	1.2	1.079	4.4	Ob, R
AC83064-1	422	372	88.5	175	42	99	3.2	1.081	3.7	L, R
AC83064-6	373	333	89.4	106	38	99	3.2	1.083	3.4	L, R
AC83068-1	473	383	81.0	82	76	99	3.5	1.092	4.4	L, R
AC83172-1	368	294	79.4	79	71	100	3.0	1.104	4.4	L, R
AC84028-4	324	247	76.1	25	76	96	2.0	1.079	3.6	L, R
AC84069-3	357	257	71.8	62	95	96	2.0	1.094	3.9	L, R
AC84413-4	401	266	66.2	28	129	99	2.0	1.084	7.1	Ob, R
AC84487-1	315	237	74.4	47	72	98	1.8	1.074	4.8	L, R
AC84638-1	431	360	83.6	74	57	99	2.8	1.077	4.5	R, Re
CO80011-5	363	289	79.6	66	58	97	2.0	1.075	3.2	L, R
CO83027-2	373	334	89.3	122	32	98	2.5	1.096	4.1	Ob, R
CO84074-2	404	333	82.6	55	57	97	3.5	1.082	2.9	Ob, R
CO84205-5	429	367	85.5	133	59	96	2.8	1.072	3.9	Ob, R
CO85026-4	316	281	88.7	96	31	97	3.8	1.093	2.4	L, R
CO85168-4	372	301	80.9	42	71	97	3.0	1.105	3.9	Ob, R
NDTX8-731-1R	392	363	92.6	182	20	97	2.5	1.073	1.8	R, Re
TX6-1216-1RU	310	254	81.7	54	54	98	1.0	1.076	4.4	Ob, R
TXAV657-27	439	358	81.5	87	66	98	2.8	1.099	5.2	Ob, R
Centennial Russet	289	223	76.8	16	66	97	3.0	1.081	3.2	Ob, R
Eide Russet	374	305	81.8	53	67	98	2.0	1.080	3.8	Ob, R
Russet Burbank	394	285	72.3	83	65	99	2.5	1.087	3.3	L, R
Russet Norkotah	293	240	81.6	59	49	97	1.0	1.076	3.6	L, R
Russet Nugget	369	314	84.6	94	48	97	3.5	1.110	3.4	Ob, R
Sangre	394	337	85.3	61	51	98	2.8	1.079	3.0	Ov, Re
Mean	371	300	80.8	77	60	98	2.6	1.086	3.8	-----
LSD[3] (0.05)	39	44	6.1	39	18	NS	0.7	-----	0.8	-----

[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; Re=red.

[3]Least significant difference.

Table 2. Grade defects for advanced yield trial clones - 1991.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
AC75430-1	5.4	SG,GC*,MS,GR	1.1
AC82052-1	1.0	SG*,GC,GR	0.0
AC83044-1	19.4	SG,GC*,MS	0.0
AC83044-2	0.0		0.0
AC83064-1	1.6	GC*,MS*	0.0
AC83064-6	0.5	GC*	0.9
AC83068-1	2.8	GC*,MS	1.7
AC83172-1	1.0	SG*,GC*,GR*	0.0
AC84028-4	0.3	MS*	0.0
AC84069-3	1.5	SG,MS*,GR	0.8
AC84413-4	1.4	GC,MS*	0.0
AC84487-1	2.2	GC*,MS	0.0
AC84638-1	3.1	GC*,MS	1.8
CO80011-5	4.5	GC*,MS*,GR	0.0
CO83027-2	2.1	GC*,MS	3.6
CO84074-2	3.4	GC*,MS	0.0
CO84205-5	0.6	GC*,MS*	0.0
CO85026-4	1.5	GC*,MS,GR	0.0
CO85168-4	0.0		1.1
NDTX8-731-1R	2.3	GC*,MS*	7.7
TX6-1216-1RU	0.6	GC,MS*	3.8
TXAV657-27	3.3	GC*,GR	0.0
Centennial Russet	0.4	MS*	0.4
Eide Russet	0.4	GC*,GR*	0.0
Russet Burbank	11.1	SG*,MS	2.3
Russet Norkotah	1.8	MS*,GR	0.0
Russet Nugget	2.0	SG*,GC,MS	0.0
Sangre	1.8	GC*,MS	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 - 1991.

Clone	7 wks 40F	7 wks 50F	7 wks/40F +3 wks/60F	7 wks/50F +3 wks/60F	Specific Gravity
A80559-2	3.0	2.0	2.5	1.0	1.104
AC80545-1	4.0	1.5	3.0	1.5	1.080
AC83306-1	3.5	2.0	2.0	2.5	1.081
AC83311-2	4.5	2.0	3.5	3.0	1.097
AC83311-5	5.0	3.0	3.5	4.0	1.081
AC84375-2	5.0	4.0	4.5	3.0	1.091
AC84610-2	4.0	1.5	3.5	2.5	1.080
AC84610-5	4.5	1.5	1.5	2.5	1.101
AC85438-4	4.0	2.0	3.0	2.0	1.092
AC86444-5	4.0	1.5	3.0	2.0	1.090
AC86449-1	3.5	1.0	1.5	1.5	1.099
AC86449-2	3.0	1.0	1.0	2.0	1.086
AC87057-1	4.0	1.5	4.0	1.5	1.089
AC87057-3	5.0	3.0	4.5	3.5	1.084
AC87057-8	4.0	2.5	4.0	2.0	1.090
AC87115-2	4.5	2.0	4.5	2.5	1.086
AC87313-3	3.5	1.5	1.5	1.0	1.094
AC87341-2	4.0	2.0	2.5	1.5	1.079
AC87345-2	4.0	3.0	4.0	1.5	1.087
ATX7-85404-8	4.0	1.0	2.0	1.5	1.090
BC0894-2	3.0	1.0	2.0	2.0	1.077
BC0997-1	5.0	3.0	5.0	3.0	1.079
CO84111-6	5.0	2.5	3.0	2.0	1.092
CO86106-3	4.5	2.0	4.0	1.5	1.072
CO86106-4	4.5	1.0	3.0	1.5	1.084
CO86224-1	4.0	2.5	2.5	2.5	1.091
CO87017-1	3.5	1.5	4.0	2.5	1.080
CO87017-5	3.5	1.5	3.5	1.0	1.088
CO87019-1	4.5	2.5	4.0	2.0	1.077
CO87047-1	5.0	2.5	5.0	2.5	1.075
CO87100-1	5.0	3.5	4.5	3.0	1.084
CO87106-1	4.0	2.5	3.5	3.5	1.090
CO87106-5	3.5	1.5	3.5	1.5	1.089
ND651-9	5.0	2.0	3.0	1.0	1.084
ND1995-1	3.0	1.0	1.5	1.0	1.093
ND2008-2	3.0	1.0	2.0	1.0	1.084
ND2109-7	4.5	1.0	3.0	1.0	1.087
NDO1496-1	4.0	1.5	2.0	1.5	1.085
Atlantic	4.0	1.5	3.0	1.5	1.101
Norchip	4.5	1.5	3.0	1.0	1.085
Snowden	4.0	1.5	2.0	1.0	1.081

[1]Chip color was rated using the Snack Food Association 1-5 scale. Ratings of $\leq$2.5 are acceptable.

Table 4. Chip color[1] and specific gravity evaluations - Borden, Inc.[2] - 1991.

Clone	Specific Gravity	Oct. 23[3]	Feb. 12[3]
AC80545-1	1.075	2.0	4.0
AC83306-1	1.078	4.0	3.5
AC83311-2	1.095	5.0	5.0
AC83311-5	1.081	5.0	3.5
AC84610-2	1.081	3.5	3.5
AC84610-5	1.105	2.0	2.5
AC85438-4	1.087	4.0	7.0
AC86444-5	1.089	2.0	2.5
AC86449-1	1.097	2.0	3.5
AC86449-2	1.090	4.0	2.0
ATX7-85404-8[4]	1.092	2.0	3.0
BC0894-2	1.078	1.0	1.0
CO84111-6	1.088	3.0	2.5
CO86106-3	1.077	4.5	3.0
CO86106-4	1.080	3.5	4.5
CO86224-1	1.093	5.0	5.0
NDO1496-1	1.089	2.0	2.0
Atlantic	1.098	2.5	3.0
Norchip	1.087	2.5	2.5

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

[2]Data collected by Mr. Larry Anderson.

[3]Potatoes were harvested September 2-4 and held at approximately 55-60F prior to chipping on October 23. Tubers were then gradually cooled to 48-50F for storage.

[4]Internal purple discoloration observed.

Table 5. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for Western Regional Trial clones - 1991.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	% Stand	Vine Maturity[1]	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type[2]
A74212-1	396	269	67.4	84	81	99	4.0	1.098	2.4	L, R
A81473-2	389	327	84.1	86	48	93	3.5	1.092	3.7	Ob, R
A82119-3	392	318	81.1	139	56	95	3.0	1.095	2.9	Ob, R
A82705-1	424	363	85.7	83	55	97	3.0	1.081	2.1	R, Re
AC78069-17	390	339	86.9	151	28	99	3.0	1.092	3.7	Ob, R
AC81198-11	425	317	74.1	167	46	99	2.8	1.085	3.9	Ob, R
AO82283-1	412	311	75.0	80	82	86	3.2	1.091	3.4	L, R
AO82611-7	426	335	78.4	126	66	100	2.5	1.095	2.7	L, R
AO83037-10	457	421	91.8	199	23	98	4.0	1.090	2.5	Ob, R
ATX6-84378-1RU	412	309	75.1	248	18	98	3.5	1.091	2.4	Ob, R
CO81082-1	269	217	80.8	56	52	86	2.0	1.077	3.2	L, R
CO82142-4	354	330	93.2	135	23	97	3.2	1.092	3.1	L, R
COO83008-1	334	285	85.6	110	34	98	3.0	1.098	2.8	L, R
ND671-4RU	354	255	71.9	51	91	97	2.0	1.072	3.6	L, R
ND1538-1RU	390	331	85.0	98	51	98	2.5	1.079	3.6	Ob, R
Centennial Russet	262	194	73.6	14	67	97	2.8	1.085	3.2	Ob, R
Lemhi Russet	387	282	72.7	79	80	99	2.8	1.094	5.0	L, R
Red LaSoda	456	365	80.0	137	45	99	2.0	1.076	3.0	R, Re
Russet Burbank	429	255	59.5	64	64	97	3.0	1.088	2.3	L, R
Russet Norkotah	269	222	82.6	58	41	99	1.2	1.073	2.8	L, R
Sangre	416	349	83.7	75	65	96	2.8	1.075	2.8	Ov, Re
Shepody	400	349	87.3	207	21	94	2.8	1.089	2.4	L, W
Mean	384	307	79.8	111	52	96	2.8	1.087	3.1	-----
LSD[3] (0.05)	60	64	7.3	54	19	5	0.6	-----	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: Ov=oval; Ob=oblong; L=long. Skin type: R=russet; W=white; Re=red.

[3]Least significant difference.

Table 6. Grade defects for Western Regional Trial clones - 1991.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
A74212-1	11.7	SG*,GC,MS	0.0
A81473-2	3.6	GC*,MS*	0.0
A82119-3	4.7	SG*,GC,MS*	0.0
A82705-1	1.2	GC*	0.0
AC78069-17	5.7	GC*,MS	0.0
AC81198-11	14.8	SG,GC*,MS	0.0
AO82283-1	4.5	SG,GC,MS*	0.0
AO82611-7	6.1	SG*,MS,GR	0.0
AO83037-10	3.1	SG,GC*,MS	0.0
ATX6-84378-1RU	20.7	SG,GC*	1.8
CO81082-1	0.0		1.2
CO82142-4	0.3	MS*	0.5
COO83008-1	4.3	SG,GC*,MS	0.0
ND671-4RU	2.3	GC*	0.6
ND1538-1RU	1.9	GC*,MS*	0.0
Centennial Russet	0.4	GC*	0.0
Lemhi Russet	6.5	GC*,MS	0.0
Red LaSoda	10.1	GC*,MS,GR	3.4
Russet Burbank	25.5	SG*,GC,MS	2.5
Russet Norkotah	2.3	SG,MS*	0.0
Sangre	0.4	GC*	0.0
Shepody	7.7	SG*,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 7. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for Western Regional Chipping Trial clones - 1991.

Clone	Yield (Cwt/A) Total	US #1 Total	US #1 %	US #1 >10 oz	US #1 <4 oz	% Stand	Vine Maturity[1]	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type[2]
A80559-2	433	379	87.6	97	39	97	3.2	1.121	3.8	R, W
AC80545-1	455	396	87.1	128	42	98	3.0	1.099	4.2	R, W
AC83306-1	472	352	74.8	69	59	98	3.2	1.100	4.0	R, W
AC83311-2	433	331	76.5	61	90	98	3.0	1.103	4.0	R, W
AC83311-5	322	283	88.0	107	35	95	2.0	1.075	3.1	Ov, W
AC84601-1	420	359	85.4	131	46	96	2.0	1.083	2.2	R, W
AC84610-2	340	321	94.1	95	16	97	2.5	1.078	2.5	Ov, W
AC84610-5	402	315	78.3	46	77	99	2.8	1.100	4.9	Ov, W
AC85438-4	383	267	70.0	31	78	99	2.5	1.094	3.4	R, W
CO84111-6	328	257	78.2	23	70	100	2.8	1.095	3.8	R, W
ND651-9	333	196	57.8	10	136	96	1.5	1.088	5.2	R, W
ND2109-7	292	194	65.9	13	96	99	1.0	1.088	4.4	Ov, W
NDA2031-2	498	358	71.9	40	130	96	3.0	1.092	4.5	Ov, W
Atlantic	372	329	88.6	109	35	94	3.5	1.101	2.8	R, W
Gemchip	389	349	89.5	93	36	96	3.0	1.091	3.3	Ov, W
Norchip	354	269	76.1	37	58	97	2.2	1.083	3.8	Ov, W
Snowden	371	277	74.2	35	94	97	3.0	1.101	4.0	R, W
Mean	388	308	79.1	66	67	97	2.6	1.094	3.8	-----
LSD[3] (0.05)	48	48	6.3	24	17	NS	0.7	-----	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. Skin type: W=white.

[3]Least significant difference. NS=not significant.

Table 8. Grade defects for Western Regional Chipping Trial clones - 1991.

Clone	% External Defects[1]	External Defects Observed[2]	% Hollow Heart[3]
A80559-2	3.4	SG,GC*,MS,GR*	0.4
AC80545-1	3.6	SG,GC*,GR	0.0
AC83306-1	12.7	GC*,MS,GR	0.0
AC83311-2	2.7	GC*,GR*	1.2
AC83311-5	1.1	SG*,MS,GR	1.0
AC84601-1	3.5	GC*,GR	0.4
AC84610-2	1.0	GC*	0.4
AC84610-5	2.3	GC*,GR	0.0
AC85438-4	9.8	GC*,MS,GR	0.0
CO84111-6	0.2	GR*	2.0
ND651-9	0.6	GC*,GR	0.0
ND2109-7	0.6	GC*,GR*	0.0
NDA2031-2	1.9	MS,GR*	0.0
Atlantic	1.9	GC,MS,GR*	5.2
Gemchip	1.2	GC,GR*	6.9
Norchip	7.7	GC*,MS,GR	0.0
Snowden	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 9. Chip color[1] and specific gravity for Western Regional Chipping Trial clones - 1991.

Clone	7 wks 40F	7 wks 50F	7 wks/40F +3 wks/60F	7 wks/50F +3 wks/60F	Specific Gravity
A80559-2	2.0	1.0	1.5	1.0	1.121
AC80545-1	4.0	1.0	3.0	1.0	1.099
AC83306-1	2.5	1.5	3.5	2.0	1.100
AC83311-2	5.0	1.5	2.5	1.5	1.103
AC83311-5	5.0	2.5	3.0	1.5	1.075
AC84601-1	3.0	2.0	1.5	2.5	1.083
AC84610-2	4.0	2.0	3.0	2.0	1.078
AC84610-5	4.5	1.5	1.5	1.5	1.100
AC85438-4	3.5	1.5	1.0	1.0	1.094
CO84111-6	4.0	2.0	2.0	2.5	1.095
ND651-9	4.5	2.0	2.5	1.0	1.088
ND2109-7	4.5	1.0	2.0	2.0	1.088
NDA2031-2	4.0	1.0	3.0	1.5	1.092
Atlantic	3.0	1.5	2.0	1.5	1.101
Gemchip	4.0	2.0	3.0	1.5	1.091
Norchip	4.0	2.0	3.0	1.0	1.083
Snowden	4.0	2.0	1.0	1.0	1.101

[1]Chip color was rated using the Snack Food Association 1-5 scale. Ratings of $\leq$2.5 are acceptable.

Table 10. Comparison of clones for yield, grade, maturity, specific gravity, and grade defects.

Clone	Usage[1]	Loc x Years	Total Yield (Cwt/A)	% US #1	Vine Maturity[2]	Specific Gravity	% External Defects[3]	% Hollow Heart[4]
Russets								
A74212-1	FM	5	399	83.9	3.3	1.083	3.3	0.0
CO80011-5	FM	6	363	81.9	2.3	1.074	3.1	0.1
AC78069-17	FM/FRY	5	383	87.6	3.3	1.086	4.6	0.4
CO81082-1	FM	5	336	85.0	2.2	1.076	0.6	0.8
AC75430-1	FM/FRY	4	399	85.8	3.2	1.094	2.3	1.1
CO82142-4	FM	4	383	91.1	3.8	1.089	0.9	0.5
Centennial Russet	FM	18	290	77.3	3.0	1.084	1.1	0.6
Frontier Russet	FM/FRY	3	271	84.2	2.0	1.089	2.8	0.3
Norgold Russet	FM	9	321	76.2	1.2	1.078	0.4	0.8
Ranger Russet	FM/FRY	3	371	86.0	3.4	1.089	2.3	0.0
Russet Burbank	FM/FRY	19	363	63.9	2.8	1.086	10.1	1.3
Russet Norkotah	FM	7	265	80.1	1.4	1.076	2.3	0.3
Russet Nugget	FM/FRY	9	357	79.3	3.9	1.098	1.8	0.4
Chippers								
AC80545-1	CHIP	6	445	83.4	3.7	1.090	3.4	0.1
Atlantic	CHIP	5	391	86.1	3.5	1.100	1.5	3.0
Gemchip	CHIP	8	398	83.6	3.4	1.090	1.6	1.9
Norchip	CHIP	11	330	74.3	1.9	1.083	6.2	0.4

[1]FM=fresh market, FRY=french fry.

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

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

[4]Based on tubers greater than 10 ounces.

Table 11. Vine vigor[1] ratings for Russet Norkotah line selections on three dates - 1991.

Clone	Date 8/6	8/13	8/20	Clone	Date 8/6	8/13	8/20
1[2]	1	1	1	23	1	1	1
2[2]	1	1	1	24	1	1	1
3	2	2	2	25	1	1	1
4	2	2	2	26	1	1	1
5	2	2	1	27	1	1	1
6	3	3	2	28	2	2	2
7	2	2	3	29	1	1	1
8	3	3	2	30	2	2	2
9	2	2	2	31	1	2	1
10	2	2	2	32	2	2	1
11	3	3	3	33	1	2	2
12	3	3	3	34	2	2	2
13	1	2	2	35	1	2	2
14	1	2	2	36	2	2	1
15	2	2	2	37	1	2	2
16	2	2	2	38	1	2	2
17	1	1	1	39	1	2	2
18	1	1	1	40	2	3	3
19[2]	1	2	2	41	2	3	3
20[2]	1	1	1	42	2	3	3
21	1	1	2	43	1	2	2
22	1	1	1	44	2	3	3

[1]Vine vigor is rated on a 1 to 3 scale with 3 being the most vigorous.

[2]Standard Russet Norkotah selections.